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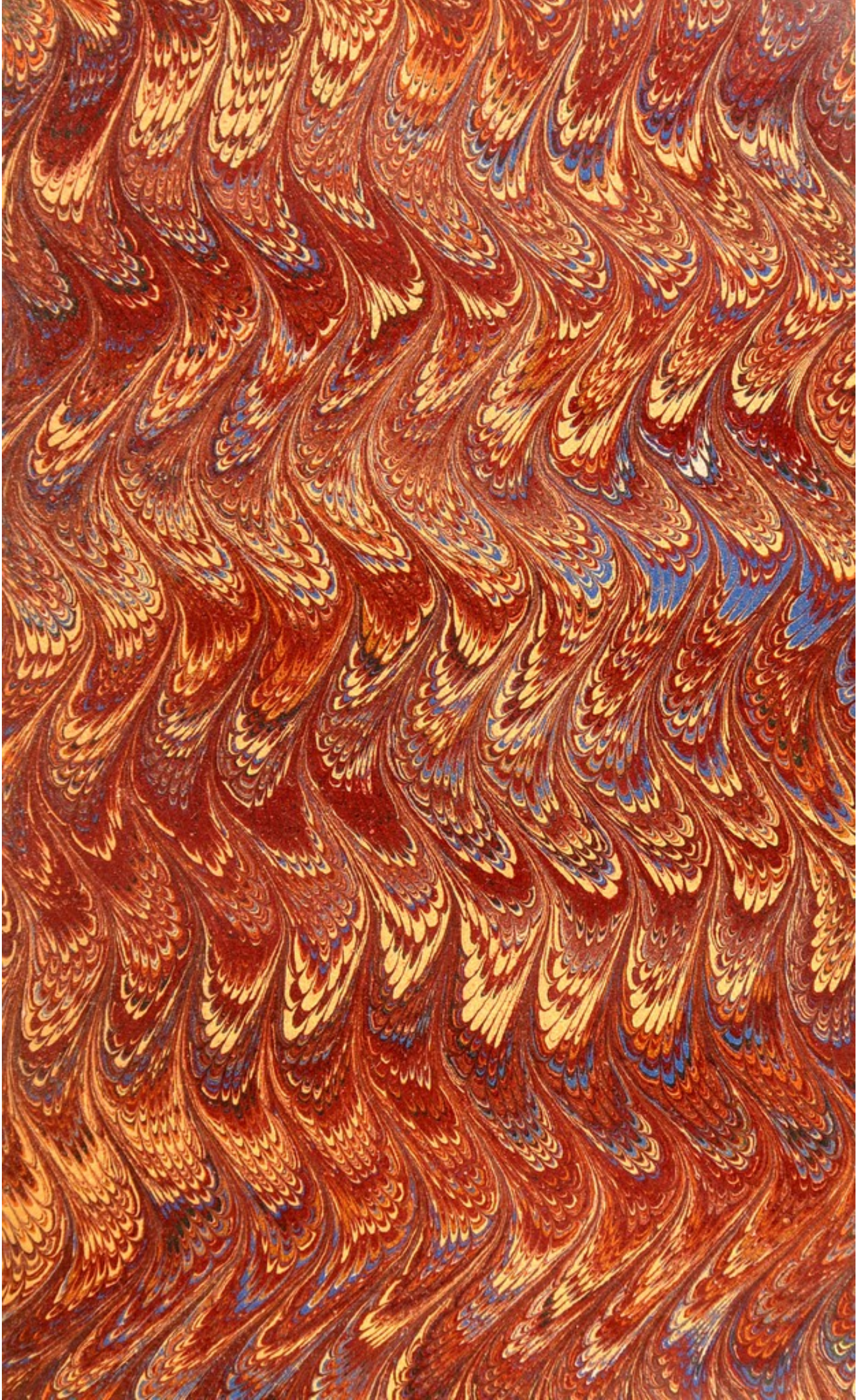

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THE

PRINCIPLES AND PRACTICE

OF

MEDICINE.

G. WOODFALL AND SON, ANGEL COURT, SKINNER STREET, LONDON.

THE

PRINCIPLES AND PRACTICE

OF

MEDICINE.

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Second Edition,

GREATLY ENLARGED AND IMPROVED.



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TO

HENRY, LORD BROUGHAM,

BARON BROUGHAM AND VAUX, F.R.S.,

MEMBER OF THE NATIONAL INSTITUTE OF FRANCE;

THE ABLE, LIBERAL, AND ENLIGHTENED PROMOTER OF KNOWLEDGE

IN ALL ITS DEPARTMENTS;

TO WHOM

THE LITERATURE OF THE COUNTRY IS INDEBTED FOR SOME

OF ITS BRIGHTEST ORNAMENTS;

AND

THE COUNTRY ITSELF FOR SOME OF ITS BEST LAWS;

WHOSE EXERTIONS

THROUGH THE PRESS, AT THE BAR, AND IN THE SENATE,

HAVE RAISED FOR HIM

"A MONUMENT MORE DURABLE THAN BRASS";

WITH

PROFOUND ADMIRATION OF HIS TRANSCENDENT TALENTS, BUT STILL GREATER

RESPECT FOR THEIR APPLICATION,

THIS VOLUME IS INSCRIBED,

BY HIS OBEDIENT SERVANT,

THE PUBLISHER.

PREFACE TO THE SECOND EDITION.

When this Work first appeared, it had to compete with several long established favourites, and to encounter some deeply rooted prejudices on the part of men who strongly dissented from Dr. Elliotson's views on certain subjects. In spite of these obstacles, however, its reception has been more flattering than we dared to anticipate. The first impression was rapidly exhausted; it became the favourite class-book in the majority of our Medical Schools; and even those who were formerly strongly prejudiced against it, have since acknowledged the practical information they have derived from its perusal. All this is highly satisfactory; and were any additional proof of its sterling worth required, it would be furnished by the fact that the Germans have published a translation.

In entering on the task of preparing for publication a Second Edition, we have been stimulated by the success of the first to fresh exertions, in order to render it (if possible) still more worthy of the approbation it has received. With a view to the accomplishment of this object, we have ventured on making certain additions and alterations; which, without materially increasing the size of the book, will (as we believe) materially enhance its value. Much care and discrimination were necessary in making these additions,—both as to the *materiel* to be selected, and the mode of its insertion; otherwise the book would have been injured, rather than improved. We have therefore been careful only to remedy obvious deficiencies, and to make such other additions as more recent researches had rendered necessary. The sources whence this supplementary matter has been taken are various; but we have of course been guided, to a great extent, by public opinion;—making our selections from those works which seemed best entitled to our confidence, for their general accuracy and soundness of doctrine. For the purpose of rendering these additions as useful as possible, it has been deemed advisable to insert them within brackets, in the text;—taking care, how-

ever, to preserve the continuity of the whole; and to acknowledge, in a foot-note, the source whence each quotation was derived. Some other illustrative extracts, often very interesting in a literary point of view, and all bearing on some medical observations in the text, have been inserted as foot-notes.

The alterations that have been made, though few, are such as have been dictated by a desire to consult the convenience of the Reader. The subjects have been grouped together, in conformity with Dr. Elliotson's own views; and divided into Parts, Books, Chapters, and Sections. Page-headings and side-titles have been introduced; and, together with a copious Index, will (it is hoped) enable the Reader to refer to any particular passage with perfect ease. We may also add, that the work has been printed with a smaller, though clear and distinct type;—for the purpose of enabling us to add about two hundred and fifty pages of new matter, without materially enhancing the size or price of the book.

These are the alterations we have deemed it necessary to make. In the performance of our task, we have been actuated (at every step) by a sincere and ardent wish to render the volume worthy of the reputation which Dr. Elliotson has so justly acquired, both as a teacher and Physician. In working out this design, we have received every assistance from the enterprising publisher, who has spared no expense either in the literary or the printing department;—being anxious to raise this distinguished member of his series of Medical Text-Books to a degree of excellence commensurate with the favour it has received. Whatever approbation or censure may be bestowed on our labours as Editors, we feel quite certain that the valuable materials contained in this book, will always meet with the respectful consideration due to genius and industry, when directed to the alleviation of human misery.

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THE

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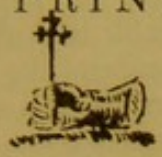
OF



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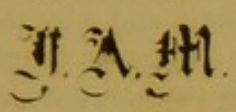

INTRODUCTION.

The Art of Medicine is to be perfected, I conceive, by improvements in our knowledge of the nature of diseases, by improvements in diagnosis, and by improvements in our acquaintance with remedies and their application.

Anatomy.—Improvements in our knowledge of the nature of diseases must be obtained through the cultivation of Anatomy and Physiology, and of Morbid Anatomy and Morbid Physiology; or, in other words, from an acquaintance with the derangements that take place in structure and function. It is evident that no one can be acquainted with a disease, unless he is acquainted, more or less, with the part diseased,—its situation, form, and structure; and the more accurate and minute his acquaintance with these, the greater, *cæteris paribus*, will generally be his knowledge of the nature of its lesions. I say "*cæteris paribus*"; because a knowledge of mere Anatomy, however accurate and minute, does not imply a knowledge of disease (its symptoms, history, and causes), or skill in treating it;—any more than a knowledge of the alphabet, and the ability to read, imply a literary character: and nothing can be more absurd than for the public to presume that a man is a good practitioner, *merely* because he is a good anatomist. An anatomist is not necessarily even a physiologist; and Mery was accustomed to say,—"We anatomists are like the porters of Paris; who are all well acquainted with all its streets, as well as all its lanes and alleys, but know nothing of what passes within the houses."[a] The most assiduous examination of only the dead body, can disclose but little of the functions and properties of the living. The structure of the brain would never teach us that it is the organ of feeling and thought; or of the kidney, that it produces a fluid containing lithic acid and urea. The sympathy existing between the nasal membrane and diaphragm, and between the kidneys and surface; the curious phenomena resulting from contagions and malaria; the various morbid actions to which various parts are liable (the innumerable diseases of the nervous system, for instance); the susceptibility of various parts to the operation of various agents during health (such as of the mouth to the operation of mercury, and of the stomach to that of ipecacuanha); the peculiar power of certain substances over certain diseases (as of quinina over intermittent fever);—all this would never be suspected at the dissecting-table. And I cannot refrain from remarking, that for any one to pride himself upon his knowledge of established Anatomy, would be exceedingly weak; as it requires no preparatory philosophical education, and no intellectual exertion; but merely the possession of eyes and memory, and a willingness to employ them. Dr. M'Culloch, in his powerful, though (I must be pardoned in saying) occasionally extravagant, work, apologizes for not arranging his cases anatomically; on the ground

[a] Rees's Cyclopædia; Article "Mery."

that it would have savoured of pedantry;—"a small pedantry", he says, "far too common; as if any man could not make himself master of Human Anatomy in a few weeks, as well as of any other tangible and demonstrable substances."[a] But if it would be laughable for any one to pride himself on his knowledge of Anatomy, it is culpable in a physician not to be a good anatomist. Otherwise he cannot comprehend the phenomena of many diseases. He cannot, for example, understand why, in partial paralysis of the head, sometimes only certain muscles cease to obey the will;—why loss of sensation sometimes occurs alone, and why to only a certain extent;—why the pain of neuralgia takes a particular course;—or why, in disease of the heart, unusual varieties of sound and impulse are observable in particular portions of the cardiac region. He cannot possess any but the most superficial knowledge of Morbid Anatomy; the cultivation of the far greater and more important part of which is peculiarly the duty of the physician, who treats the chief morbid states of the most important organs of the body; and not of the surgeon, who does not even witness their symptoms. He, will, therefore, either neglect to complete the investigation of his unsuccessful cases, by examination after death, or be unable to appreciate what presents itself, and perhaps be indebted to an active surgeon for information. He cannot otherwise be a good physiologist; for, although Anatomy alone will seldom teach the operations of an organ, these can manifestly not be known, unless the organ itself is understood.

Physiology.—The importance of Physiology requires no argument in its support; for, except in obvious structural or mechanical changes, the symptoms of disease are chiefly Morbid Physiology; and therefore, to quote the familiar passage of Galen,—"The magnitude of a disease is proportionate to its deviation from the natural state; and he only knows the extent of the deviation who knows exactly what is the natural state". Εἰς ὅσον γὰρ ἐξίσταται τῆς φύσεως ἕκαστον, εἰς τοσοῦτο καὶ μιγέθους ἥκει. Τὸ δ'ὅσον ἐξίσταται, γνῶναι δυνατὸν μόνῳ τῷ τὸ κατὰ φύσιν, ἀκριβῶς ἐπισταμένῳ.[b] And again, Μὴ δύνασθαι τίνα καλῶς ἰάσασθαι τὰ νοσήματα, πρὶν ὅλου τοῦ σώματος ἐπισκέψασθαι τὴν φύσιν.[c] Without a thorough acquaintance with both the natural structure and the functions, a thousand highly interesting deviations will never be recognised in the cases which come daily before us.

Pathology.—If such is the importance of Anatomy and Physiology to every physician, it will not be disputed that, in order to advance our knowledge of the nature of diseases, these sciences should be improved to the utmost. But however necessary these foundations (Anatomy and Physiology), the grand source of this knowledge is the observation of the phenomena of diseases,—their symptoms, history, and causes (in other words, Pathology), and of their structural lesions (in other words, Morbid Anotomy). No one expresses a doubt respecting the importance of Pathology;—the importance of observing the symptoms, and tracing the history of diseases; and of investigating their peculiarities, analogies, and causes. Yet, in all this, how liable are we to error! How patient and searching an eye is required to note all the phenomena of a disease;—to perceive what is essential to its existence, and what is only incidental!

[a] "Marsh Fever and Neuralgia"; Volume 2; Page 104.

[b] "As is the degree of deviation from nature, so is the magnitude at which the disease arrives; but the amount of this derangement can be ascertained only by him who is accurately acquainted with the natural state."—"*Methodus Medendi ad Glauconem*"; *Liber* 1; *Caput* 1.

[c] "It is impossible for any one to cure diseases perfectly, without having previously well examined the constitution of the whole body."—"*Methodus Medendi*"; *Liber* 1; *Caput* 1.

How profound a judgment to reason upon these phenomena, and to investigate their causes;—to discern the analogies between affections which, at first sight, are perfectly distinct! And, at the same time, how cool should be the judgment duly to appreciate all fanciful analogies, all hypothetical suggestions! Exactly the same difficulties surround Morbid Anatomy; but in its case they are alleged, by some, as objections to its prosecution. But how could any affection beneath the surface of the body have been understood, without an ocular investigation of the parts affected? How could pain in the chest, dyspnœa, cough, and pyrexia, have been known as signs of inflammation of the lungs or their membranes, unless the examination of persons who died under these symptoms, had proved such a lesion to be frequently their cause? If knowledge can be thus obtained, why not obtain the utmost possible? True it is, that incidental morbid appearances have often been mistaken as necessary and constant; and that some even pretty constant appearances have often been absurdly announced as the essence of the disease, when they were merely its effect, or (at the utmost) only among the number of its phenomena. Equally true it is, that changes after death have been mistaken for morbid appearances; as was pointed out by Dr. John Davy in the case of redness from imbibition of blood.[a] But such errors, surely, afford no reason for neglecting careful and extensive examinations of diseased parts, and drawing just inferences as to the connexion of the change of colour or structure with the disease;—they supply no reason for not cultivating so ample a field of knowledge scientifically. If a disease be accompanied by a change of structure or appearance *within* the body, surely this change, as a fact in the disease, is worthy of notice;—as worthy as *visible* changes in the skin, the mouth, or the eyes; which changes are always carefully described by these objectors, even when merely secondary effects; though they differ from the facts of Morbid Anatomy, only in the accident of being cognisable without dissection; while they are not a whit more necessary to a perfect history of a disease, and are much less in number;—owing to the circumstance of nearly all our organs being concealed from view. After some diseases, indeed, no change of structure or appearance is discernible. But even here, extensive anatomical investigation is important; for it often prevents us from forming groundless hypotheses, as to the seat and nature of such affections. Hydrophobia might be referred to the stomach, were it not that the red patches, which are sometimes seen in this organ after the disease, are frequently not to be detected. Tetanus might be thought always to arise from inflammation of the spinal marrow, were not this part frequently found free from inflammation in tetanic patients. It discloses to us a fact which we might otherwise have doubted;—that diseases may be only functional, as well as structural;—that, in the words of one of the most intelligent and industrious cultivators of Pathology and Morbid Anatomy (Dr. Andral),—"it is one of the most serious errors to which the ill-directed study of Morbid Anatomy can lead, to admit no other alteration in the economy, than those which are discoverable by the scalpel."[b] We learn, in short, to form a just estimate of Morbid Anatomy;—that it is an important part of the basis, but by no means the "*main* basis" of Pathology.

Diagnosis of Diseases.—But if our art is to be perfected by a better acquaintance with the nature of diseases, it is not less to be perfected by im-

[a] "Transactions of the Medical and Chirurgical Society of London"; Volume 10; Page 89.

[b] "Clinique Médicale"; Tome 3; Page 510.

provements in distinguishing them;—by improvements in diagnosis.[a] The diseases of the lungs and their membranes, are as well understood as any of the body; yet the best practitioners continually fail in distinguishing them. They often fail, for instance, to distinguish one form of chronic bronchitis from hydrothorax; the treatment of which diseases may be totally different. So important is diagnosis, that it has become a proverbial saying,—"The knowledge of a disease is half the cure." Diagnosis also is to be improved, not only by a better acqaintance with the symptoms and history of diseases, but by a better acquaintance with Morbid Anatomy; so that the correspondence between symptoms and local lesions may be established, and thus the affection clearly ascertained. As *Healthy* Anatomy is the foundation of *Morbid* Anatomy, and Physiology is the foundation of Pathology, the importance of these also to improvements in diagnosis is apparent.

Laennec's Discoveries.—The discoveries made by Laennec with respect to diseases of the heart and lungs[b], are great enough to entitle him to all the honours which have ever been acquired in our profession. He has enabled us to judge of diseases, which are otherwise often not distinguishable with certainty, or even at all; and this with an accuracy inconceivable to those who are unacquainted with his investigations. He has enabled us to distinguish diseases of the heart, which were formerly, and are still, too often either all expressed by the easy term—"disease of the heart",—without any specification of the part of this complicated organ affected; or are as often passed over entirely;—the case being mistaken for hydrothorax, or some pulmonary affection. He has also enabled us to distinguish diseases of the lungs which, in many cases, could not be pronounced upon with accuracy; and others of which the diagnosis was always uncertain. Moreover, we can point out the very part affected.

But Laennec's discoveries are objected to on the very ground of their accuracy. We are asked—"*Cui bono?*" ("Of what use are they?") The answer is plain. It is universally allowed that every disease should be described, and its nature ascertained, as accurately as possible. Now, with every advance in accuracy of description, and in knowledge of the source of symptoms, diagnosis imperceptibly and inevitably becomes more accurate. To condemn accurate *diagnosis*, therefore, is to condemn accurate *knowledge*;—to rest satisfied with imperfect information, when industry would give us more;—to admire ignorance, when knowledge is within our reach.

The art of diagnosis ought to be universally cultivated, without reference to its utility in particular instances. It is part of our science; every part must be cultivated for the perfection of the whole; and what may not be practically useful to-day, may become so to-morrow. How many discoveries in Chemistry and Physics appeared, at first, to be objects of mere curiosity; but have afterwards been applied to the most important purposes! Plato possessed so exalted a feeling for science on its own account,

[a] On this subject we beg to refer the reader to Dr. Marshall Hall's "Treatise on Diagnosis." It is now incorporated with his "Principles of the Theory and Practice of Medicine." Dr. Cowan, in his "Bedside Manual of Physical Diagnosis", has given, in a very portable form, the physical signs of the diseases which affect the following important parts:—1. Lungs and Pleura. 2. Heart and Pericardium. 3. Vascular System. 4. Abdomen, Osseous System, and Auditory Apparatus. The physical signs are chiefly furnished by auscultation and percussion.

[b] See his celebrated Treatise, entitled—"De l'Auscultation Mediate; ou Traité du Diagnostic des Maladies des Poumons et du Cœur; fondé principalement sur ce Nouveau Moyen d'Exploration." ("Treatise on the Diagnosis of Diseases of the Lungs and Heart; chiefly founded on a New Mode of Investigation,—Mediate Auscultation.") This work is principally known to the English reader through the medium of Dr. Forbes's Translation;—a work which is enriched with many valuable notes.

that he considered the applications of geometry to practical purposes, as far inferior to its philosophy[a]; and those who may see no reason for being so deeply enamoured of science as that, must allow that there is every reason to remember the words of Jesus, the son of Sirach:—"None may say—'What is this?'—'Wherefore is that?'—for, at time convenient, they shall all be sought out."[b] In improving diagnosis, it is impossible to discover only what is obviously useful. The research must be made generally; and what is at once useful, and what is not, must turn up together. In the diseases of other organs, we always aim at accuracy of diagnosis, without any hope of utility. When a solid tumor exists in the abdomen, we endeavour to ascertain whether it is the liver, the spleen, the pylorus, an ovarium, a new formation, or something else; although the treatment would probably be the same in all.

Auscultation and Percussion.—But there *is* immediate utility in the discoveries of Avenbrugger[c] and Laennec. No one will pretend that, in chronic diseases of the chest—with the exception, perhaps, of phthisis—the diagnosis is generally satisfactory. Before I adopted auscultation, I frequently discovered disease of the heart after death, where I had not previously suspected it; and frequently found the organ sound, when I had supposed it diseased. When I was correct in expecting to see organic affection of the heart, I was often wrong as to the precise nature of the lesion. Too often has auscultation at once revealed to me disease of the heart, when, by good practitioners, no affection of the heart, or even of the chest, had been suspected; or where the case had been named "nervous palpitation" or "asthma";—where the lungs had been regarded as the seat of the malady; or where the case had been treated with the most violent remedies for hydrothorax. Repeatedly have I seen chronic bronchitis with extreme congestion in the lungs mistaken for hydrothorax; and this was unavoidable, when percussion and auscultation were omitted; because the symptoms were precisely the same, with the exception of those which percussion and auscultation could alone disclose. Inflammation of the substance of the lungs often takes place during other diseases, without being obvious before death to any but the auscultator and percussor. Without the aid of the ear, who can distinguish emphysema of the lungs, or, in every case, pneumato-thorax?[d] Both may be readily mistaken for hydrothorax. The symptoms may be a pallid face, purple lips, orthopnœa, sud-

[a] Οὐκοῦν εἰ μὲν οὐσίαν ἀναγκάζει θιάσασθαι, προσήκει, εἰ δὲ γίνεσιν, οὐ προσήκει. ὡς γὰρ πράττοντές τε καὶ πράξιος ἕνεκα πάντας τοὺς λόγους ποιούμενοι λέγουσι, τετραγωνίζειν τε καὶ παρατείνειν καὶ προστιθέναι, καὶ πάντα δύτω φθεγγόμενοι· τὸ δ' ἐστί που τῶν τὸ μάθημα γνώσιος ἕνεκα ἐπιτηδευόμενον.—ΠΟΛΙΤΕΙΑ. Liber vii. ("We must not, therefore, if compelled to contemplate, on the one hand, an actual being, say—'It is fitting'; and if we contemplate, on the one hand, the origin of that being, say—'It is not fitting'; for they speak as intriguing advocates, who utter all their speeches with a sinister design;—squaring, stretching, adding, and asseverating without scruple; but every scientific pursuit is cultivated for the sake of knowledge.")

[b] "Ecclesiasticus"; Chapter 39; Verse 17.

[c] Avenbrugger's discovery was percussion; and his work on that subject, first given to the world in 1761, was entitled—"Inventum Novum, ex Percussione Thoracis Humani, ut Signo, Abstrusos Interni Pectoris Morbos Detegendi." ("A New Discovery for detecting Obscure Diseases of the Chest, by means of Percussion.") A translation of it is given in "Original Cases, with Dissections and Observations, illustrating the Use of the Stethoscope and Percussion in the Diagnosis of Diseases of the Chest. By John Forbes, M.D., Physician to the Chichester Dispensary."

[d] The name "*pneumo*-thorax", adopted from Itard by Laennec, is evidently improper. Such compound words are always made from the dative singular;—the final letter being changed into *o*, if it be any other vowel. We thus have "*utero*-gestation", "*cerebro*-spinal", and "*hemato*-cele." The geni-

den starting from sleep to the waking state, a small and intermitting pulse, cold extremities, and swollen feet. The remedies of hydrothorax may appear indicated; but the ear will discover, on percussion, a hollow sound—far *too* hollow a sound—in the chest, at its very lowest parts; while there is, in the first case, little respiratory murmur, and in the second none at all,—at the very place where the hollow sound is heard. Nothing but the ear can show the nature of these cases. Nothing but the ear can distinguish them from each other. Without the ear, no case can be known with certainty to be one of hydrothorax,—however marked the symptoms.

It has more than once happened to me, to be unable to form *any* opinion as to the nature of a disease, without auricular examination. Patients have complained of mere debility and loss of flesh, with slight general ailment; and have declared themselves free from all local symptoms:—so that nothing but the most random guess could be made at their disease. A minute examination of them has discovered nothing wrong, or nothing *materially* wrong, in the performance of the functions of the head, chest, or abdomen: but, on percussing the chest, the sound proved as dead in some part as if the thigh had been struck; and, applying the stethoscope, no respiration has been heard, or the voice has rushed through the instrument, or an unnatural sound has been heard in the heart; and thus the whole mystery has been at once cleared up. In truth, the exact state of the functions of the lungs and heart cannot be ascertained, except by the ear; and without an examination by its aid, no one is warranted in declaring these functions healthy. I once admitted a man into St. Thomas's Hospital, without any friend to give an account of him; and so deaf and stupid, that he could scarcely give any himself. He complained merely of occasional coldness, heat, and sweating, with debility; declared he had been ill but two or three weeks; and ascribed his complaint to sleeping in a damp bed at Gravesend. The case resembled remittent fever more than any thing else; and I treated it with sulphate of quinine. The symptoms of remittent fever yielded; but the debility remained, and even increased. I investigated the case minutely. There were no symptoms of phthisis, or of any other local disease, except convexity of the nails; but, on striking the chest, I found the right superior part give a dead sound; and in the centre of this I heard pectoriloquism. The case was then regarded as one of abundant tubercular deposition in the right lung, with an excavation in its centre; and the autopsy showed that the diagnosis was correct. The diagnosis, it is true, did not lead to a cure; but it prevented me from plaguing the patient with medicines, from an erroneous idea of the nature and seat of the disease; and it enabled me to give a correct prognosis. Even when there can exist no doubt in the mind of an able practitioner, as to the seat and nature of the disease, auscultation may prove a useful aid. In consultation, another practitioner, from a peculiar bias towards the heart, may consider the symptoms to arise from that organ; although they are evidently pulmonic, perhaps even phthisical; and *vice versâ*. Or perhaps he may refer unquestionable symptoms of organic pectoral disease in general, to the liver, or the digestive organs (according to the reigning folly of the day); as is done, continually, with affections of the head and spine. It may be impossible clearly to refute him by the ordinary means of diag-

tive and dative of αἷμα (*blood*) are αἵματος, αἵματι. The genitive and dative of πνευμα (*air*) are πνευματος, πνεύματι; and the compound word should be "*pneumato*-thorax." Indeed, we already have "*pneumatomphalos*", to signify a person with an umbilical hernia; and, what is still closer, we have the word "*pneumatocele*."

nosis; and yet auscultation may furnish some symptoms so decisive as to silence him.

Auscultation, however, can never justify us in the least neglect of the general symptoms and history of a disease. This would indeed be unphilosophical; for the symptoms of auscultation, are but one set among a number of others. But if it would be unphilosophical to neglect the general symptoms, it would be equally so to despise those which present themselves to the ear. If the functions of the heart and lungs are naturally performed with peculiar sounds, and if in diseases the sounds are altered, these deviations surely demand equal attention with those which are discernible by the other senses. Surely the physician requires all his senses for the acquisition of knowledge; as much as other prosecutors of natural science. We employ our eyes to discern the countenance and general aspect of our patients; the changes of the pectoral, intestinal, and renal secretions; and alterations in the colour, size, and figure of various parts. We employ our touch to examine the pulse; and to ascertain the preternatural presence of fluid, preternatural enlargement, diminution, or induration. Our smell gives us information as to the depraved secretions of fever, as to suppuration, and as to gangrene. In diabetes, some have even recourse to the sense of taste. Nay, certain symptoms observable by the ear only, are always carefully dwelt upon. Borborygmi, for instance, enter into the definition of hysteria; and all the varieties of cough and wheezing are described. Why, then, should such sounds as are elicited by striking the chest, or require the ear to be brought either into contact with it, or into connexion with it by means of a solid medium, be despised? The celebrated Hook not only did not despise the ear as an inlet of knowledge, but looked forward to the invention of acoustic instruments, which would enable it to make important discoveries. Indeed, he almost prophesied the stethoscope. "There may be a possibility", says he, "of discovering the internal motions and actions of bodies by the sound they make. Who knows but that, as in a watch we may hear the beating of the balance, and the running of the wheels, and the striking of the hammers, and the grating of the teeth, and multitudes of other noises,—who knows, I say, but that it may be possible to discover the motions of the internal parts of bodies (whether animal, vegetable, or mineral) by the sound they make;—that one may discover the works performed in the several offices and shops of a man's body; and thereby discover what engine is out of order, what works are going on at several times, and lie still at others, and the like. I could proceed further; but methinks I could hardly forbear to blush, when I consider how the most part of men will look upon this. But yet, again, I have this encouragement;—not to think all these things utterly impossible, though never so much derided by the generality of men, and never so seemingly mad, foolish, and fantastic;—that, as the thinking them impossible cannot much improve my knowledge, so the believing them possible may perhaps be an occasion for taking notice of such things as another would pass by without regard, as useless. And somewhat more of encouragement I have also from experience;—that I have been able to hear, very plainly, the beating of a man's heart; and 'tis common to hear the motion of the wind, to and fro, in the guts and other small vessels. The stopping in the lungs is easily discovered by the wheezing. As to the motion of the parts one amongst another, [in order] to their becoming sensible, they require either that their motions be increased, or that the organ [of hearing] be made more nice and powerful, to sensate and distin-

guish them as they are; for the doing of both which, I think it not impossible but that, in many cases, there may be helps found."[a]

Far be it from the defenders of auscultation and percussion to assert, that the diagnosis of thoracic diseases can never be doubtful. Skill in auscultation requires much application; and, even with the greatest, doubt will frequently exist. The stethoscope does not render the parietes of the chest transparent. Percussion and auscultation merely open a new set of symptoms to our notice; and, as diagnosis is certain in proportion to the number and nature of the facts on which it is founded, and the percussor and auscultator, with all the same means of judging as his opponents, possesses others in addition, he is better qualified to form an opinion; and, though he may sometimes still regret his want of certainty, he knows that by shutting his ears,—by levelling himself with his opponents, he augments his uncertainty a hundred-fold.[b]

The alleged errors of those who practice auscultation, are no arguments against it. Many tales of this description, like those of the errors of phrenologists, have, when traced to their origin, proved inaccurate, or even altogether destitute of truth; and eagerly to catch at them would betray a mind hoping that no fresh knowledge is to be attained. Persons, it must be remembered, who have no skill will pretend to it; and the skilful will sometimes give a hasty judgment; but, as in the case of Phrenology, nature is open to us all. Let us examine for ourselves—examine carefully and patiently;—not anxious to find auscultation a deception, but hoping to find the promise of new information fulfilled;—not unwilling to learn because we are no longer *in statu pupillari* ("in the rank of pupils");—not so high in our own estimation, as to feel indisposed to be taught by others;—not unphilosophical enough to have a hostile opinion upon a matter which observation must decide;—not guilty of the inconsistency of lamenting the imperfection of our art, and whining about its sad claim to the title of a conjectural art, while we are too indolent to investigate a method which professes to remove much of its uncertainty, is recommended by men of the greatest talent and the most intense application to the study of their profession, bears upon itself the stamp of probability, and the results of which are capable of being proved physically necessary.[c]

[a] "Method of improving Natural Philosophy." Posthumous Works; Page 39.

[b] Dr. Andral—who no where shows a disposition to overrate the value of auscultation, and is a highly-informed practical physician of the soundest judgment—says, in the preface to the second part of his "Clinique Médicale",—"Thanks especially to the wonderful discovery of Professor Laennec, the diagnosis of a great number of thoracic affections may be frequently established with as much accuracy as that of the least complicated luxation, or the simplest fracture. There is a certain number of pneumonic inflammations, in which we are able to follow the different phases of the alteration of the lungs, and their return to the healthy state, with as strict precision as the eye externally follows the different periods of the cicatrization of a wound. There are affections of the heart, in which the nature of the organic lesion may be determined by the sense of hearing, almost as accurately as the state of a cutaneous tumour may be ascertained by the eye, or the state of the neck of the womb by the touch. Clinical observation, however, meets with many cases in which diagnosis is very obscure; and others, in which the very nature of the affection is still a matter of dispute."

[c] I said, upon another occasion, that "the greatest discoveries have generally been at first ridiculed, and their authors, no less than all the truest benefactors of the human race, have been 'despised and rejected of men.' ('Prophecies of Isaiah'; Chapter 53; Verse 3.)

'Romulus, et Liber Pater, et cum Castore Pollux,
Dum terras hominumque colunt genus, aspera bella
Componunt, agros assignant, oppida condunt,

Therapeutics.—With respect to the third mode in which I conceive that our art must be perfected,—improvements in our knowledge of remedies

Ploravêre suis non respondere favorem
Speratum meritis.'

('Romulus, and Bacchus, and Castor, and Pollux, while dwelling among men, brought to a successful issue many difficult wars, distributed territories, and built cities; but they found that the gratitude excited, was not equal to the benefits conferred.'—*Horace's 'Epistles'; Book* 2; *Epistle* 1; *Lines* 5, 7, 8, 9, *and* 10.)

"Let us remember that Harvey, whose memory *we* honour, was dishonoured at first by his cotemporaries, for the discovery which immortalized his name;—that he lost his practice, and—so far from finding comfort among his brethren—left the country, and was lampooned from one end of Europe to the other; and that no English physician who had attained the age of forty at the time, ever (to the end of life) acknowledged the circulation of the blood. Let us remember that Sydenham, whose memory also *we* honour, was called a quack and a murderer by many of his cotemporaries; whose names, whatever bustle they made during their existence, have never once been mentioned since their death. Let us remember that the discovery of the lacteals was at first rejected with contempt;—that Bartholin, in a letter, says,—'There is not one among the doctors of Montpellier who acknowledges the lacteal vessels;—so wedded are they to the authority of Galen; for which they contend as though 'pro aris et focis' ('for their altars and homes'), and disregard the experiments of the moderns.' Let us remember that even old Harvey, when the thoracic duct was afterwards discovered, could not at once loosen himself from the bonds of early prejudice, and give up the prevailing belief that the lacteals all terminated in the liver; and that the very Bartholin who saw the folly of the Montpellier doctors, never believed in the exclusive office of the thoracic duct. Let us remember that, if the illustrious father of our modern philosophy, Lord Bacon, was not vilified and imprisoned (like Galileo) for announcing truth, he was represented by Cecil to Elizabeth, when she thought of making him her Solicitor-General, as 'a man of mere speculation';—as one wholly given up to philosophical enquiries,—*new*, indeed, and *amusing;* but *fanciful* and *unsound*; and therefore more likely to distract her affairs, than to serve her carefully and with proper judgment.'

"In ancient times, Horace saw his odes despised, because they were *new*. The public, he said,—

——— 'Nisi quæ terris semota, suisque
Temporibus defuncta videt, fastidit, et odit.'

('Neglects and dislikes every thing which does not relate to times long since passed away.'—*Horace's 'Epistles'; Book* 2; *Epistle* 1; *Lines* 21 *and* 22.)

'Est vetus atque probus, centum qui perficit annos'.

('He is ancient and excellent who has been dead a hundred years.'—*Horace's 'Epistles'; Book* 2; *Epistle* 1; *Line* 39.)

"But, like the illustrious Gall, Laennec is no more:—

'Extinctus amabitur idem'.

('He himself, when dead, will be beloved.'—*Horace's 'Epistles'; Book* 2; *Epistle* 1; *Line* 14.)"

I cannot forbear from making the following extract from the first volume of Gall's work "sur les Fonctions du Cerveau":—

"The followers of the different schools of philosophy among the Greeks, accused each other of impiety and perjury. The people, in their turn, detested the philosophers; and accused those who investigated principles, with presumptuously encroaching upon the rights of the Deity. The novelty of Pythagoras's opinions caused his banishment from Athens; those of Anaxagoras threw him into prison; the Abderites treated Democritus as a madman, because he dissected dead bodies, in order to discover the cause of insanity; and Socrates, for demonstrating the unity of God, was condemned to drink hemlock.

"The same scandal has been renewed at all times, and in all nations. Many of those who, in the fourteenth century, distinguished themselves by their knowledge of natural things, were put to death as magicians. Galileo, for proving the earth's motion, was imprisoned at the age of seventy. Those who first maintained the influence of climate upon the intellectual character of nations, were suspected of materialism.

"Universally, nature treats new truths and their discoverers in a singular but uniform manner. With what indignation and animosity have the greatest benefits been rejected! We may instance potatoes, Peruvian bark, vaccination, &c. As soon as Varolius made his anatomical discoveries, he was decried by Sylvius as the most infamous and ignorant madman. *Vesanum, litterarum imperitissimum, arrogantissimum, calumniatorem maledicentissimum, rerum om-*

and their application,—I must be brief. Much remains to be accomplished in the discovery, both of the virtues of medicines already in use, and of new medicines, or such modifications of old ones as almost entitle them to the epithet "new." Every advance in our knowledge of the essential nature of diseases, will (no doubt) enable us to improve our application of remedies upon general principles;—to improve our "general indications." But without any additional knowledge of the nature of diseases, cautious

nium ignarissimum, transfugam, impium, ingratum, monstrum ignorantiæ, impietatis exemplar perniciosissimum, quod pestilentiali halitu Europam venenat, &c. ('Mad, very deficient in learning, most arrogant, most slanderous calumniator, ignorant of every thing, a turn-coat, impious, ungrateful, a monster of ignorance, a most pernicious example of impiety, which poisons Europe with its pestilential breath', &c.) Varolius was reproached with dazzling his auditors by a seductive eloquence; and with artificially effecting the prolongation of the optic nerves as far as the thalami. Harvey, for maintaining the circulation of the blood, was treated as a visionary; and depravity went so far as to attempt his ruin with James and Charles the First. When it was no longer possible to shorten the optic nerve, or to arrest the course of the blood in its vessels, the honour of these discoveries was all at once given to Hippocrates. The physical truths announced by Linnæus, Buffon, the pious philosopher Bonnet, and George Le Roy, were represented as impieties likely to ruin religion and morality. Even the virtuous and generous Lavater was treated as a fatalist and materialist. Everywhere do fatalism and materialism, placed before the sanctuary of truth, make the world retire. Everywhere do those upon whose judgment the public relies, not merely ascribe to the author of a discovery the absurdities of their own prejudices; but they even renounce established truths, if contrary to their purposes; and revive ancient errors, if calculated to ruin the man who is in their way.

"This is a faithful picture of what has happened to me. I have, therefore, some reason to be proud of having experienced the same lot as men to whom the world is indebted for so great a mass of knowledge. It seems that nature has subjected all truths to persecution, in order to establish them the more firmly; for he who can snatch one from her, always presents a front of brass to the darts hurled against him, and has always force enough to defend and establish it. History shows us that all the efforts and sophisms which are directed against a truth once drawn from darkness, fall like dust blown by the winds against a rock.

"The instances of Aristotle and Descartes should particularly be quoted, when we wish to display the influence of prejudice upon the good or bad fortune of new doctrines. The opponents of Aristotle burnt his books. Afterwards, however, the books of Ramus, who had written against Aristotle, were burnt; the opponents of the philosopher of Stagira were declared heretics; and it was even forbidden by law to dispute his doctrines, under pain of being sent to the galleys. There is now no longer any discussion about the philosophy of Aristotle. Descartes was persecuted because he taught the innateness of ideas; and the University of Paris burnt his books. He had written the most sublime thoughts upon the existence of God; but Voët, his enemy, accused him of atheism. Afterwards, this same university declared itself in favour of innate ideas; and when Locke and Condillac attacked innate ideas, the cry of materialism and fatalism resounded on all sides.

"Thus, the same opinions have at one time been regarded as dangerous because they were new, and at another as useful because they were ancient. We must, therefore, pity mankind; and conclude that the opinions of cotemporaries as to the truth or error, and dangerous or innocent tendencies of a doctrine, are very suspicious; and that the author of a discovery should be anxious only to ascertain whether he has really discovered a truth or not." (Page 221.)

Gall might have added, in the words of Professor Playfair, that—notwithstanding "the splendour of Newton's discoveries, the beauty, the simplicity, and grandeur of the system they unfolded, and the demonstrative evidence by which that system was supported—the Cartesian system of vortices kept its ground for *more than thirty years* after the publication of those discoveries"; and that actually "the Newtonian philosophy first entered the University of Cambridge under the protection of the Cartesian", by a stratagem on the part of Dr. Samuel Clark; who quietly explained the views of Newton, without any appearance of argument or controversy, in the form of notes to a new translation which he published of the French Cartesian work, long established as a text-book by the tutors of the University.

Dr. Chalmers, speaking of the first reception of the Newtonian philosophy, says—"authority scowled upon it, taste was disgusted by it, and fashion was ashamed of it."

trials—guided by the best analogy we may discern, or by some fortuitous occurrence—will enable us (if we are disposed to labour) to effect much in extending our knowledge of the powers of particular remedies over particular diseases. Lord Bacon [a] regrets that physicians apply themselves so exclusively to general indications;—neglecting the peculiar properties of remedies in particular diseases. "Medici hujusce ætatis", he says, "licet generales intentiones curationum non malè persequantur; particulares tamen medicinas quæ ad curationes morborum singulorum proprietate quâdam spectant, aut non benè norunt, aut non religiosè observant." [b] He remarks that they merely go on, in their prescriptions, "addendo, et demendo, et mutando, circa medicinas, prout iis libitum fuerit; et ferè, pharmacopœorum more, quid pro quo substituendo" [c]; and he advises that some physicians "et eruditione et practicâ insignes, opus aliquod conficiant de medicinis probatis et experimentalibus ad morbos particulares." [d]

Such experimental facts, however insulated they may at first appear, gradually arrange themselves with others into general principles; and thus what is, at first, little better than empiricism, becomes science. I confess that I look with more hope to this source of improvement, than to any other.[e]

Medical Education in England.—From the want of a University, Medicine and Surgery were, for a long time, scarcely taught in London

[a] "Instauratio Magna."—First Part.

[b] "Physicians of the present day, it is probable, may fulfil the general indications of cure not inefficiently; but the particular medicines which, by some special property, are fitted for the cure of particular diseases, they either do not well know, or do not sufficiently regard."

[c] "Adding, diminishing, and changing medicines, as freely as possible; and generally, according to the custom of apothecaries, substituting one drug for another of similar value."

[d] "Eminent both for learning and experience, should prepare a work on the approved and the doubtful medicines, adapted to particular diseases."

[e] To such investigations, therefore, I have sedulously applied myself; and those of my results which were successful, are before the profession:—I. Cases illustrative of the Efficacy of Hydrocyanic Acid in Affections of the Stomach; with a General Report upon its Medical Powers. II. Some Facts respecting the Inertness of ordinary Antimonial Powder. III. The Use of Opium in Diabetes; and the Necessity of Varying the Doses of Medicines, in Various Circumstances. The foregoing were published, in the year 1820, in one octavo volume. IV. Nine Papers, published in the 12th, 13th, 15th, 16th, and 18th volumes of the Medico-Chirurgical Transactions, on the following subjects:—1. The Medical Properties of Quinine (Volume 12, Page 543). 2. The Use of the Sub-Carbonate of Iron in Chorea, and its General Properties (Volume 13, Pages 263 and 464). 3. The Use of Sub-Carbonate of Iron in Tetanus (Volume 15, Page 161). 4. The Use of Sulphate of Copper in Chronic Diarrhœa (Volume 13, Page 451). 5. Rupture of the Stomach (Volume 13, Page 26). 6. Fallopian-Tube Pregnancy (Volume 13, Page 51). 7. Glanders communicated from the Horse to the Human Subject (Volume 16, Page 171). 8. The Discharge of Fatty Matters from the Alimentary Canal and Urinary Passages (Volume 18, Page 67). 9. Additional Facts respecting Glanders in the Human Subject (Volume 18, Page 201). V. Lumleyan Lectures on "The Recent Improvements in the Art of Distinguishing the Various Diseases of the Heart." VI. Two Papers in the "Cyclopædia of Practical Medicine":—1. Acupuncture (Volume 1, Page 32). 2. Neuralgia (Volume 3, Page 165). VII. A Paper on Acupuncture, in the "Cyclopædia of Practical Surgery" (Volume I, Page 44).

I make this statement for the purpose of easy reference; as some of my friends wish me to collect into one volume these,—the whole of my professional attempts, except the English edition of Blumenbach's Physiology, and an Introductory Lecture upon State-Medicine [delivered in Mr. Grainger's Theatre, Southwark, on Thursday, November 1, 1821]; and I feel disinclined to follow their advice. [To the above list we may add Dr. Elliotson's Edinburgh Thesis (on Inflammation); his "Address delivered at the Opening of the Medical Session, in the University of London, October 1, 1832"; and a Letter "to the Gentlemen who composed Dr. Elliotson's Class of the Practice of Medicine, in University-College." (March 4, 1839.)]

at all;—notwithstanding the ample means presented by the population and the hospitals. The student was compelled to travel to France, Holland, Italy, or (in later times) to Germany or Scotland, for the purpose of acquiring a true professional education; for our own two Universities neglected almost entirely to teach medicine. It is doubtful whether this arose from the want of anatomical and clinical means, the hopelessness of rivalling the great continental and Scottish schools, or the idea that their proper end was to teach general knowledge,—to impart only what all educated persons should know; or from the circumstances mentioned in a powerful and remarkable article upon the Universities of England, in the one hundred and sixth number of the "Edinburgh Review":—the ascendancy of the Colleges over the University;—the subversion of the professorial system by the tutorial. "Time was", says the reviewer, "when the Colleges did not exist, and the University was there; and were the Colleges again abolished, the University would remain entire." When "the University was paramount, the cycle of instruction was distributed among a body of teachers, all professedly chosen from merit, and each concentrating his ability on a single object"; and "the whole youth of equal standing in the University, were daily collected into large classes under the same professor"; whereas "the Colleges and Halls are now elevated into so many little Universities"; into which "the students are distributed (with little regard to ability or standing) among some fifty tutors", who are "chosen from the fellows"; notwithstanding that "the fellowships were not founded for the purposes of teaching", and that "the fellow rarely owes his eligibility to merit alone, but, in the immense majority of cases, to fortuitous circumstances."[a]

Establishment of Medical Lectures in London.—The opportunities of teaching Anatomy, Surgery, and Medicine, in London, however, became at length too great to be entirely thrown away; and the surgeons of the hospitals began to deliver lectures on Anatomy and Surgery, and afterwards the physicians upon Medicine. These lectures were of limited extent; nor, for a time, were systems of courses delivered,—so as to constitute regular schools. The time, the trouble, and the expense of travelling to a University of medical reputation, rendered the emolument fairly to be expected on establishment in practice too high for the mass of the people to afford; and as population increased, and more practitioners were demanded, home medical instruction was sought after by greater numbers every year;—and this the more, as any one could practise without the license or authority of any University.

Establishment of Medical Schools.—The lectures improved, and at length regular schools were established; yet, as they were all private, and could confer no privileges or honours, those who required degrees went to the old celebrated schools; while those whose only resource was the private schools, had too limited pecuniary means to devote much above a year to public study; so that these metropolitan schools remained scanty and superficial. The whole of Anatomy, Physiology, and Morbid Anatomy together, was disposed of in a course of little more than three months; the Practice of Medicine, and the science of Chemistry, each in the same period, with only a lecture of one hour's duration three times a week. Much of General Pathology, and Forensic Medicine, was altogether omitted; the whole of Medical Police likewise, and the literature of the profession, were passed over. It was left for the University of London[b] to be bold enough to establish courses of six

[a] "Edinburgh Review", June, 1831; Volume 53; Pages 386, 387, 394, and 395.

[b] Now called "University-College."

months' duration; in which full scope would be afforded to the professors of laying before the student the whole body of medical science; to add the charms of varied illustration; to inculcate important points earnestly and repeatedly; and to introduce the student to an acquaintance with medical literature.

Advantages of Lectures.—The mode of instruction by lecture, though by no means sufficient of itself, is in my opinion of high importance. When a whole subject can be taught in a solitary course of lectures, and the exhibition of nothing is required,—so that a mere delivery of statement constitutes the whole task of the professor,—there can be no doubt that a good work, containing all the same information, might be studied in private with equal benefit; and, indeed, with this greater advantage;—that it would probably, after costing less, remain in the possession of the student, to be consulted by him whenever he might think fit. But when a circle of instruction is required,—when the subjects are numerous, and demand many courses of lectures, and many professors,—the student cannot be committed to himself. Without lectures he would become (almost to a certainty) bewildered;—studying at irregular intervals, wandering from one subject to another, and getting little fruit from any; whereas the attendance on various lectures, at stated hours, creates an excitement and an interest, as well as a regularity of habit, which are of incalculable utility.

Drawings and Specimens.—In our science and art, however, lectures are, on another account, of superior advantage,—indeed indispensable. One part of the office of every medical lecturer, is to describe objects of sense. The attempt to learn Anatomy, Physiology, Chemistry, Materia Medica, or Botany, would be ridiculous, without the inspection of the material objects, and the principal phenomena. Of the Practice of Medicine and the Practice of Surgery, the same is true. No professor, either of the one or of the other, can give his pupils a full idea of the phenomena of diseases, or of the administration of remedial means, unless he refer to patients exhibiting the various phenomena of disease, and subjected to the exercise of our art. As cases, however, cannot be had at pleasure, so as regularly to illustrate a systematic course of lectures, it is indispensable to deliver the general description and history of diseases and their treatment, in a distinct course; and to afford the illustrations from life in a totally separate manner, as they incidentally present themselves in a collection of patients. It is, therefore, essential that there should be both a general course, and clinical instruction. Yet, in the general course, material illustration is both possible and necessary. Representations of the various morbid changes (by copious and well-executed drawings, engravings, and models), and actual specimens of these changes, and all the material products of disease, it is the duty of a teacher to present and explain; although, when I was a student in Edinburgh, the professor of Medicine never exhibited a single drawing, or a morbid specimen.

Hospitals and Dispensaries.—For the other great mode of instruction in the Practice of Medicine and Surgery, an hospital is imperiously necessary. A dispensary must always be a miserable substitute for an hospital. No medical University would grant the degree of Doctor in Medicine, to any who had frequented merely a dispensary. At the latter the majority of patients are so little indisposed, as to be able to go about. When seen, they necessarily pass in rapid review before the practitioner;—giving him an opportunity of showing how practice may be despatched, rather than how disease should be investigated: for if the time demanded for the scientific

and patient investigation of each case, and for demonstration and explanation to the pupil, were given, the poor creatures would be compelled to lose, in attending at the charity, far more time than their condition in life or their strength would allow. There is, besides, among the patients of a dispensary, no certainty that medicine is regularly taken;—no possibility of fixing their diet;—no certainty of their continuing to attend, so that each case may be regularly followed up to its conclusion;—no possibility of making daily observations. When cases are severe, and the patients confined at home, there is not only the same uncertainty of strict attention to the injunctions respecting medicines and diet, but the student must lose a great deal of time in running from one house to another: and the physician or surgeon will not visit all such patients daily with his pupils; and, indeed, his pupils cannot accompany him in these visits, with any degree of regularity. In an hospital the patients are compelled to obey every injunction; and, being under the same roof, they may be seen at pleasure any hour of the day, without loss of time; so that long and repeated observation of their cases is easy.

When death occurs to a dispensary-patient, and an examination is permitted, the student loses still more time; for he must not only go to the house of the family, but prepare the body, and afterwards reinstate it; and, in all probability, will seldom be accompanied by the physician or surgeon. At hospitals the examination takes place without any loss of time; the student has nowhere to go; servants prepare, and sew up, and wash the body; and the physician or surgeon usually superintends the inspection. So superior are the advantages of hospitals, that, as I have already remarked, certificates of attendance upon them are required at all medical Universities, previously to examination for the doctorate; and although certificates of attendance at dispensaries are admitted by the Apothecaries' Company of London, and may be obtained at a cheaper rate than those of hospitals, the majority of English medical students voluntarily enter themselves to the medical practice of hospitals.

The inferiority of dispensaries is, indeed, acknowledged by their medical officers, in the greater cheapness of their terms; and the Apothecaries' Company declare it, in their demand of a longer attendance at them than at hospitals. It is, therefore, much to be lamented that the Apothecaries' Company admit dispensary-attendance at all; since if, of the short period enjoyed by the medical pupil for the public study of his profession, a certain portion is necessarily devoted to the observation of cases, that portion should evidently be spent in witnessing them in what is acknowledged to be the most efficient manner; and if eighteen months can be spared for attendance on *dispensary*-practice, they can be spared for witnessing *hospital*-practice. Those who cannot see the necessity of hospital-attendance, for the purpose of observing, without loss of time, the most important diseases, their minute investigation, and accurate and unrestrained treatment by the physician,—cannot but admit the necessity of hospital-attendance for the purpose of witnessing the great accidents, and operations of surgery. The College of Surgeons receives no certificates of attendance upon the surgical practice of dispensaries. If, therefore, the student must attend an hospital for half his experience, it is indisputably best that he should acquire the other half within the same walls.

I will not scruple to add, that I think the student pays too much for hospital-attendance in London; that the entrance should not be to medical or surgical practice alone, but to the whole range of the hospital; and that the sum which is paid to witness the surgical practice only, would be a

sufficient remuneration for the surgeons and physicians together; and I should rejoice to see the most meritorious among the senior students, rewarded gratuitously with the appointments of dressers to the surgeons, as well as of clinical assistants to the physicians.

Without an hospital, the professors who teach the practical part of the profession, not only are deprived of the means of properly instructing their pupils, but lose the great advantage of proving to them the truth of their statements, and the propriety of their precepts. One great source of my pleasure in teaching at St. Thomas's Hospital, was the opportunity of showing the pupils that I practised what I inculcated;—of rendering probable, or even proving to them, that what I advanced was true; and of referring from time to time, for illustrations of my descriptions, to cases which they had witnessed with me in the institution.

The last argument I will urge in favour of hospitals is, that they are also dispensaries. They have a dispensary-department, in which patients are attended to the same amount as at mere dispensaries. Besides all the inmates of St. Thomas's, the greater part of ten thousand out-patients are attended; and, although none are visited at home, this might readily be done without any farther trouble or expense, by the senior and best-informed students; to whom such a trust would be an incalculable benefit.

Large and Small Hospitals.—For the greater part of these important objects, a small hospital would be sufficient;—a hundred medical, and a hundred surgical beds. This number of well-selected cases, assiduously studied, would answer all ordinary purposes, as well as the four hundred and fifty-eight beds of St. Thomas's;—one half of the cases in which are imperfectly, or not at all known, to the pupils. An hospital of this extent might, I am inclined to believe, be conducted at less expense than is generally imagined. An important advantage, however, is inseparable from a large hospital;—not that of affording a large number of examples of the same affections, but of giving a probability of the occurrence of the more rare,—nay, of the rarest diseases, accidents, and operations, during the period every student frequents it. Besides the opportunity of becoming fully acquainted with all the ordinary cases of Medicine and Surgery, it is indispensable to a full and perfect education, that instances of every disease and accident which he may afterwards have to treat, should be witnessed by the student.

The most elaborate description of a disease, or mechanical derangement, not only falls short of conveying an adequate idea, but the conception gradually fades away; or, if retained, is frequently not recalled when, after a lapse of time, the disease so described chances to occur, and probably we do not recognise it till another person names the nature of the affection; or, if we suspect its nature, we still have our doubts. On the other hand, if diseases or accidents have once been seen,—"oculis subjecta fidelibus"[a], when they again present themselves, they are immediately recognised.

A striking exemplification of these remarks came under my observation when a student. A poor man, labouring under true scurvy, applied to a surgeon on account of the horrid state of his mouth;—his gums being swollen, spongy, and bleeding; his teeth loose, and his breath offensive. The surgeon, not having seen a case of scurvy, supposed the disease of the gums arose from a bad state of the teeth; and extracted several in succession. He was then sent to another, of high eminence and enormous

[a] "Submitted to the faithful eyes."—*Horace, on the Poetical Art; Line* 181.

practice, who pronounced it a case of fungus hæmatodes of the gums; and admitted him into his hospital;—intending to resign him to his fate. Being visited, however, by a practitioner who had witnessed scurvy at a naval hospital, the nature of the disease was at once recognised; some lemon-juice, fresh meat, and vegetables were prescribed; and he was well in a week or two. The surgeons, who were not aware of the nature of the complaint, were well-informed men; and the disease was one which all have heard of, and the leading symptoms of which are universally known. But, though formerly very prevalent and fatal in London, it is now uncommon; and thus, from not having witnessed it, these two gentlemen committed a serious error. It is also of great importance to the student, that he should have witnessed all the rarer accidents and surgical operations; and for this purpose a large hospital is indispensable.

General Education of Medical Men.—While I rejoice in the establishment of an English School of Medicine in this city[a], on a plan which, if well conducted, will render it equal to any, and far superior to most others, in the civilized world, I rejoice also that the School in question, forms part of a University. Nothing is more to be desired, than that those who go forth into the world to practise the healing art, should be men of excellent education. In most countries of the Continent this is the case. The great body of practitioners there, receive a general education at a University, previously to commencing the study of their profession. They in truth receive what ought to be the education of a physician; and they *are* physicians. In this country, those who carry on the great mass of practice,—those who, in addition to their original occupation of apothecary, have risen to the office, though not to the name, of physicians,—are indebted chiefly to their own exertions, for even their professional knowledge and skill. All the lectures, excepting perhaps those on Anatomy and Surgery, have been too scanty and superficial; and the clinical instruction has been conducted too generally in a most careless manner; so that clinical lectures were actually unknown in London a few years ago; and an extremely small number of those whose chief business in life was to practise medicine, ever thought of entering to the medical practice of an hospital, or even of a dispensary. No proper systematic method of practical instruction, whether medical or surgical,—no plan for intrusting the students with the charge of patients, is even yet established; and no better education is given by parents to those children intended for medical practitioners, than to those whom they destine for trade; and when the best part of general education should begin, the youth, with all his capabilities of literary and philosophical attainment, is hurried off to mix draughts and weigh powders, during the greater part of the day, for several years. The portion of time thus consumed, and the sum of money thus expended, would enable the youth of our profession to attain every acquirement of a high education. The young men who come to our schools, to prepare themselves for general practitioners, are, in the majority of instances, as gentlemanly in their sentiments and manners, as intelligent and anxious to learn everything that their instructors are disposed to teach them, as are those sent to Oxford or Cambridge,—as are young men of whatever station in society, and in the previous enjoyment of whatever advantages. I trust that, ere long, the five years' apprenticeship to learn the business of the dispenser will be abolished; and the youth will acquire a good classical education, a knowledge of the three great continental languages (French, German, and Italian), and no

[a] London.

inconsiderable acquaintance with Mathematics, Physics, and Mental Philosophy. By a change of plan, and by practicable facilities, I am confident that all this may be accomplished with no great increase of expense; and the young practitioner be ready for the commencement of his active career, at the age of two or three-and-twenty; ond no one will deny, that a given expenditure of money and of time, ought to be made to produce the greatest possible advantages. I hope that the Apothecaries' Company will, one day, rather require from those young gentlemen who go before them, testimonials of having received a respectable classical and mathematical education, and of being able to read the German, French, and Italian writers in the originals, with the possession of a share of Physics and Mental Philosophy; than of having consumed five years, when the mind thirsts most ardently for knowledge, in drug-mixing, or such poor and desultory instruction as a private practitioner has time to bestow; and which must be as nothing before they begin, systematically and practically, to learn Anatomy, Physiology, and Chemistry, at a public school.

An eminent scientific professor at Utrecht, in a pamphlet published in English by Mr. Faraday, in answer to Mr. Babbage's complaint that science is on the decline among us, says :—" There are countries in Europe where no young man could think of studying Medicine, Mathematics, or Natural Science, with the help of Latin only; and without being prepared, before entering the University, with a sufficient knowledge of German, English, and French. The ignorance of foreign science in England, cannot be attributed to want of zeal, but to a defect in English education,—the ignorance of foreign languages.

If it be alleged that an improvement in education, will make the general practitioner equal in knowledge to the physician,—" Then", it may be answered, " so much the better." I have no desire that the importance of physicians should be maintained by the depression of the general practitioner. If the physician is to continue as superior to the general practitioner as he formerly was, he must progress in the same proportion; he must not think of preventing the advance of the general practitioner; he must also step forward himself, to maintain his advantage. The physician who devotes himself to a limited sphere, and whose means allow him to appropriate more time than the general practitioner to his literary and scientific education, and to the subsequent study of his profession; and who—exempt, while in practice, from the toils of Midwifery, and the distractions which beset the ordinary practitioner—employs those advantages as his sense of duty may dictate,—he will thus acquire every reasonable ascendancy; and general practitioners will gladly avail themselves of his assistance, and recognise him as the supporter of the respectability of the profession. The mass of the middle classes of society, has begun a great movement in the acquisition of knowledge, in the discovery of rights, in the correction of absurdities, and in virtue and liberality of sentiment. The higher orders see the impossibility of arresting this progress; and titles and decorations will no longer command notice, unless supported by real excellence. Among the higher ranks there are some who, so far from viewing this upward movement with dread, step forward to promote it. So ought physicians to act towards the general practitioner;—to make every effort to improve his general education, and professional knowledge. In fact, all those who lecture or practise at public institutions, act (whether they will or not) contrary to the narrow views of interest; for they are occupied in imparting knowledge to the rising generation of general practitioners;—occupied in endeavouring to make them as learned as themselves.

In *me* such narrow views would be the height of baseness, and would be the height of ingratitude; for I hesitate not to avow,—I rejoice in this public opportunity of declaring, that to the general practitioners of England, Scotland, and Ireland, I am indebted for success in my profession. When I commenced my professional career, I determined upon seeking for success by working hard; and by conducting myself as well as the infirmity of human nature would allow. I determined, however long I might wait for success, never to fawn upon and run after my superiors, nor to stoop meanly to my inferiors; never to intrigue for an advantage, nor to employ trumpery artifices for making myself known to the public. For many years I toiled; and saw most of my contemporaries,—nay, of my juniors (who worked less, but were wiser in their generation) pass by me. I published work after work,—edition after edition; and paper after paper was honoured with a place in the Transactions of the first Medical Society in Europe.[a] I was physician to a large metropolitan hospital; and had attended there, and gratuitously out of doors, above twenty thousand patients. But in vain. In the year 1828 my profession was no more lucrative to me than in 1818, and was as short of my actual expenses. At that time the "Lancet" was pleased, now and then, to publish a clinical lecture, delivered by me at St. Thomas's[b]; and my practice at once doubled. The following year it published the greater part as I delivered them[c]; and my practice doubled again. Next season[d], the "Lancet" published them all; the "Medical Gazette"[e] followed its example; and my practice doubled a third time. This astonished me the more, as my clinical lectures were generally delivered with little or no premeditation; while all that I published myself had cost me great labour, many a headach, and much "midnight-oil." It was through the general practitioners, in the large majority of instances, and through general practitioners (for the most part) with whom I had not the honour of any acquaintance, that the publication of those lectures accomplished my success. To the body of general practitioners, therefore, I owe a debt of gratitude. They have called me forth spontaneously, from no interested motive; and I cannot exert myself too much in the education of their successors.

Books.—Young men are generally frightened on hearing the almost countless names of medical authors; or on beholding the array of volumes in public professional libraries; and a melancholy, amounting even to despair, has seized many an upright and inquiring youthful mind. Should any one be suffering from this anxiety, let him take comfort from my sincere assurance, that very few of these volumes need ever be opened. The greater part are full of absurd hypotheses, narratives at present comparatively unimportant, and exploded practice. Many are little more than copies and compilations from others; and the real good that exists in them all, is to be found in the best modern treatises. Except authors and teachers, few can have a necessity, in the whole course of their lives, for poring over these ponderous tomes. Students, indeed, I am thoroughly persuaded, should never read any but elementary works; and their whole library cannot, with any propriety, amount to twenty volumes. One good work on Anatomy, one on Physiology, one on Chemistry, one on Botany, one on

[a] "The Medical and Chirurgical Society of London." See Volumes 12, 13, 15, 16, and 18 of their "Transactions."

[b] See the "Lancet" for the Session 1828–9.

[c] See the two volumes of the "Lancet" for 1829–30.

[d] The season 1830–31.

[e] See Volumes 7 and 8 of the "Medical Gazette."

Materia Medica, one on Midwifery, one on the Practice of Medicine, one on Surgery, and one upon State-Medicine, should, in my opinion, constitute nearly the whole of a student's library. The design of his education is to fill his head, not with opinions and strange facts, but with solid truth; and if, after three or four years' close study, with the assistance of a regular attendance on lectures on all these subjects, and of unwearied observation in the wards and in the dissecting-room, he fully comprehends the contents of these few works, and deposits them in the storehouse of his memory, he will have done well, and will be prepared to practise his profession with honour.

GENERAL PATHOLOGY.

General Law of Mutability.—It appears to be a law of the universe, that every thing shall undergo incessant change. Whether the universe be eternal or not;—whether we believe it has existed (according to the opinions of some ancient philosophers) from eternity, and is to exist to eternity; or whether we are so to understand Scripture, as that not only the arrangement of all things, but all things themselves, had a beginning, and must have an end,—however this may be, while the universe is in existence, it appears to be the law of the Creator that every thing in it shall undergo incessant change.

Both the animate and the inanimate world are in this predicament. The most minute aggregate of matter, and the largest material bodies, appear only destined for certain periods of continuation in their existing state. With respect to our own earth, we see that countries are continually lessened and destroyed by the encroachments of the sea and by eruptions; and, on the other hand, from similar circumstances, other countries are produced. It is probable, therefore, that the appearance of the earth at present, is totally different from what it once was, and that after a period it will be totally different from what it now is. Even with respect to other worlds, there is every reason for astronomers to believe, that many have been destroyed; and that some worlds which are now seen, are but fragments of others which have been broken to pieces.

Period of Existence Limited.—With respect to the animated part of the creation, every vegetable,—every animal, has but a limited period destined for its existence. This period varies exceedingly; for some animals are destined to live but a few hours, while others, again, appear to live for centuries.

But besides this definite period, every animated being is liable to be cut off long before its natural period arrives. Animals and vegetables are all exposed to violence of every description;—not only to *mechanical* violence, but to the destructive operation of a thousand causes; and to disturbance from the cessation of the circumstances which are necessary to their existence. One animal is destined to devour another while in its prime; nay, to destroy the element of what would be the young (the eggs, for example) of another; and myriads of insects are continually destroyed in storms. Constantly, therefore, the limit which Providence appears to have placed to every thing is curtailed. Every animal and vegetable is subject to be cut short long before that limit is reached; so that there appears to be a perpetual struggling throughout nature;—the Creator having, on the one hand, invested every animated being (whether vegetable or animal) with a power to exist for a certain time, and to resist injurious agencies; and having provided, on the other hand, injurious agencies without number, to injure and to cut it off before its time.

It has been said by some philosophers that, looking at man, one would suppose he was destined to live to all eternity;—that, at first sight, such a machine as the human body, unless destroyed by external violence, would appear capable of lasting for ever. And by experience alone we are taught the contrary. "Primo statim aspectu, talis machina, nisi fortè causâ aliquâ externâ corrupta vel læsa, in omne œvum durabilis videtur. Et quidem

solâ experientiâ contrarium docemur."[a] However, there is nothing in the appearance of the human machine which would lead us to suppose that it could last for ever. Whatever we know of nature, can be learned only from experience; and it would be as correct to say, that because it is summer we should believe it will be summer for ever, or because it is day we should believe it will be day for ever, unless we have contrary experience, as it would be to say, that the human machine in itself appears capable of lasting for ever. We can learn nothing from taking a partial view of things; for it is impossible to form a judgment of nature, except by taking a continuous and enlarged view. It would also be contrary to all analogy, to suppose that the human machine is capable of lasting to eternity.

SECTION I.—THE NATURE OF DISEASE.

Positive Causes of Death.—With respect to the injurious circumstances which are positive, and to which animals are exposed, and by which they may be cut off before their full period has arrived, they are those, in the first place, of mechanical violence; in the second, those of a specific nature. Many animals and many vegetables contain within them materials, which are destructive to the life of others.

Negative Causes of Death.—Animals are liable to be destroyed, also, from a want of suitable external circumstances; for a series of actions is incessantly going on in every animated machine, and those actions are maintained by external circumstances;—such as by a certain degree of temperature, by a certain surrounding atmosphere, and by a certain supply of matter to be taken into the mouth or stomach, or some equivalent organ. The deprivation of any of these may put a stop to existence, or impair it; and, on the other hand, the excess of some of them, will have the same effect. The excess of food may destroy or injure life; and the excess of heat may cause serious injury, or absolutely consume the body. Besides this, the depraved quality of those external matters which are necessary to the continuance of life, will have an injurious effect. This is well illustrated by the effect of bad food.

Temperature.—One of the most common causes,—indeed, I may say, the most common cause of diseases, is a deviation with respect to external temperature. A certain degree of heat is required for the support of life; and a deviation in that particular is the most common cause of the diseases which we observe in this country. An excessive degree of heat produces one set of effects; an excessive degree of cold produces another; and an alternation of the two—from the body being suddenly exposed first to the one and then to the other (more especially if this exposure be partial)—is attended by the most serious effects. The greater number of diseases are inflammatory; and the most common cause of inflammation is sudden alternations, or other unfavourable circumstances, with regard to temperature.

Air.—Bad air is also a common cause of disease; but this does not arise from the want of oxygen in particular, as has been imagined; but from the presence of certain substances of deleterious quality. I believe it is found, that the quantity of oxygen in the air is the same in almost every country and in every situation; and it is the presence of other things, in addition to the oxygen, which produces the injurious effect. We see the effect of the bad quality of the air in unhealthy situations, where persons

[a] Gregory's "Conspectus Medicinæ Theoreticæ." Book 1; Paragraph 12.

are *sallow* and *bloated*, and carry about with them marks of disease, visible enough to others who come from a healthy spot, although not allowed to exist by the parties themselves;—simply for this reason,—that, being so accustomed to what they witness, they conceive it to be their nature.

Food and Labour.—The ill effects of unwholesome food are seen every day. The body is rendered feeble; and when this takes place, whether from bad air or bad food, it becomes an easy prey to any other cause of disease which may present itself. Want of the rest necessary for the refreshment of the body, has also the effect of producing disease. Excessive action, too, either of the mind or any part of the body, has likewise the same tendency.

Thus, disease is continually produced from mechanical violence, from the presence of injurious agents, and from errors in regard to those agents which are absolutely necessary to the support of life;—whether the errors be those of excess, deprivation of proper quantity, or depreciation of quality.

Hereditary Taint.—This, however, is not all. When a disease has been induced, it frequently happens that a tendency to that disease is transmitted to the offspring of the sufferer; so that it requires no exposure of such offspring to the particular cause of the disease, in order to become its victim; but at a certain period of life, unless placed in very happy circumstances,—and perhaps in spite of the happiest circumstances possible,—the disease under which the parent laboured appears in the child, or in a still later offspring; and possibly cannot be controlled. Again: independently of the inherent disposition to disease, and the external circumstances to which the offspring is exposed, original malformation of certain parts of the body so disorders its functions, that sooner or later disease, which may end in death, makes its appearance.

Derangement of Functions.—When disease takes place, the functions of the body suffer disturbance. A series of actions is continually taking place in the body; and some of these, when "disease" (so called) occurs, become deranged. The circulation of the blood is altered; more is accumulated in some parts than there should be, and less in others. The temperature of the body is altered; it is too hot either partially or generally, or it is too cold. The feelings of the body are altered; they become too acute or too dull, or they become otherwise wrong. The strength of the body likewise is changed; in some few instances it is increased, but in the great majority it is impaired. What was done naturally in the body before this change took place, is now done either too little, or too much, or in a depraved manner. The products of the body are likewise altered. The sweat is not natural in its quality, any more than in its quantity; the urine, and the secretions poured forth from the intestines, become altered in quality; and I have no doubt that the excretion from the bronchial tubes, also, is changed in its constituent proportions. At last, not merely are the *actions* of the body, and the *products* excreted from it altered, but even the very *substance* of the body itself will become changed.

Extent of Derangement.—With respect, however, to all the changes I have just enumerated, they must evidently be in a certain intensity,—a certain degree of them must exist, for us to say that disease is present. A change, although (strictly speaking) a disease, may be so inconsiderable, that one would be laughed at for calling it by that name. A slight spot upon the surface,—a single point not larger than a flea-bite, no one would think of calling "a disease"; and yet, if there were a large number of these, though the only difference consisted in amount (the nature and degree of

each being exactly the same), we should not hesitate to say that disease was present. Therefore, when a deviation with respect to function or structure takes place, there must be a certain extent of it, or a certain intensity of it (one or the other), to justify us in saying it is really a disease. Logically and strictly speaking, disease is said to be "an aberration of function or structure of one or more organs from a sound state." You will find this mentioned in some books, as the definition of a disease. But this is hardly sufficient; because, with respect to *structure*, and even with respect to *function*, a part may be sound, and yet be in a state of disease. A part may grow to a much greater size than natural,—there may be diseased bulk of the organ, although the structure is healthy. This is a rare occurrence; but sometimes it does takes place. Generally, where there is increased bulk there is diseased structure; but it is possible for a part to be enormously large, without being altered in structure; and yet the person may be said to be labouring under disease. A person with an enormous liver, or brain, though no unhealthy change could be discovered in its texture, would nevertheless be pronounced to be in a state of disease. So with respect to the fluids; they also suffer very great changes, and yet there may be no fault of function. In the disease called "anæmia" [a], where the blood is deficient in quantity, the disease may really be quite independent of any fault of the body itself. A mere want of nourishment may cause the blood to be of a diseased quality;—that is to say, not to contain its natural elements, but to be very watery,—to be thin and pale (the whole body becoming white or tallowy in appearance); and yet no function can be said to be diseased,—at least excepting through this want of nourishment. The body is ready to do all that is required of it, if proper food be given. This definition of disease, therefore, is more or less exceptionable. Besides: in a large number of diseases, the quality of the *fluids* is altered; and it is essential to a correct definition, that this should be taken into account.

With respect to the *extent* of affection which is necessary to exist in order to constitute a disease, there must be a great difference in various individuals; for the health of different persons is exceedingly various. What is health to one man, would be disease in another; just as the degree of strength which is natural to a delicate person, would be considered downright weakness in another. To obviate any difficulty of this kind, we sometimes find added to the definition of disease which I have already given,—"rendering assistance necessary." The definition given in Dr. Gregory's "Conspectus" is:—"A disease is present, when the customary actions of the body are either altogether impeded, or performed with difficulty and pain." ("Morbus adest, quùm corpus tantum a statu sano deflexerit, ut solitæ actiones vel prorsus impediantur, vel ægrè aut cum dolore perficiantur." [b])

Definition of Disease.—Disease, therefore, may generally (perhaps) be defined to be,—"an aberration of function, or structure, or size, of one or more organs; or of the quality of the fluids, from the sound state; rendering assistance necessary."

Pathology, Definition of.—This, however, it may be remarked, is only a definition of disease in general; I shall make some further remarks upon the definition of each particular disease hereafter. Diseases, therefore, are neither more nor less than alterations in the physiology or anatomy of the

[a] From ἀν (privative) *without*; and αἷμα, *blood*.

[b] Gregory's "Conspectus Medicinæ Theoreticæ"; Chapter I; Paragraph 24.

body;—in other words, morbid physiology, and morbid anatomy. This morbid state of physiology[a], and this morbid state of anatomy[b], are together called "Pathology." The doctrine of diseases, whether as it regards function or composition, is called "pathology."[c] There is an inclination, in the present day, to limit the word "*pathology*" to morbid anatomy. That, however, I think, is quite unjustifiable; for pathology is the doctrine of disease, whether it relates to function, or structure, or both. Pathology, therefore, is an unhealthy state (if I may so speak) of physiology and of anatomy;—the composition of the fluids, as well as function, being comprehended under the term "*physiology*";—size, as well as structure, being comprehended under the term "*anatomy*."

Functional and Structural Diseases.—Diseases are often divided into those which are "functional", and those which are "structural"; but it is very common for the one to terminate in the other;—for diseases which are at first purely functional, to become at last structural. At any rate, many organic diseases do not at first exhibit themselves as such, but are ushered in by a change of function. It is possible that a minute change of structure may exist, long before it is discovered; and that minute change is enough to explain the alteration of function; but many diseases exist long, to all appearance, as mere functional disturbance, before they become structural. Many diseases remain functional,—at least they go through their course as a disturbance of function, never affecting the structure; but structural diseases almost always disturb function. It is evident that if the structure of an organ which is to perform a certain duty be much altered, that duty cannot be well discharged.

Organic Diseases.—Structural diseases are sometimes called "organic." I believe that the words "*structural*" and "*organic*" are used synonymously, to express those diseases which consist in a change of composition and arrangement of the organ itself, and not a mere alteration in the mode in which it does its duty. Perhaps the word "*organic*" is preferable to the word "*structural*"; and for this reason,—that some diseases of this description do not appear to consist in any alteration of structure, but merely in a diminution or an excess of bulk. Now in those cases (which, though they are rare, nevertheless do sometimes occur) where an organ wastes, or becomes larger than natural, and yet appears otherwise healthy, the affection cannot exactly be called "structural";—the word "*organic*" better applies to them; and therefore, altogether, the term "*organic*" may be preferred to "*structural.*"

Disorders and Diseases.—There has been an attempt by some to call the one set of complaints, supposed to be merely functional,—"disorders"; and the others, which are structural or organic,—"diseases." For instance: they call dyspepsia, or diabetes, a "disorder"; and ulceration or cancer of the stomach, or ulceration of the kidneys, a "disease." This plan, however, is not generally adopted. It might be very well if all persons agreed to adopt the terms in this sense. But that is not the case: indeed, so far from it, that, in most books, the expression "organic or structural *disease*" occurs; which would not be necessary if every one adopted the word "*disease*" to signify in itself a structural affection. Nay, so extensively is the word "*disease*" employed by some persons, that even accidents (as dislocations or fractures) are called "disease." You will find, in Cullen's "Nosology", that dislocation and fracture are arranged under

[a] From φυσις, *nature*; and λογος, *a discourse.*

[b] From ανα, *about*; and τιμνω, *to cut.*

[c] From παθος, *a disease*; and λογος, *a discourse.*

the class of "Local *Diseases*."[a] The word "*disease*", then, is used by some nosologists very extensively. They employ it to signify accidents, mechanical affections, dislocations[b], hernia[c], and every thing of that description; and it is used by almost all writers to signify both functional and structural affections. I shall, therefore, use the word "*disease*" to signify, not organic affections exclusively, but all depraved conditions, whether functional or organic.

Local and General Diseases.—Disease may be considered according as it is *local* or *general*. Some diseases affect only one part, and others are supposed to affect the whole system. Fever, for example, was formerly supposed to be an affection of the *general* system, without the preponderance of disease in any individual organ. The labours of Louis, Cruveilhier, and Bright, however, have conclusively established the fact, that proper typhus, in every instance, presents a disease of the intestinal glands, more especially those of Peyer; while, with regard to fevers of a less malignant character, it is by no means proved whether they consist in a general disturbance only, or whether they depend upon a more local action for their cause. I can entertain no doubt, however, that there are such things as general diseases; and it appears to me that scurvy is of this description, for every fluid of the body seems vitiated;—at least the blood throughout the whole body is so, and all the solids appear to be in a similar state. There is no one part of the body that can be fixed upon as the seat of the malady. So with respect to ague. I cannot discover any reason for ascribing the disease to any one part of the frame; and I therefore think that it also is an instance of a general affection.

Acute and Chronic Diseases.—Diseases are also different from each other according as they are *acute*[d] or *chronic*.[e] Some diseases come on suddenly, last usually but for a short time, terminate either in health or death,—

——"Cita mors venit aut victoria læta,"[f]

and are called *acute*. Other diseases last for a long time—perhaps coming on slowly; but whether they come on slowly or suddenly, if they last for a long time, they are called *chronic*. Acute diseases, however, will sometimes, instead of terminating in health or death, become chronic;—that is, become less violent in degree, and go on for a length of time. Diseases, therefore, are to be considered acute or chronic according to their duration.

Active and Passive Diseases.—Diseases are also considered, by some, according as they are *active* or *passive*;—that is to say, according as they are attended with a degree of violence or excitement of the system, or no excitement at all. Some persons (indeed a large number) use the terms "*active*" and "*passive*", and "*acute*" and "*chronic*", synonymously; but this is an error which ought particularly to be guarded against. It does not follow because a disease is acute,—that is to say, exists for a short time, and then terminates,—that it is necessarily attended by violent symp-

[a] They constitute Orders 7 (Ectopiæ, from ἐκτοπος, *out of place*) and 8 (Dialyses, from διαλυω, *to dissolve*) of Class 4. A complete view and explanation of all the Classes, Orders, Genera, Species, and Varieties in Cullen's System, may be obtained at a glance, by means of a "Synopsis of Cullen's Nosology", published on a single sheet, by Butler, St. Thomas's Street, Southwark.

[b] From δις, *out of*; and "locus", *a place*.

[c] From ἑρνος, *a branch*;—alluding to its protrusion.

[d] From "acuo", *to sharpen*.

[e] From χρονος, *time*.

[f] "A quick death or a happy victory arrives."—*Horace's* "*Satires*"; *Book* 1; *Satire* 1; *Line* 8.

toms; nor does it follow, because it lasts for a length of time, that these symptoms should not be active. This is illustrated, every day, in the case of rheumatism. It is daily spoken of as "acute" or "chronic", and "active" or "passive";—the term "*acute*" being used indifferently with "*active*", and "*chronic*" with "*passive.*" In the chronic form of the affection, therefore, a person would not think at first of applying those remedies which, in an acute attack, would be beneficial;—taking it for granted that, as the disease is chronic, there is no violence; but that a slowness of mischief is going on, and that the remedies for the active acute state are improper. But we see, every day, cases of rheumatism which, although they have lasted for six or twelve months, or even longer, are still attended with all the symptoms of an acute disease;—that is, attended by heat of the parts, if not by quickness of pulse; and if blood be taken away, it appears buffed. It would, therefore, be a serious error to consider "*active*" and "*passive*", as synonymous terms with "*acute*" and "*chronic*"; because, in acute diseases, the word "*acute*" refers simply to their short duration; and, in chronic diseases, the word "*chronic*" simply to their long duration; whereas the word "*active*" refers to the violent disturbance going on in the system or part, and the word "*passive*" to slow changes,—changes not of a violent description. A *chronic* disease may be *active;* and an *acute* affection may be *passive.* A person with an acute affection may lose all his powers, and the whole functions of the body may go on in the most languid way. Therefore "acute" and "chronic" are one kind of state, "active" and "passive" are another. An *acute* affection cannot be *chronic*, but it may be *passive;* and a *chronic* affection cannot be *acute*, but it may be *active.*

Continued, Remittent, and Intermittent Diseases.—Diseases differ, also, according to their uniformity of duration. Some continue with uniform tenour during their whole course,—without any very great deviation from the beginning to the end; these are called "continued." Others, again, undergo a very great remission at regular periods, or at least pretty regular periods;—the symptoms not going off entirely till the disease ceases altogether, but undergoing such a relaxation of severity at such periods, as to acquire a character from this circumstance;—when they are called "remittent." While others, again, will cease entirely from time to time (generally, too, at stated times), and recur again at certain intervals, so long as the person is affected with them; these are called "intermittent." These varieties are particularly seen in the case of fever. Fever may hold a pretty uniform course;—never ceasing at all, or particularly diminishing, during the twenty-four hours, till its close; and then we call it "*continued* fever." It may last for a day, a week, or several weeks. In other cases, there is a sudden diminution in the degree of heat, violence of pulse, thirst, and all the other symptoms, at a certain period in the twenty-four hours, and perhaps at longer intervals; but they do not cease entirely: such is the character of "*remittent* fever." Others, again, cease entirely. The patient will be attacked at a certain hour; be ill a certain number of hours; and then recover perfectly, with the exception perhaps of languor: the disease then receives the name of "*intermittent* fever."

Continuent and Periodical Diseases.—Many persons speak of "continued" disease, as distinct from "remittent"; and it is so common that we are justified in using the distinction; but some make a nicer distinction, and use the word "*continued*" to include both "*continuent*" (which preserves the same tenor to the end), and "*remittent*" (which, although it never ceases, yet relaxes from time to time). If intermittent diseases recur

and disappear at regular intervals, then they are called "periodical." A periodical disease is necessarily intermittent; but an intermittent disease is not necessarily periodical. Intermittent embraces the circumstance of simple intermission, no matter when or how; but it embraces also regular intermission,—periodical disease. The presence of a disease which is intermittent, is called the "paroxysm"[a], or "exacerbation"[b] (these being considered synonymous terms); and the interval which occurs between them, is called the "intermission"; or, in case of febrile disease, the period of apyrexia[c],—the period of the absence of pyrexia.[d] I fear being troublesome in mentioning the meaning of so many terms; but it is absolutely necessary that they should be understood, before proceeding to treat of particular diseases.

Diseases differ, therefore, according as they affect function or structure; and as to whether they be local, or general; acute, or chronic; active, or passive; continued, remittent, or intermittent.

Nature, Causes, and Seats of Diseases.—Diseases likewise differ in their true inherent *nature*, independently of any other circumstances. They differ also as to their *causes*. Some are produced merely by an aberration as to some of the circumstances which are necessary to the support of life; such as the excess of temperature or food, or a deprivation of food or air, or a *diminution* of food or air. Others, again, are produced by *specific* causes,—by the agency of particular substances, the nature of which cannot be comprehended. Such, for example, is ague, which is produced only by a certain exhalation; and such is small-pox; and such are all those diseases which acknowledge a peculiar specific poison for their cause. Diseases differ likewise, according to the *organ* which they affect. There are some diseases which can affect almost every organ in the body. Inflammation is one which affects every part of the frame which has vessels; but there are certain diseases that can only affect particular organs. The tendency to produce gall-stones, can affect no other part than the biliary system. In addition, therefore, to all the circumstances previously mentioned, diseases differ as they affect any part of the body at large, or are necessarily confined in their operation to particular organs.

Explanation of Terms.—I must now enter a little more minutely into the explanation of certain expressions, which will be used frequently hereafter; otherwise I am in danger of being misunderstood. The whole doctrine of disease is called, collectively, "General Pathology." Pathology is the science of disease,—"ægroti hominis scientiæ"[e]; while physiology is the science of health. General Pathology is commonly said to embrace four particulars:—1. General Nosology[f]; or, an account of diseases in general, and of their differences. 2. An account of the causes of disease; which is called "ætiology."[g] 3. The symptoms of disease; which is called "semeiology"[h], or "symptomatology."[i] 4. The treatment of disease; which is called "therapeia."[k] There is, however, not only a *general* but a *special* pathology, which respects particular diseases; and if the epithet "*methodical*" be attached to "*nosology*", an arrangement of diseases is meant;—a classification of the various affections to which we are liable.

[a] From παροξυνω, *to aggravate.*
[b] From "exacerbo", *to become violent.*
[c] From α, *without*; and πυρεξια, *fever.*
[d] From πυρ, *fire.*
[e] "The science which relates to a sick man."
[f] From νοσος, *a disease*; and λογος, *a discourse.*
[g] From αιτια, *a cause*; and λογος, *a discourse.*
[h] From σημειον, *a sign*; and λογος, *a discourse.*
[i] From συμπτωμα, συμπτωματος, *a symptom*; and λογος, *a discourse.*
[k] From θεραπευω, *to heal.*

SECTION II.—GENERAL NOSOLOGY.

I shall first speak of what is called "*general* nosology", or the consideration of diseases in general. These may be either *local* or *general*; but even when local, they seldom continue so without producing more or less general effects. Diseases vary in their symptoms, and in their course, according to the texture which they affect. The body consists of a certain number of textures;—the various parts of the frame may be resolved into a certain number of particular "tissues", as they are called. Now, some diseases affect certain textures; and others affect other textures; and the symptoms of diseases, and their course, are influenced very much by the texture which is thus affected. To take inflammation, for example: we shall find that the symptoms are very different when it affects a *serous* membrane, from what they are when it affects a *mucous* membrane. Again: the symptoms are very different when it affects the skin, or when it affects a bone. The symptoms of disease, too, and the course of diseases, vary exceedingly according to the organ. Diseases may not only attack a particular organ, but they may attack a particular texture in a particular organ, or they may attack all the textures of an organ. Now, when they attack any particular organ, the importance of that organ to the economy, the function which it performs in health, and the various relations of that organ, greatly influence the symptoms. For example: inflammation which may be of no consequence in the finger, may (though only to the same extent) be fatal when seated in the stomach; a little ulceration, of not the slightest importance on the hand, may produce death if it occur in the stomach; an affection in the brain, or in the heart, may be productive of very different results,—a very different degree of danger, from what it would if seated in many other parts.

Increased and Diminished Action.—Diseases vary exceedingly, likewise, in proportion as they are attended by *excessive* or by *diminished* action. Some diseases are characterized by an inordinate, violent action of the part;—the natural state of the part seems augmented. Whatever is done in health, is done ten times more in the disease;—at least for a time; till the strength is exhausted, or the state gradually subsides into health. Other diseases are characterized from the beginning, or nearly so, by a great diminution of action. The natural functions of the part decline exceedingly; so that depression is the character of the disease. If the affected part be, in ordinary circumstances, possessed of much sensibility, (the general surface, for example,) the progress of disease in it is characterized by a very acute sensation of pain. If the part be one the function of which is motion, the latter may become very intense; and convulsions may occur as the consequence. On the other hand, we may have a *diminution* of feeling,—perfect torpor,—insensibility; and such an absence of all power of motion, that the part is useless to the individual. Again: if the part be one which secretes, the secretion may be in *excess*; and if it cannot escape we have dropsy. The secretion, on the other hand, may be exceedingly *diminished*; so that, in the case of the kidneys, no urine can be formed; and, in the case of the skin, the surface shall be perfectly dry.

Changes of Size and Consistence.—Some diseases, among structural affections, are attended by a great dilatation of the part;—the part becoming much dilated, beyond its natural extent. On the other hand, in some diseases, the parts become contracted and diminished. In some diseases, the

parts become exceedingly hardened; so that from being naturally soft, they become as firm as cartilage[a]; and are sometimes converted into absolute bone. Again: very firm parts will occasionally become perfectly soft; and bone will become as pliable as muscle.[b] I have seen the liver become softened down to a pulp, in the course (to all appearance) of three days. Again: diseased parts will become exceedingly full,—distended with fluid; and this may be either *general* or *local*. It may be either local congestion[c], or universal plethora[d] of the body. In other instances, the parts become devoid of fluid, and shrink; and this is observed also generally or locally. Alterations of texture likewise take place, and alterations in the quality of the fluids. The texture,—to say nothing of induration, softening, hypertrophy, or atrophy,—the texture of the parts sometimes becomes perfectly different from what it is observed to be in the state of health. So with respect to the fluids, they will frequently be formed of a character totally dissimilar from what they should be. The urine is sometimes any thing but genuine urine; and the bile is sometimes so pale, that we can scarcely recognise it as bile; and so with respect to the blood itself; it is sometimes very little more than a reddish watery fluid.

Hereditary, Congenital, and Acquired Diseases.—The foregoing are important and essential differences in disease. There are, however, many other varieties, which are considered more or less *accidental*;—that is to say, which do not affect the nature and course of the disease. Some diseases are "hereditary", for example; and this will not at all influence the nature of their course or duration; but some diseases may be hereditary in the particular individual; while other diseases are not hereditary,—not transmitted from parent or ancestor to offspring or posterity, but still are born in the individual. They seem to be implanted in him at his first formation; and then they are called only "connate"[e] or "congenital."[f] A disease which is connate, or congenital, may be hereditary; but it is not necessarily so. All diseases which are neither hereditary, nor connate or congenital, are said to be "acquired."

Primary and Secondary Diseases.—Then diseases,—to speak still of accidental varieties,—are sometimes "primary", and sometimes "secondary." Sometimes the disease which occurs is the first; but sometimes, after one disease has taken place, it is joined by another;—that is to say, it exists with another, or gives such a predisposition that another is produced; but it is of no consequence to the nature of a disease, whether it is primary or secondary.

Sporadic, Endemic, and Epidemic Diseases.—Again: diseases are sometimes said to be "sporadic"[g], sometimes "endemic"[h], sometimes "epidemic."[i] A disease is said to be *sporadic*, when it occurs from an accidental circumstance occurring to any particular individual;—when it is a solitary accidental case. Hence, when a person, from exposure to cold, suffers inflammation of the lungs or intestines, he is said to labour under a sporadic disease. These are insulated cases,—having no connexion with each other;—not having any general prevailing cause. But if diseases occur from some general and temporary cause affecting a whole population, then

[a] From "carnilago";—from "caro, carnis", *flesh*.

[b] From "musculus", the diminutive of "mus", *a mouse*;—from the resemblance to that animal when flayed.

[c] From "congero", *to accumulate*.

[d] From πλησω, *to fill*.

[e] From "con", *with*; and "nascor", *to be born*.

[f] From "con", *with*; and "genitus", *born*.

[g] From σπειρω, *to sow*.

[h] From εν, *among*; and δημος, *the people*.

[i] From επι, *upon*; and δημος, *the people*.

they are said to be *epidemic*. "Sporadic" and "epidemic", therefore, stand contrasted with each other;—diseases of the former class being those which occur occasionally and accidentally, from some peculiar circumstance happening to the individual; while epidemic diseases are those which affect a large mass of persons, from some general prevailing cause. Again: diseases are sometimes said to be *endemic*;—that is to say, when they do not arise from any general influence at a particular time, pervading a population, but when they spring from certain causes fixed and inherent to a certain place;—when certain places in which people reside, send forth causes of disease, to which all persons who come to that spot are liable, but from which persons do not suffer unless they go there. This is the distinction between "*en*demic" and "*epi*demic" diseases;—the former being confined to the inhabitants of a particular spot; and the latter being those which arise from a general cause, taking place only from time to time, and pervading, not a particular spot, but a considerable population.

Contagious and Non-Contagious Diseases.—Another difference in diseases—not at all affecting their nature, their course, or their treatment—is, that they may arise from a common cause, or from a specific contagion. Some diseases are contagious, and some are not; but the symptoms do not vary in their essential nature; so that we are continually very much in doubt, as to whether a certain disease is contagious or not. There is nothing in the disease itself, to make us say that it must necessarily be contagious: and the greatest disputes are carried on, as to whether a particular affection is or is not contagious.

Period and Seat of Diseases.—Diseases have likewise been distinguished according to the time of year at which they occur; so that we have vernal, summer, autumnal, and winter affections;—*vernales*, *æstivi*, *autumnales*, and *hyemales*. Other accidental differences of disease arise from their seat;—whether they are internal or external; and then, again, as to whether they are fixed, or whether they wander. If they cease in one particular part, and appear in another, they are said to be "metastatic"[a], or "retrograde"[b], or "retrocedent."[c] If disease suddenly cease in one part, and another become affected, a metastasis, or change of place, is said to have occurred.

Severity of Diseases.—Diseases differ according to their severity. Some are exceedingly severe, others are light;—some are said to be mild, and others are said to be malignant. Those which are said to be of a malignant character, however mild they may be in appearance, are sure to baffle all the resources of our art, unless we can eradicate the affected part by a surgical operation; which sometimes is, but sometimes is not, possible. The word "*malignant*", however, is sometimes employed simply to denote a certain degree of severity;—it is a term of rather indefinite meaning. Small-pox is said sometimes to be "mild", and sometimes "malignant"; and, again, a sore which is of a cancerous nature,—however trifling the pain attending at first, but which is sure to go on to ulceration, violent pain, and (at last) destruction of the part,—is also said to be "malignant."

Duration of Diseases.—Diseases vary likewise as to their duration. If they be exceedingly short,—so as to terminate within four days,—they are called by Latin authors "acutissimi"; but if they terminate within seven days, then they are called "peracuti." We have no English words to signify the difference between these two durations. If they terminate within four-

[a] From *μεθίστημι, to translate.*

[b] From "retro", *backward*; and "gradus", *a step.*

[c] From "retrocedo", *to go back.*

teen days, they are called "acute"; if they run on to twenty days, then you will find authors calling them "sub-acute"; and some are so nice in their terms, that if they last forty days they call them "acuti decidui"; and all that run on above that period are called "chronic." It is sufficient, perhaps, to remember, that an *acute* disease is considered to be one which terminates within *fourteen* days—a *sub-acute* one which terminates within *twenty*; if the disease extend to or above twenty days, we may consider it *chronic*;—at least, I fancy a *patient* would think we were justified in so denominating it.

SECTION III.—ÆTIOLOGY.

Classification of Causes.—The *causes* of disease are generally divided by authors into two;—the "remote" and the "proximate." The remote causes, again, are divided by systematic writers into two more;—"predisposing" and "exciting." The word "*cause*", however, is in these cases used in a totally different sense. When we speak of "*remote* causes", a very different idea presents itself, than when we speak of "*proximate* causes";—in fact, the cause of the disease, properly speaking, can only be remote. The *remote* cause, for example, of fever may be bad food, and the depressing passions; and the exciting cause may be, according to some, a specific contagion. Now the remote causes of the first description are called "predisposing"; they render the body liable to become the prey of something, which has a tendency to excite the disease. The exciting cause of the disease might have had no effect, unless the body had been predisposed; and the predisposition might not have had the effect, unless the exciting cause had occurred. A circumstance, therefore, which inclines the body to become the subject of disease, is called, "a *predisposing* cause" ("causa *prædisponens*"); that which actually excites the disease, "an *exciting* cause" (causa *excitans*); and both together are called "*remote* causes" (causæ *remotæ*). They are called remote, I presume, because they are a little distance from the disease itself; and because the proximate cause is, to all intents and purposes, close to and all but the actual disease. In one sense, indeed, it is the disease itself.

Proximate Cause.—The application of this term ("proximate") gives rise to a great deal of confusion to the student. He would imagine that disease could be nothing more than disease; and to call the disease "the proximate cause", would be thought absurd; but the reason of this I will explain. In defining any particular disease, we are obliged to take into our definition only what we observe;—just as the naturalist defines any flower, or any mineralogical specimen, by merely taking what is the object of sense, and describing it with all the marks together; and thus we have what is called the "definition of a disease." For example: in jaundice we take together the yellowness of the skin, the yellowness of the eyes, the yellowness of the nails, the whiteness of the fæces, and the high colour of the urine; and say that the patient certainly has jaundice. The jaundice is not the disease, strictly speaking; but the collection of symptoms under which the patient labours, is called "jaundice." Thus the word "*disease*" is applied by nosologists, not to the single *cause* of all these symptoms, but to the *collection* of symptoms. Take epilepsy: a person falls down foaming at the mouth; struggling in every limb; perfectly unconscious; and afterwards, when he ceases to foam and struggle, he lies senseless;—such a person is said to labour under epilepsy. These particular symptoms, blended together, occurring in

succession, are called "epilepsy." Now in Cullen's, and other methodical nosologies, the disease is defined according to mere symptoms;—all opinion,—all cause, is excluded. They take merely the symptoms, and call them the disease. It is perfectly right that it should be so. But these symptoms must have a cause;—there must be a cause for this disturbance in epilepsy;—there must be a cause for the bile going into the blood in jaundice, appearing in the urine, and not being able to find its way to the fæces.[a] The cause of the epilepsy, or of the jaundice, is the circumstance that produces all these effects; and that is considered to be the "proximate cause." If the epilepsy arose from a piece of bone depressed upon the brain, we should say the proximate cause of the epilepsy was the spiculum of bone. If the bile were obstructed because a calculus was impacted in the hepatic[b] duct, we should say the impaction of the calculus was the proximate cause of the jaundice. The proximate cause, therefore, is in fact the disease itself;—the actual disease from which the symptoms arise. The *remote* causes are those that predispose to the disease, or actually excite it; the *proximate* cause is the circumstance to which the *predisposing* and *exciting* causes have given rise; and this circumstance, when present, produces all the external symptoms,—the visible changes.

But the word "*disease*", when we come to any specific affection, is (in a nosological sense) applied merely to a set of symptoms;—to that which we can comprehend,—which is discernible; and, as nosologists, we should not apply the word "*disease*" to the cause of all these symptoms; but should call it the "*proximate cause.*" When speaking as *pathologists*, however, and not as *nosologists*, persons inquire,—"What is the actual disease in this epilepsy?—What is the actual disease in this jaundice? Is it an enlarged pancreas pressing upon the ducts? Is it a calculus sticking there? Is the disease a contraction of the sides of the ducts, or what is it"? But that is a different sense of the word "*disease*"; and it is necessary to state that the term is employed by methodical nosologists, and must be so by me, to signify a collection of symptoms; and not the true *cause*, which is at the bottom of those symptoms; for though we might be inclined to say that this was the real disease, yet it is not so considered, but has received the appellation—"*proximate cause.*"

I trust that the explanation now given, will hereafter prevent any confusion which might otherwise arise. From an imperfect understanding of this matter, persons quibble about what is, and what is not, disease. It is necessary to know that a set of symptoms, following in a certain order, or united in a certain collection, is called "a disease"; and the *immediate cause* of all these symptoms,—which some say is the real disease,—is called by the best writers "the proximate cause."[c]

Occasional or Procatarctic Causes.—Exciting causes are, by some authors, called "*occasional*" or "*procatarctic.*"[d] Generally, in England, we say

[a] From "fæx, fæcis", *dregs.*

[b] From ἧπαρ, ἥπατος, *the liver.*

[c] The proximate causes of disease consist in alterations either in the *structure* or in the *functions* of parts; and are therefore divided into *organic* and *functional.* The *organic* proximate causes may be divided into four classes:—1. Inflammation and Fever. 2. Depositions. 3. Gangrene. 4. Displacements. Depositions are of four kinds:—1. Natural Tissues in Excess. 2. Preternatural Tissues. 3. Natural Fluids in Excess. 4. Preternatural Fluids. Displacements are of seven kinds:—1. Intus-susception. 2. Hernia. 3. Prolapsus. 4. Extra-uterine Conception. 5. Miscarriage. 6. Fracture. 7. Dislocation. The *functional* proximate causes may be divided into three classes:—1. Spasms, and other examples of *increased* action. 2. Convulsions, and other examples of *irregular* action. 3. Palsies, and other examples of *diminished* action.—*Dr. Fletcher.*

[d] From προκαταρχω, *to go before.*

"predisposing", and "exciting"; but in foreign books a variety of other names are employed.

Predisposing Causes.—With regard to the *predisposing* causes of disease, they depend upon a very great number of circumstances. Each particular age, for example, is predisposed to particular affections. The child is predisposed to one kind of disease, the youth to another, the adult to another, and the old man to a very different set. Climate, also, causes a great difference in the disposition to disease [a]; the season of the year, likewise, has a great effect; the habit of the individual, as to temperance and sobriety, and as to a natural or unnatural and artificial course of life, has a peculiar influence. All these circumstances cause a predisposition to different affections. In regard to some diseases, there is not so much a *predisposition* required, as a *want* of *indisposition*. Almost every one, for instance, will take the small-pox, the measles, and the hooping-cough: so that we can hardly say that there is a predisposition to these diseases. The cases in which they do not occur are rare exceptions; and we are more justified in saying, that the person is *indisposed* to them, when these diseases will not occur in spite of the presence of contagion, than that those who catch them are *predisposed* to them;—that is to say, by nature we are *all* more or less liable to them; and it would be almost an abuse of terms to say that we were *predisposed* to them. All that appears to be requisite is, that there should be *no indisposition* to them.

Exciting Causes.—With respect to the *exciting* causes of disease, they have been generally classed in three orders. 1. Those which excite or stimulate. 2. Those which depress or debilitate. 3. Those which exert a physical or physico-chemical action. Heat, and excess in wine, are *stimulating* causes of disease; the depressing passions, and an excessive loss of blood, may be instanced as *debilitating* causes of disease; and these debilitating causes are spoken of, by some Italian authors, as *contra-stimulating* causes. Many causes, however, cannot be said either to depress or stimulate solely; they exert a peculiar action, which is not to be thus explained. It is something we do not understand. For example: malaria [b], which produces ague, is a certain agent perfectly unknown to us, except so far as regards the situation in which it is produced. Malaria produces a set of symptoms of so peculiar a nature, that we cannot say it is a mere depressive or contra-stimulating agent;—that is to say, though the first symptoms of ague produced by it are those of extreme debility, yet if we weaken the body to the same extent in various ways (as by bleeding and other means), we do not produce that train of symptoms known to us as intermittent fever. We have, then, "stimulating", "depressing", and "physical", or "chemical" causes;—sometimes called "stimulantes", "contra-stimulantes", and "irritantes." We must not, in medicine, be very nice about the etymology of our words;—that is to say, we must employ words of a certain meaning, so as to be clearly understood; but we shall find words signifying something very different from what their etymology would lead us to suppose. Nor is this remark confined to medicine; it applies equally to anatomy; and our only object should be to employ language intelligible among ourselves;—to know what ideas are meant to be conveyed, when certain expressions are used.[c]

[a] In hot countries the skin and the liver are more liable to disease, and the lungs and the kidneys in cold; because these have, respectively, more to do in a hot and in a cold climate.—*Dr. Fletcher.*

[b] The Italian name of an intermittent, endemic in the Pontine marshes.

[c] This is a very *good* object, but it ought not to be the *only* object aimed at. The "expressions used" should, as nearly as

An *exciting* cause may become a *predisposing*; and a *predisposing*, an *exciting*. For instance: malaria excites ague. But a person who has been exposed to malaria, may not have ague till he accidentally gets wet through; and then this *excites* the disease, to which the malaria had only *predisposed* him. Again: if a predisposition continue to increase, disease will happen without any exciting cause. Plethora of the head may increase till a fit of apoplexy occurs;—without stooping, overloading the stomach, or any common exciting causes.[a]

Non-Naturals.—Among the most common causes of disease, are aberrations with regard to six particular circumstances, which have been very strangely called "non-naturals." The air we breathe, the food and drink which we take, the retentions and excretions, motion and rest, sleep and watching, and the various passions of the mind (which are all natural enough), are called by old writers "non-naturals"[b]; and others, seeing the strangeness of this expression, have called them "things necessary to life"; —that is to say, things which are necessary in order to the continuance of our existence. The great source of disease is,—an aberration of all these from that state which conduces to health. With respect to *air*, for example: vitiation produces a variety of diseases; such as fevers, and many others. Our health must depend much upon the wholesomeness of our *food* and *drink*, and upon a proper quantity of them. The body cannot bear more than a certain degree of *exertion*; many diseases, therefore, arise from fatigue. On the other hand, excessive rest and indolence produce a collection of fluids in various parts of the body,—stagnation, plethora, fatal dropsy, and various organic diseases. So with respect to *sleep* and *rest*, alternations are absolutely necessary; and we every day see persons who, for want of sleep, become the victims of fever, and gradually of the most destructive diseases. Again, with respect to the *passions of the mind*;— there is scarcely a disease (with the exception of those that depend upon contagion) to which they do not give rise; nor is there any one part of the body, in fact, exempted from disease through the passions of the mind. No one can imagine what a vast number of diseases, not only functional but organic, arise simply from unpleasant emotions of the mind;—that is to say, from grief and deep-rooted sorrow, from violent anger, from regret and chagrin, and all those feelings which are of an unpleasant character. On the other hand, it is also to be remembered, that emotions of the most agreeable kind,—excessive joy, for instance,—may have an effect almost as injurious as those which are of an opposite character.

Air.—With respect to the first of these non-naturals, the *air*, it may injure the body by its weight or levity,—by the various electrical qualities which it may possess,—by its temperature, dryness, and moisture. Various winds produce, upon the human body, effects of the most curious kind;— according to the countries, or districts, or parts, over which they pass. With respect to temperature, it injures the body not only by its height or lowness, but also by its vicissitudes; and not only so, but according to its partial or general application to the body. A temperature that would do no harm if it were continued, would be productive of serious mischief if it suddenly succeeded an opposite temperature. A temperature which would do *no* harm if applied throughout the body, frequently does *great*

possible, correspond with the "ideas meant to be conveyed."

[a] "Predisposing" causes are always internal; "exciting" causes may be either internal or external. Sleep (which, in excess, produces disease) is an example of an internal exciting cause.—*Dr. Fletcher.*

[b] So called, because they do not enter into the composition of the body; but, at the same time, are necessary to its existence.

harm if partially applied. Every body knows the danger of suddenly cooling, if the body be over-heated and fatigued; and of a draught applied to any one part of the body. Under this head, also, may be mentioned various effluvia and odours; as they are transmitted through the air.

Food and Drink.—Upon *food and drink*, another source of disease, I need say but very little; they may be injurious either by their quantity or quality.

Retained Secretions;—Plethora.—The great thing here alluded to by old authors, is the blood; and it was supposed formerly, that it might greatly injure the body mechanically by its excess, either absolute or relative: so that "plethora" formerly occupied a very prominent part among the causes of disease. Some curious distinctions are made by old authors on the subject of plethora. They called it "absolute" or "true", or "*ad vires*"[a] or "*ad vasa*"[b], when the quantity of blood was absolutely in excess. They called it "apparens" when the blood was in its natural quantity, but expanded;—believing that it might be expanded by heat, and thus a temporary plethora be induced. When there was no actual increase of blood,—when the blood was not expanded improperly by heat, but the space in which it moved had become too small, this was called "*relative* plethora", or "plethora *ad spatium*"[c];—where the vessels, it was supposed, became contracted, and the blood was merely in excess, as compared with the contracted space. Plethora, however, may either be *general* or *local*. A local plethora is what, in modern language, is called an inflammation or congestion,—just as the case may be. When the blood is really in excess, I believe that it is generally of too rich a quality; that there is too little of its watery portion, and too much of the crassamentum.[d]

Inanition.—The opposite of plethora is *inanition*. This is a state which is induced by excessive discharges, or from the want of food; so that the blood which was in the body is let out, or the blood which naturally escapes in the various excretions, is not replaced. Anæmia (bloodlessness; or, more properly, a watery state of the blood) will arise from a state of the system that is not at all understood; in which, although food is taken, nourishment is but very sparingly extracted from it. Cases of this description are seen continually: chlorosis is one of this kind. But the blood certainly is sometimes in fault with regard to its constituents; not merely as to whether it is too rich or too poor, but—as would appear by some experiments of a friend of mine (Dr. Stevens), and of Dr. Clanny—by the saline ingredients erring in quantity; so that the blood, in many cases of disease, is absolutely deficient in its saline particles.[e] It is evident, however, that diseases of the solids themselves will sometimes cause these aberrations of the blood; so that the blood itself is not the cause of the disease. It may become an instrument of farther disease; though disease of the solids originally gave rise to the aberration of the vital fluid.

Undue Excretions.—With respect, however, to the *excreta*, it may easily be conceived how excessive discharges occasion various diseases. The excessive discharge may consist of blood, of bile, of secretion from the alimentary canal (fæces), of urine, of perspiration, of saliva (seldom, however, doing much harm), or of semen. These are the fluids which particularly escape from the body, and the escape of which may do harm. But with regard to that last-mentioned (semen), although one must suppose

[a] "Relatively to strength."
[b] "Relatively to the vessels."
[c] "Relatively to the space."
[d] From "crassus", *thick*.
[e] See "Observations on the Healthy and Diseased Properties of the Blood; by William Stevens, M.D."; and "Hyperanthraxis, or the Cholera of Sunderland; by William Reid Clanny, M.D."

that the excessive loss of the fluid must of itself be injurious, yet it is very certain that the *mode* in which that fluid is lost, exerts a very great influence upon the constitution.

Exercise.—With regard to *motion* and *rest*, I need not point out the ill effects of sluggishness on the one hand, or of fatigue on the other. Nor need I make any remarks with respect to *sleep* and *watching*; for they come under the same head as "motion" and "rest";—sleep and watching being to the brain, what repose and motion are to the rest of the body.

Mental Emotions.—With respect to the *passions of the mind*, I mentioned that they are a frightful source of disease;—much more so than is commonly imagined. An immense number of cases of disease of the heart, and disease within the abdomen [a], as well as of the brain itself, arise (I am certain) from unpleasant passions of the mind. It is not only *unpleasant* passions, however, that affect the body injuriously; violent emotions of the most *pleasurable* kind, will sometimes operate in the same way. History relates many accounts of persons who have died from excessive joy.

Poisons.—Besides those circumstances which I have just mentioned, the body is liable to injury from two very common sources; one of which is *poison* of various sorts [b]; which poison may enter the system by the surface, by the breath through the medium of the lungs, or by being swallowed. It is a very curious fact, however, that many poisons which act offensively when admitted into the body one way, have no effect when admitted in another; for it is an established fact, that the poison of hydrophobia, or of a serpent, may be swallowed with the most perfect impunity.

Mechanical Injuries.—In addition to poison, the body suffers much from *mechanical injuries;* which, of course, may affect almost any part of the body.[c]

Predisposing Causes;—Age and Sex.—Among the causes of disease which chiefly act by giving a *predisposition*, we may mention that of *age*. All periods of life are subject to their own diseases; whether we divide them with Shakspeare into seven [d], or with those authors who mention five [e], or those who mention more. We rarely see gout in an infant; nor is it common for old persons to have the symptoms of acute hydrocephalus. In short, every age seems marked out as particularly liable to be, if not destroyed, at least impaired, by particular diseases. The same is the case with respect to sex. Hysteria, which occurs only now and then in the male, occurs far more frequently in the female; and even when there is no reason to suppose an affection of the uterus. Of course, there are certain diseases which can affect but one sex.

[a] From "abdo", *to conceal*;—as the abdomen conceals the viscera within it.

[b] Dr. Christison divides poisons into three classes.—1. Irritant. 2. Narcotic. 3. Narcotico-Acrid. Orfila has four:—1. Irritant. 2. Narcotic. 3. Narcotico-Acrid. 4. Septic, or Putrefiant. Dr. Fletcher divides them into six classes:—1. Acrid. 2. Corrosive. 3. Narcotic. 4. Narcotico-Acrid. 5. Astringent. 6. Septic. The reader is referred to his "Physiological Classification of Poisons", published as a Chart, by Butler, St. Thomas's Street, Southwark.

[c] The following are the principal causes which, either by their *presence*, by their *excess*, or by their *deficiency*, may excite disease:—1. Caloric. 2. Light. 3. Electricity. 4. Air. 5. Contagious and infectious Miasms. 6. Aliment. 7. Poisons, either swallowed or inoculated. 8. Pressure. 9. Blows. 10. Wounds. 11. Exercise. 12. Retained Secretions. 13. Sympathy. 14. Passions. 15. Sleep.—*Dr. Fletcher.*

[d] 1. The Infant. 2. The School-Boy. 3. The Lover. 4. The Soldier. 5. The Justice. 6. The Pantaloon. 7. Second Childishness. See "As you like it"; Act 2; Scene 7.

[e] 1. Infancy; from *birth* to *seven* years. 2. Boyhood; from *seven* to *sixteen*. 3. Adolescence; from *sixteen* to *twenty-five*. 4. Adult Age; from *twenty-five* to *fifty*. 5. Old Age; from *fifty* years to *death*.—*Dr. Fletcher.*

Temperaments.—Disease depends much upon temperament.[a] We are all of some temperament, or some combination of temperaments; but excess of one temperament gives a great liability to disease. The usual divisions of temperaments are four:—1. Sanguineous. 2. Melancholic. 3. Phlegmatic. 4. Choleric. The *sanguineous* is marked by smoothness of skin, softness of hair, a quick pulse, a warm surface, great excitability of the whole frame, and generally a fair skin with florid complexion. The *melancholic*, on the other hand, is marked by a slow pulse, a dark swarthy complexion, dark and strong hair, and less susceptibility of emotion,—that is to say, of sudden violent emotion; although, when certain emotions take place, they are said to be more continued. The *phlegmatic* is marked by torpidity, paleness, and flabbiness. The *choleric* is characterized by reddish hair, and great excitability. However, these divisions, made by the ancients, are not so much attended to now. We often see these temperaments strongly marked; but they are also, at other times, variously combined.

An attempt has been made, within these few years, to divide temperaments differently; namely, according to the activity of particular parts. For instance: some persons have the chief activity in the head. They have a large intellectual development of the head, as some people say; and theirs would be called, perhaps, "the *cerebral* temperament." Others, again, have a large broad chest, with a considerable development of all the muscles; and this is called "the *thoracic*, or *muscular* temperament." Again: others are sluggish,—prone to eating and drinking, with protuberant abdomens; and are said to have "the *abdominal* temperament." It is rather an abuse of terms to call these states "temperaments"; for I think the word "*temperament*" rather refers to the constitution and character of the frame altogether. Yet there is no doubt that these divisions occur; for you see some persons all intellect; others all muscle and chest; and some portly, with their large abdomens and lean pates;—their heads suffering in proportion to the predominant size of the abdomen. In truth, Dr. Thomas entitles his work,—"Physiologie des Temperaments ou *Constitutions.*"

Whether we call these conditions "temperaments" or not, it is well to know that these persons will suffer various diseases, according to the division under which they come;—as in the case of those who are of a sanguineous, phlegmatic, choleric, or melancholic temperament. They will be particularly liable to diseases of the *head*, if they be of the *cerebral* conformation; they will be subject to affections of the *chest*,—not of a phthisical, but of an inflammatory kind,—if they have a full *thorax*; and they will be subject to various *hepatic*, and other *abdominal* diseases, if the *abdomen* gain the sway. It is worth while to attend to this other division of temperaments; although, perhaps, the term itself may be objectionable.

Peculiarities.—Besides original temperament, acquired peculiarities take place by a long residence in a particular climate. By long residence in a particular spot, certain dispositions of the body are engendered; and a second nature, if I may so style it, is produced. The various occupations of life have the same effect;—the various trades have their various diseases. On this subject I cannot point out better works than Ramazini's[b] and Thackrah's.[c] Custom and habit—whether referrible to trade or situation,

[a] From "tempero", *to mix together.*

[b] "Treatise on the Diseases of Artificers", translated by Dr. James.

[c] "Effects of Arts, Trades, and Professions, on Health and Longevity."

or action, or any other circumstance—have also very great effect in producing or preventing the cure of disease. For example: if a person who is in the habit of dram-drinking has a sore, nothing is more common than to observe, that in spite of the best surgical treatment, the healing process will not commence till the person is allowed his dram. After surgical operations, persons have been known to sink, through ignorance (on the part of the surgeon) of the general habits of the patient. Even death has occurred after operations, from the sudden abstraction of stimuli, to which the patient had been previously accustomed; whereas if he had been allowed his ordinary dram, the probability is that he would have recovered. This has been strikingly shown in other cases, where the knowledge was happily attained; and a good allowance of gin, after some severe accident, has caused every thing to go on well, though the patient at first appeared sinking. Bad habits are, therefore, sometimes to be *indulged;* although they should certainly never be *acquired.*

Idiosyncrasies.—Independently of what is called *temperament*, an individual may have a particular disposition, not acquired; it may be born with him, and be hereditary. A peculiarity is sometimes so exceedingly singular,—so totally different from what we observe in other people, that it is called *idiosyncrasy.*[a] It is nothing more than a peculiarity, either original or acquired by habit; and sometimes it is only congenital, while at other times it is hereditary. As an instance of this, we sometimes find a person who cannot eat a certain article of food. I recollect seeing a young woman who could eat the hardest salt beef, and digest it well; but if she took a raspberry, or currant, or any other fruit, she was instantly thrown into the most violent spasms of the stomach; so that a stranger would have fancied her life in danger. These are called *idiosyncrasies*; and it is of great use to know them, because some persons are peculiarly affected by certain remedies; and that which is a proper remedy for the disease, may be improper for a particular patient.[b]

So much, therefore, with respect to the causes of disease in general (general *ætiology*). I will now proceed to consider the third branch of General Pathology;—the symptoms of disease in general (*semeiology* or *symptomatology*).

SECTION IV.—SEMEIOLOGY.

Nature of Symptoms.—Symptoms comprehend every thing which is observed in a patient out of the course of health;—"singulæ quæ in ægro præter naturam observantur res."[c] The most evident, and the most constant of these, are put together; and are said to constitute the disease. The disease is not the *cause* of the symptoms; but the aggregate of symptoms constitutes the disease. I illustrated this with respect to jaundice and epilepsy[d]; the outward signs of which are jaundice and convulsions, while the inward state is the proximate cause.

Essential and Accidental Symptoms.—Symptoms may be "essential" (also called "pathognomonic"[e],) or they may be "accidental." The *essential*

[a] From ἰδιος, *peculiar*; συν, *with*; and κρασις, *a temperament.*

[b] The principal circumstances which predispose to disease, may be summed up under the following heads:—1. Age. 2. Sex. 3. Temperament. 4. Idiosyncrasy. 5. Habit of Body. 6. Climate. 7. Situation. 8. Season. 9. Diet. 10. Trade or Profession.

[c] Gregory's "Conspectus Medecinæ Theoreticæ." Chapter 1; Paragraph 26.

[d] See Page 31.

[e] From παθος, *a disease*; and γινωσκω, *to know.*

symptoms of disease, are those which are necessary to make the disease,—to constitute the idea of the disease. We cannot, for instance, suppose a patient to have pleurisy, unless there be a degree of feverishness, with sharp pain of the side, increased upon respiration, together with cough. These symptoms would be called "the essential symptoms of the disease"; yet no one of them would make the disease. A patient may have feverishness without pleurisy; or a sharp pain (either muscular or neuralgic) in his side without pleurisy; or, again, he may have cough without pleurisy. These symptoms, then, are altogether essential to the disease; but no one of them constitutes it. If, however, a symptom be so important to the disease that the latter cannot be present without it, then it is called "pathognomonic;"—a symptom without which we could have no conception of the existence of the disease. There are, however, but few of these symptoms. In jaundice, the yellowness of the skin, of the sclerotica[a], and of the nails, is pathognomonic. Without making any farther inquiry, we may be sure that the patient labours under jaundice; but, in general, we make out the disease from the groups of essential symptoms, and from taking into consideration every circumstance of the case. Besides these symptoms, others are *accidental.* Many cases have symptoms which are not at all necessary to the disease, since it has frequently existed without them.

Positive and Negative Symptoms.—You will find symptoms also spoken of as "positive" and "negative"; and it is of great use to attend to the latter. "A negative symptom" is, perhaps, an improper expression; as, properly speaking, a symptom must be positive. But, from the *absence* of certain circumstances (or symptoms) we frequently make out the nature of a disease. If there be two diseases with certain symptoms common to both, but one of them has a symptom which the other never has, then, if that symptom be absent, it enables you to make out the true nature of the case. Hence the absence of certain symptoms is frequently of as great importance to be attended to, as the presence of others.

Diagnosis of Diseases.—From the presence of the symptoms chiefly, but not entirely, we make out the character of the disease; and the determination of the character, the name and nature of the disease, is called the "diagnosis."[b] To speak again of jaundice[c]: from the yellowness of the skin, the whiteness of the fæces, and the dark colour of the urine, we make our diagnosis, and say the disease is jaundice; although, indeed, we may do so merely from the yellowness of the skin and of the sclerotica. But, frequently, the diagnosis is not easily made out from the symptoms alone. It is necessary to look into the exciting and predisposing causes of the disease, to ascertain what predisposition the patient is likely to have; also to ascertain to what exciting cause he has been exposed; and then—conceiving what it is likely would ensue, and observing (as far as possible) what actually has ensued—we are enabled to form a much better conclusion as to the real character of the affection. The diagnosis is also materially assisted by attending to the history of the case;—not merely observing the symptoms that present themselves to our notice, but inquiring carefully of the patient the whole story from the beginning. We thus ascertain whether these circumstances confirm what we suppose to be the nature of the case. In making out the character of the disease, it is also of great importance to learn the effects of any previous treatment that may have been adopted. If vigorous treatment has been employed, and has produced no effect what-

[a] From σκληρόω, *to harden.*
[b] From διαγινώσκω, *to distinguish.*
[c] See Pages 31 and 38.

ever, there will be great reason to doubt the propriety of the view which has been taken, with respect to the nature of the affection. In making a diagnosis, all these points are to be scrupulously attended to.

It is in making an accurate, careful diagnosis, that the medical practitioner chiefly shines. When the nature of a disease is once ascertained, it is no difficult matter to treat it. Other qualities of mind are then required;—frequently only courage, or mere perseverance; but it is in making a diagnosis,—in ascertaining the character of a disease, that the scientific practitioner outshines the inferior. Unfortunately this is a point not attended to as it ought to be. Many persons pride themselves in being good practitioners; because, without knowing what is the matter, they can say what will do good. It is an unscientific way of proceeding; and, even if I could not practise better for making a good diagnosis, still I would be as particular on that point as possible, for the sake of observing a good general rule,—for the sake of endeavouring to treat the patient better than I otherwise could, notwithstanding all my conceit; and for the purpose of being ready to meet any unexpected emergency that might arise. A medical man who will not take the trouble to establish a diagnosis, is just like a surgeon who will not condescend to learn the anatomy of hernia; but who says that he knows if he cuts this way and that way, he shall liberate the entangled parts, and accomplish the operation as well as the best. I have witnessed this; but, then, what are such men when a difficulty arises? They are lost in perplexity, and glad to apply to those who know better. It is impossible to be too minute in making a diagnosis.

Not only is it necessary to make a diagnosis as to the general character of the disease, but also to ascertain what variety of the affection it is (whether it is one with strength or weakness); and to weigh the minutest circumstances respecting the case. This is, perhaps, an exercise of patience; but it is a highly gratifying exercise, especially when it is found that a correct diagnosis has been made.

Prognosis of Diseases.—The judgment formed as to what will happen in a case, is called "*prognosis.*"[a] It is quite essential to the formation of a correct prognosis, that an accurate diagnosis should have been previously made; for if the nature of the affection be not known, it is difficult to pronounce an opinion as to the probable termination. For the sake of making a prognosis, all the symptoms must be observed, and the history of the case learned,—exactly as in making a diagnosis; but there is something more than that to be done. The direct tendency of the disease ought to be known;—the course which the disease is always inclined to run; and the course which it is likely to run in the particular individual, according to age,—sex,—previous habits,—and all those circumstances which I have previously mentioned, as to individual peculiarities[b]; and in proportion as it is in our power to put into practice requisite curative means. There are some cases in which, if we were allowed to practise our art freely, we should make a favourable prognosis; but in which, our hands being tied,—as they are when others, ill informed or inactive, are called in over us,—we must give an unfavourable prognosis;—simply because the patient must be allowed to die. In making a *prognosis*, there is frequently less skill required than in establishing a *diagnosis*; for some persons, with a sort of tact, will tell whether an individual is in danger or not, without knowing what is the matter with him. Many persons who have no knowledge of medicine, or at least very little, have such strong perceptions, that—from

[a] From προ, *before*; and γινωσκω, *to know*.

[b] See Pages 37 and 38.

the aspect of an individual, and from general observations of their own—they are enabled to give a very correct prognosis, either favourable or unfavourable. This I know to be the case. There are a great many intelligent officers, who—from seeing their men fall around them in battle, and sick in hospitals—have become, in one sense of the term, good doctors; and though they are not able to cure the disease, or tell what is the matter, they will be able to give a shrewd and correct guess as to how matters will turn out. But although some people, by nature, are well qualified for this, while others are not, yet the medical man must be taken as he is; and whether he does or does not possess sufficient natural sagacity to make an accurate *prognosis*, it is his duty to make as careful a *diagnosis* as he can;—in order that he may make as good a prognosis as possible. If his intellect be not of an acute description, yet, by knowing the case, and by the aid of science and minute observation, he will be able to form as good an opinion, as the man who, by nature, is qualified for these things; and if with science and observation be combined native sagacity, then I need not say, that his prognosis will be much superior to that of the individual who trusts alone to his natural powers.

Such, therefore, is what is meant by *diagnosis*, and *prognosis*; and I cannot too strongly recommend the most careful attention in establishing the former. Whether the patient can be cured, or not, it should be a solemn rule to investigate the case to the utmost. It is only by this plan we can profit ourselves, or that those who come after us can profit. If we be not careful, we cannot advance science; and the next generation will be none the better for us.

Diathesis.—There is a term which I have not yet explained, or even mentioned;—namely, the word "*diathesis.*"[a] When the body is particularly predisposed to any kind of affection, it is said by some to have that particular *diathesis*, or a disposition to it. The term, however, is generally limited to two states;—an inflammatory state; and a state of weakness, or debility, if not of putrescency. One is called the "phlogistic", or "sthenic" (which means "strong"); and the other the "asthenic", or "weak." When, for instance, a person labouring under any particular complaint, is in a high state of excitement, with a full and strong pulse, and increased heat of body, he is said to have the *sthenic*[b] or *phlogistic*[c] diathesis:—in fact, an active inflammatory state of the body. If, however, the state be one of debility (so that any disease which is actually present is attended with weakness), and still more if there be extreme collapse, and a disposition to putrescence, then it is called the *asthenic*[d] diathesis. I believe, in modern times, these terms are rarely used, except when a certain disease is present; so that they really imply, not the disposition to disease, but the character of the disease;—as to whether it is actively inflammatory (attended by strength), or whether it is attended by weakness. In this country, we seldom hear persons use either of these terms, except "phlogistic."

The word "*diathesis*" is used by old authors in other senses;—to signify, for instance, the general disposition to disease at any particular season; so that the constitution of the period was said to be its diathesis. If the disposition of any particular season of the year,—not the regular seasons,—were to produce such and such kinds of disease, the word "*diathesis*" was applied to that disposition;—to the disposition, if I may so speak, of the

[a] From διατίθημι, *to dispose.*
[b] From σθένος, *strength.*
[c] From φλογιζω, *to burn.*
[d] From α, *without*; and σθένος, *strength.*

atmosphere at the time. But, generally speaking, the word is used as I have pointed out above. However, sometimes a constitutional disposition to certain diseases, when present, is called a diathesis. For instance: it is not uncommon, in practice, to hear persons talk of a "scrofulous diathesis." Where a person has every look of scrofula, with its actual presence in one part, individuals say,—"That is a scrofulous diathesis." A disposition to many other kinds of disease, when present, is sometimes called a diathesis; but it is the *phlogistic* diathesis of which mention is most frequently made. This term is sometimes used to signify that full state of the body, which would render a person very liable to an active inflammatory affection; but is certainly more frequently limited to that state, when the disease has actually begun. Now and then, persons with merely a full pulse, are said to be labouring under the phlogistic diathesis; but that state is characterized more particularly by the word "*plethora*", of which I lately spoke.[a]

Let us now consider those symptoms of disease, on which the diagnosis and prognosis are in a great measure to be founded. The symptoms of disease may be divided, perhaps, in one point of view, into two kinds;—those which are discoverable by the patient only; and those which are discoverable by the by-standers also, or by them alone.

Uneasy Sensations.—There are some symptoms which a patient alone can ascertain;—for example, his feelings. He it is that feels the pain, and it is a lucky circumstance that it is so; for if the doctor felt the pain as well as the patient, there are but few who could stand the practising of the profession. We know little about the pain, except from the patient's account; and in many cases, in public practice, we are deceived. We have, however, only done our duty in listening to the patient's description.

Pain.—With respect to *pain*, it is of various kinds:—it may be "sharp",—"stabbing",—"darting",—"shooting",—"lancinating". These are all words used by patients. At other times the pain is not of this character, but dull; and then we call it an "ache"; and sometimes patients add the word "*pain*";—making it "aching pain." Sometimes pain is described as "throbbing" and "pulsating"; and patients also complain of "pricking" pain,—as though a number of needles were being pressed into them. These things are all of great importance to be attended to, because they frequently show the seat of the affection; and according as a patient describes his pain to be sharp or dull, throbbing or pricking, so we frequently ascertain whether he is telling the truth or not; because the probability is, that it will be of a particular character; and we may ascertain whether his account agrees with what we should, *a priori*, expect him to describe. We sometimes hear pain spoken of as "smarting"; and, in some affections of the abdomen, a patient complains of "broiling" pain. It appears to be a high degree of smarting, with a sense of burning.

If pain be increased by pressure, or by the application of stimulants, then we say there is "tenderness"; but perhaps the word "*tenderness*" is more properly restricted to pain increased upon mechanical pressure. There are other feelings continually described by patients; as, for instance, a feeling of "dead weight." This is particularly the case with respect to the head. We sometimes hear persons complain of "fulness",—as if a part were excessively full; and now and then this sensation rises to such a pitch, that the part feels as if it would burst; and then we call it a feeling of "tension." A feeling of *tension*, appears to be a high degree of a feeling of *fulness*. Now and then, patients complain of a sensation

[a] See Page 35.

of "pins and needles"; which is very different from the sensation of pricking pain,—as if needles were being run in; it is as if the pins and needles were rather blunt. It merely gives the lowest sensation of this kind,—not amounting to pain. "Pricking" pain is of a very different character;—for instance, that which people frequently complain of from inflammation of the urethra, in gonorrhœa. They experience a pricking pain along the urethra. But the sensation experienced when the hands and feet are "asleep", is not called *pain*;—patients say they feel as if pins and needles were there. You will frequently hear persons declare, that they have an indescribable uneasiness in a part,—a sensation which nearly drives them mad; but they will not allow it to be *pain*. I have known this sensation occur in different parts of the body. I recollect one lady who had it in the neck; so that she was obliged to walk about the room, followed by a servant rubbing her neck, night and day. Unless this was done, the sensation nearly deprived her of her senses; and her countenance betrayed the greatest distress. You will find other sensations spoken of by patients;—a "creeping", a "crawling", or a feeling as if water were trickling down them. There are also symptoms which approach nearly to pain,—"itching" and "tingling"; which may be almost insupportable. Tingling is a high degree, I imagine, of what is called "itching", united with a sense of "pricking." With regard to other sensations, there is nausea felt in one part,—the stomach; and now and then persons have an excessive sensibility of one particular sense,—of the eye or the ear, for instance.

Exhaustion and Debility.—Besides these symptoms, people have a feeling of great exhaustion, or debility; and this is a point strictly to be attended to, in forming the prognosis in an acute disease; for sometimes it is a fatal symptom. When a patient, for example, after inflammation of the bowels, has no pain, but a feeble pulse; and complains that he is so weak, that he feels as if he should die,—that he never felt such weakness in his life, we may be almost sure he will be dead before the next day. On the other hand, this feeling is very deceptive. Women are subject to a sinking sensation at the epigastrium. They tell us they feel as if they had no inside; and are sure they are about to die; but the feeling is quite delusive. In the former case, after an acute disease, from seeing all, or the greater part of the symptoms decline, we might judge that the patient would soon get well, and that this feeling of weakness was nothing more than might be expected after severe indisposition; but we must take into account other symptoms,—particularly the weakness of the pulse. But with respect to these females, we find the pulse good; and they are able to walk about, notwithstanding all the depressive feelings of which they complain. This is a very remarkable circumstance; and I shall find it necessary to draw attention to it, when speaking of diseases of the stomach, and of hysterical affections.

Drowsiness, &c.—Patients, also, can alone be conscious of drowsiness, *deficient* appetite, *inordinate* appetite, and *depraved* appetite; although, with respect to many of these things, we can often, by other circumstances, ascertain whether they are telling the truth or not. It is to the patient, likewise, that we must trust for the existence of tenesmus[a] and of strangury[b];—a frequent desire to go to stool, and a painful and frequent desire to make water.

There are some symptoms, too, which are derived from other senses than those of general feelings; and these are referrible to the *ear*. Patients will continually complain of the most violent "beating pulsation" in their head:

[a] From τεινω, *to constringe.*

[b] From στραγξ, στραγγος, *a drop*; and ουρον, *urine.*

and frequently, too, of a "snapping" and "cracking" there. Such symptoms undoubtedly do exist; but we can take no cognizance of them. With respect to *sight*, we must depend on the patient's account for the occurrence of flashes of light before the eyes; and for the symptom so common in many diseases,—moats floating before the eyes; and for double vision, or diplopia [a]; and likewise for the symptoms of giddiness or vertigo. [b] On the patient, also, we must depend for symptoms with regard to *taste*. Some have in their mouth a bitter nauseous taste, of which we cannot judge. So with respect to *smell*;—now and then persons experience a most disagreeable odour, which no other person can notice. There was a case of hydrophobia at Guy's hospital, in which there was an instance of an accidental symptom, and that a symptom to be ascertained only by the patient;—the patient experienced a most disgusting odour. This occasionally happens in cases of insanity. Now and then the smell which the patient perceives, may be noticed by other persons; because it arises from some disease within the nose. There are still other symptoms, of which the patient alone can give an account; such as defects in the senses;—a loss of sight, of taste, or of hearing. So with respect to many mental circumstances; such as the loss of many desires, and a feeling of strong desires;—for all these we must rely much upon the patient.

All these are symptoms which the patient alone can know any thing about. We all know something about them, because we are more or less ill at some part of our lives; but the medical attendant must take the patient's word for these sensations;—at least he cannot ascertain the existence of them directly. He can only ascertain, by other symptoms, whether the patient is probably telling the truth.

Altered Appearances.—I shall proceed now to consider those symptoms which are perceptible to the practitioner also, or to him only. In some writers, "symptoms" and "signs" are distinguished from each other; but I think it mere trifling to dwell upon such matters. With respect to those symptoms, however, which others observe, of course the patient, for the most part, may observe them likewise.

In observing the symptoms of disease, it is right to remember that Providence has blessed us with five senses; and all these five senses it would be ungrateful, as well as unscientific, not to employ. I am led to speak in this way, on account of its being a modern practice to employ the ear extensively. Those who do so were formerly laughed at as innovators;—as people who took unnecessary pains, and were perhaps attempting a piece of quackery, in order to produce an impression on their patients. If nature has blessed us with hearing to observe certain phenomena around us, there can be no reason for not employing it, when we come to observe the phenomena of disease; and if it be a fact, that there are symptoms of the most useful nature cognizable by the ear only, it is our duty to employ our ears for the purpose of detecting them. We are bound, I think, to employ all our five senses in the investigation of disease. The senses, however, of which we chiefly make use, are those of sight, hearing, and touch; but the smell, and in some instances even the taste, may be called in to our aid;—the smell, however, much more frequently than the taste. It would be as absurd to shut our ears, as to shut our eyes; yet, because the extensive employment of hearing has only been introduced lately, those who were not instructed in this point when they were students, are, some of them,

[a] From διαπλοος, *double*; and οπτομαι, *to see*.

[b] From *verto, to turn*.

too proud to learn in their old age; and are good enough to pity us younger men.

As to those symptoms which are cognizable by our various senses, they discover themselves in every part of the body, from the head to the foot; but the two parts which give the chief symptoms to the sight, and (I may say) to the touch, and the chief symptoms not only in reference to themselves but to all other parts of the body, are the *head* and the *hand*. It has become the custom, in all civilized nations, to cover all parts of the body except the face and hands; and these two parts afford far more information than any others, respecting the state of the body, and respecting diseases that are present, and not seated in these individual parts, but at a distance. It is certainly a striking coincidence; but we must remember, that while necessity compels mankind to keep the face, and almost always the hand, uncovered, Providence has ordained that these same two parts shall convey the chief information to others, respecting our mind and body.

With respect to the face, we observe that it gives us two sorts of information;—first, as a mere portion of the body only,—a portion of the surface which is far more affected by every change than any other, excepting the hand, and therefore so far as it is *face*; and, secondly, it gives us another description of information so far as it is *countenance*,—so far as it expresses the state of the mind, and the state of the feeling altogether. The observations which we make upon this part of the body, then, may be considered as they respect simply *face*, and as they respect simply *countenance*.

Alterations in the Face.—With regard to the face, as really a part of the surface of the body, if there be fulness of blood, it is shown particularly there. If we were to take the same quantity of surface in any other part of the body,—the abdomen, back, or thighs, for instance,—we should not get the same information from the part, simply as surface, as we do from the face. If the body be at all full, we see it in the face. If the circulation be rapid, and the heat considerable, it is the face that shows it; for the cheeks become tinged much sooner than any other part. If there be the least degree of coldness, we perceive it in the cheeks, nose, and lips. We discover hectic fever in an instant, by the red patch upon the cheek. If the patient be labouring under difficulty of breathing, we find the eyes immediately suffused, the lips more or less livid, and the whole face frequently of a leaden hue;—sometimes, indeed, I have seen it black. If it be jaundice that the patient labours under, we instantly discover it in the face. By one part of the face (the eye) we can detect it, long before it appears in any other part of the body, except the hand; and when the disease has nearly declined, it is in the face as well as in the hand, that it lingers the longest. In the white of the eye we perceive the presence of jaundice, before it is apparent any where else, except at the root of the nails. If the patient be bloodless, it is first discovered in the paleness of the face, the want of the usual vermilion of the lips, and the absolute paleness of the tongue. There is not a white crust upon the tongue; but it is absolutely blanched. Two of the chief marks of scrofula are shown in the face;—the dilated pupil, and the tumid under lip.

From the face *altogether*, simply as a part of the body, we are able frequently to tell at once that the lungs are affected, or that there is a great disposition to affection of the lungs. It is sometimes impossible to doubt for a moment that, if the patient be not labouring under phthisis, it will soon approach. From the peculiar appearance of the countenance, particularly from the appearance of the eye (its transparency), together with the languor of the cheeks, or the flush upon them,—no doubt can exist as to the

nature of the disposition. And with respect to other parts, we can tell that the patient is labouring under organic disease of the abdomen, from the look of the cheeks. I do not say it is so always; but the appearance of the face is of great use, in enabling us to detect that condition.

In organic diseases of the stomach, intestines, and surrounding parts, there is often a faint greenish yellow appearance of the face, something like that of a faded leaf, with minute vessels;—not forming a patch of red, as in hectic fever; but reticulated, like net-work, on the cheeks. Where we observe this, there is generally some part of the abdomen in a state of organic disease. We discover, in a moment, the strength of a patient by his countenance. When attending a case of fever, there is frequently no occasion to ask a question: we can tell whether a patient is better or worse, by viewing his countenance. So with respect to many other diseases;—when the patient is getting either better or worse, we can tell immediately, by his face, what change has taken place subsequently to our previous visit. Every body makes this observation; and hence, when an individual meets a friend, he tells him that he looks well, or that he is sorry to see him ill. If the appearance of the face be so characteristic of the state of an individual's health, even in the judgment of an inexperienced person, how much more so must it be in that of the medical man, who studies minutely every shade of change and difference that takes place in each particular part!

Of course, if disease take place in the face locally, it will show itself there as in other parts of the frame;—whether it be swelling, mortification, local cutaneous disease, or whatever else may happen to it.

The Tongue.—In the *tongue* an immense number of symptoms present themselves; and the body cannot labour under inflammation in any part, without the tongue becoming affected by it; if there be strength, generally the tongue becomes white. If there be inflammation within the stomach and intestines, it frequently becomes red,—red at the tip, red at the sides, perhaps red all over; and perhaps there are red stripes upon it. If the stomach be simply in a state of dyspepsia, and the bowels confined, the tongue becomes covered with a yellow thick mucus. The indications of the tongue are innumerable; they have been observed from the remotest ages; and no one would think of finishing his attention to a patient, without looking at that organ. The tongue will sometimes become brown; sometimes it will become absolutely black. In what are called "putrid" diseases,—where there is a high degree of debility, and a disposition to putrescency,—the tongue will become black. In other cases it will become glazed throughout, shining, and glassy; and in this state it will frequently be cracked. In other diseases, again,—as in "delirium tremens",—it is frequently covered by a creamy mucus;—not a thick yellow mucus; but a mucus more like cream than any thing else, and so liquid that the tongue is moist. The tongue frequently, in paralysis, moves to one side; but generally in an opposite direction to that in which the mouth is drawn.[a] In fever, and other diseases, the tremor of the tongue is very characteristic. In general the whole body trembles; but the tongue does so particularly. In "paralysis agitans", though the person lie still in bed, yet if he put out his tongue, it is seen to be in a great degree of tremor. In cases of dyspnœa[b] and apoplexy, the tongue

[a] In paralysis of one side of the face, the tongue goes to the *diseased* side;—being turned in that direction, as on a pivot, by the action of the "genio-hyo-glossus" muscle of the healthy side.—*Dr. Fletcher.*

[b] From δυς, *with difficulty*; and πνεω, *to breathe.*

is swollen. I need not insist upon the great importance of this part of the face or head,—the tongue.[a]

The Eye.—Then, again, if we take the *eyes.* We discover, in a moment, whether there is great excitement of the brain going on, by the sparkling of the eyes, by their redness and watery appearance. We can discover whether a person has headach, by the oppression shown in the eyes; and, in some affections of the head, the eyes squint,—are contorted in various ways. Frequently, too, when a person is asleep, he does not completely close his eyes; which is often an indication of disease. Then, again, the state of the pupil is very characteristic of many affections of the head. If we take the eye altogether, there is generally an appearance of brilliancy, or of dulness; or, if we take particular parts, there is a dilatation of the pupil, or (on the other hand) an extreme contraction; all these things it is of the highest importance to observe, because they point out particular affections. For example: if we take apoplexy, we usually see the pupil dilated, and know that there is great oppression of the brain; but if the pupil be amazingly contracted,—reduced to a pin's point, we may almost to a certainty say that the patient will die. I do not say it is *absolutely* certain; because it is wrong to speak positively. If a person have taken a large quantity of opium, there is generally the same effect produced—a great contraction of the pupil; and where we are not informed with certainty of the patient having taken that narcotic, the appearance I have just described will assist materially in forming the diagnosis. Then—besides the strabismus[b], and open state of the eye during sleep—there are contortions in various instances; particularly if a child have convulsions of another part of the face,—the muscles of the lower jaw; so that he gnashes and grinds his teeth together during sleep, and his eyes roll.[c]

Risus Sardonicus.—There is one set of convulsions about the mouth, mentioned under the term "*risus sardonicus.*" It is a horrid sort of grin, which is often seen in persons who are about to expire. To me it is the most terrible of all sights. It has been thought to characterize inflammation of the diaphragm[d]; but I do not know whether that is the case;—inflammation of the diaphragm is a rare affection. It is common, however,

[a] The tongue is flat, with its anterior extremity rounded, in gastro-enteritis. It is cylindrical and pointed in hectic fever; in which the "lobster-tongue" (red, with white papillæ) sometimes occurs. In scarlatina it is white, with red papillæ. In dyspepsia, especially in the morning, it is rough and scabrous.—*Dr. Fletcher.*

[b] From στραβιζω, *to squint.*

[c] The eyes do not close in paralysis, apoplexy, asphyxia, and the "Hippocratic countenance." An open state of the eyes, therefore, is considered a very bad sign. In tetanus the eyes are generally open, both when the patient is asleep and when he is awake; for neither the sphincter ("orbicularis palpebrarum") nor the "levator palpebræ superioris" is completely relaxed;—so that the eye-lids are always partially separated. In this disease, the ball of the eye is fixed;—from contraction of the "recti" muscles. Ptosis is a palsy of the "levator palpebræ superioris." Strabismus occurs in the first stage of apoplexy, in myelitis of the upper part of the spinal cord, in amaurosis, in worms, &c. It takes place either from *defective* action of *one* set of muscles, or from *increased* action of *another* set. The direction of the eye is upward, in tetanus, because the "*inferior* oblique" muscle acts too *much*; and in paralysis and syncope, because the "*superior* oblique" acts too *little.* The eye is too moist in tetanus, and the last stage of ophthalmia; it is dry in the first stage of ophthalmia, in phrenitis, and in all the diseases of debility. It appears to "flash" in anger, mania, hysteria, and fever. The cause of this appearance is, that the vessels in the interior of the eye are dilated, and admit more white blood; so that more light is reflected. The iris is said to be convulsed in epilepsy; but I never met with any one who had seen it; and we are not sure that the iris is muscular,—so as to be *capable* of being convulsed.—*Dr. Fletcher.*

[d] From δια, *through*; and ρηττω, *to divide.*

for persons at death's door to grin frightfully. The phenomenon receives its name from a herb, of a poisonous quality, which grows in Sardinia; and is said to produce in those who eat it, this horrid contortion of the mouth, just before death.

The Orbit.—From the state of the *orbit*, or at least the contents of the orbit around the eye, we may judge of the extreme debility, exhaustion, and emaciation of the patient. If the parts around the eye become absorbed, the eye sinks back in the orbit, and there is produced a hollowness, which is characteristic of extreme exhaustion and inanition; and this alone will enable us to say, in a moment, how much worse the patient has become.

Facies Hippocratica.—We likewise see a singular appearance of the countenance, mentioned by almost every writer, under the title of "*facies Hippocratica*"; so called, because Hippocrates gave a most accurate description of it. His description is,—"sharpness of the nose; hollowness of the eyes; collapsed state of the temples; collapsed and contracted state of the ears; the edges of the nostrils everted[a]; the skin of the forehead firm, tense, and dry; paleness of the whole face, perhaps even blackness, or a livid and a leaden appearance." These are the characteristics of the "facies Hippocratica." It is the usual appearance of the face, immediately before death; when the body is at last completely exhausted, and life about to be resigned.

The Teeth.—I may mention (although it is not in regular order) that among the symptoms of phthisis, one is taken from the teeth:—not that all phthisical patients have the same state of the teeth; but in many there is beautiful whiteness of the teeth, with a degree of transparency and brilliancy, comparatively seldom seen in persons who are not disposed to phthisis.

Exanthematic Eruptions in the Face.—I may mention that exanthematic and acute inflammatory cutaneous diseases, show themselves much better on the face, for the most part, than anywhere else. It is on the face, first, that we discover a child is going to have the measles. When a child is in a state of pyrexia, and we are sure it is going to be ill of something or other, the face will first disclose it, if it be the measles. There we have the running of the eyes,—there we have the fulness; and the first papulæ that present themselves, are generally seen on the face. Most acute cutaneous diseases attack the face among the earliest parts; or if they do not, yet the face, if affected, generally discovers the true nature of the disease better than any other part; the reason of which is, that the face is much more vascular than other parts. The cheeks are more or less inclined to be red, in most individuals; and the least feverishness reddens the face, more than any other part of the body; and therefore it is that acute cutaneous diseases generally show themselves best in that situation.

Paralysis of the Face.—With respect to the face, simply as a part of the surface of the body, we discover paralysis in it more easily than in any other part. If a person be sitting still, we cannot tell whether his arm or his leg is paralyzed; but if his face be paralyzed, we can generally in an instant discover it, by the part affected being drawn to the opposite side, and perhaps

[a] The nostrils are *dilated* in phrenitis, tetanus, and all diseases of excitement and impeded respiration. They are *constricted* in asphyxia, and all diseases of depression. This constriction is very remarkable in the "Hippocratic countenance"; which depends on defective muscular action. The "hectic countenance" is distinguished from it by redness of the cheeks. In all other particulars it resembles the Hippocratic; but depends on a different cause,—the absorption of fat. The expansion of the nostrils, in dyspnœa, is not for the purpose of admitting more air; for, if that were the case, the mouth would be open. It is owing to the great stimulus applied to the portio dura; which sets all the muscles supplied by it into energetic action.—*Dr. Fletcher.*

from the patient's inability to swallow his saliva.[a] And so with regard to the tongue;—the moment the person begins to speak, we frequently can discover the existence of paralysis.

The Countenance.—The face is particularly indicative of the general state of the individual's mind, and of the general state of the strength likewise; and we then, perhaps, should rather call it "the *countenance*"; and speak of "the *countenance*" instead of "the *face*";—"the *countenance*" being the term generally used in reference to the state of the feelings. We can judge directly whether a patient is in pain or not,—whether he is suffering, by the countenance. In colic, and in enteritis, the agony is so depicted in the countenance, that we discover in an instant that something must be wrong. I need not say that, in insanity, that passion of the mind which is predominant, discovers itself in the countenance. We may at once detect a good natured, a furious, a proud, or a desponding maniac. We may also discover much by the way in which his *head* is carried,—to say nothing of his countenance. Those that are proud, carry the head upright; those that are cast down, carry it the reverse. But the countenance, independently of the position of the head, is indicative of the character of the disease;—an idiot is almost immediately discovered by the expression of his face. We ascertain in a moment, by the countenance, what the person's feelings are with respect to strength as well as to comfort; and what passions of the mind are predominant. We discover, as I before mentioned [b], whether a person is better by observing his face,—by noticing whether it looks fuller; but we also discover much from the expression of the countenance. What a vast amount of information, therefore, is given by the face;—not only with respect to affections of that particular part, but with respect to all other parts of the body.

The Attitude.—A great deal may be learned of the patient's feelings, by the attitude of his body. In fever nothing is a more unfavourable omen, than for a patient to be seen lying on his side at first, and gradually getting on his back, till he lies altogether supine; but when he also sinks in his bed, the case becomes still more alarming. The reason is simply this:—More muscular strength is required in order to lie on the side, than on the back, and to remain in a firm posture than to sink down; and therefore, when a patient sinks down, it is an indication that his strength is nearly exhausted. We discover a great deal, too, by the restlessness of the whole body. One of the most unfavourable symptoms, in many diseases, is extreme restlessness. Restlessness, in women, may arise from mere fidgets; but in acute diseases, when great debility has come on, restlessness is often one of the fatal symptoms.

The Hand.—But to go to the *hand*;—the part which, together with the face, in all countries (civilized and uncivilized), is most exposed. In the hand we have very great indications; though, certainly, they are not so strong as in the face. The hand is one of the extreme parts, and shows the first fall of temperature. It is one of the first parts that become cold;—exactly as the nose and ears do in the head. I believe the difference between its temperature in fever and in health, is often greater than the difference of the temperature of most other parts of the body. A cold sweat is shown in the hand, among the earliest parts; and the hectic fever which flushes the face, flushes also the palm of the hand, and indeed the sole of the foot; but it is shown particularly in the palm of the hand, from the greater fineness of the integuments. Difficulty of breathing, again, discovers itself by the

[a] Probably from "salitus", *salt.*

[b] See Page 45.

appearance of the nails. If, in the difficulty of breathing, we observe a purple hue of the lips, a fulness and a leaden colour of the face, and a purplish colour of the eyes, we discover likewise a purple hue of the nails, —at least the parts under the nails. As I mentioned, in jaundice, that the disease appears first at the roots of the nails, as well as in the sclerotica; and that after the disease has disappeared from the rest of the surfaces, we may discover it still lingering in the system by the yellowness observed in the same two parts [a],—so I believe that the changes, with respect to the eyes and nails, go on *pari passu* [b] in dyspnœa. The dryness of the hand, its mordant heat, its clamminess, its firmness, its softness, the very grasp of the patient,—are all significant. If phthisis is often seen in the eye, the ends of the fingers are no less indicative of it, or of some other internal scrofulous affection.

Besides all this, it is in the hand that we easily make the most important conceivable observations, upon the state of the circulation. It is in the hand, or at least at the wrist, that we feel the pulse much more easily than at any other part of the body. The same observation might be made anywhere else; but it would be done far less accurately, and with far less ease, than at the wrist. With respect to all other observations,—about temperature, about heat, about cold, about clamminess, and about sweats,—I think that not only are they all made much more accurately in the hand than in any other part, but that the hand appears to be affected by these particular symptoms, more than most other parts of the surface of the body.

Volume of the Pulse.—With regard to the *pulse*, great indications of disease are taken from it. The pulse generally is spoken of, in the first place, as "great" or "small" ("pulsus magnus",—"pulsus parvus"); it is mentioned likewise as "strong" or "weak" ("pulsus validus",—"pulsus debilis"); and as "hard" or "soft" ("durus",—"mollis"). A pulse may be *large*,—may be *considerable*, and yet not *hard;* a pulse also may be *hard*, and yet by no means *large*,—on the contrary, exceedingly *small*. A pulse is not necessarily *strong* because it is *large;* neither is it necessarily *weak* because it is *small* in volume. If a pulse be both *hard* and *large*, it is a *strong* pulse also; if a pulse be *small* and *soft* together, then it must be considered as *weak*. Mere softness may be such as to amount to weakness; and if it be exceedingly weak, we may extinguish it by the least pressure of the finger. This pulse has been called "pulsus vermicularis"; and (among us) "fluttering", if it be also quick. It is a pulse easily recognised in practice; and, in many cases, indicates death to be at hand. If a pulse be exceedingly *hard*, and at the same time *small*, then it has been called "a *wiry* pulse." A wire is necessarily fine and hard; and a pulse which has the same attributes is called "a wiry pulse." This is different from a *thready* pulse; just as thread is different from wire. A *thready* pulse is merely that which is small, soft, and weak;—a vermicular motion, hardly worthy of the name of a pulsation. It is chiefly in violent inflammations of the abdomen, that we have the *wiry* pulse; however, we must not depend upon the pulse only, in such cases. If there be other symptoms of inflammation of the stomach, or intestines, or peritonæum [c], we must not say that is not the disease, because the pulse is not wiry.

Rate of the Pulse.—These are the qualities of the pulse, with respect to its volume, solidity, and force;—*large* or *small*, *hard* or *soft*, *strong* or *weak*. But there are other varieties of pulse, taken from its *rate*. A pulse may be *quick*, and a pulse may be *slow;* there is the "pulsus *frequens*", and the "pulsus

[a] See Page 44.

[b] "In similar progression."

[c] From περι, *around;* and τεινω, *to stretch*.

rarus." The pulse will sometimes go up to 160. Sometimes it will go beyond that;—so that we cannot count it, especially if weak. But then we can ascertain the state of the circulation by the heart, where we can count 200 and upwards with perfect ease, when we cannot count the pulse at the wrist. A distinction is made with regard to a frequent pulse, into a "pulsus *frequens*" and a "pulsus *celer.*" "Frequens" is where there is a large number of strokes in a given time; and "celer" is where the strokes take place in a short and abrupt manner. "Pulsus *frequens*" and "pulsus *rarus*" are opposite to each other;—the former being a rapid, and the latter a slow pulse. The opposite of the "pulsus *celer*" is the "pulsus *tardus*"; in which, whatever number of beats take place, they occur in a gradual manner. In England, practitioners call the pulsus celer "a *jerking* pulse"; —"*jerking*" and "*sharp*" are our terms corresponding to "*celer*", with regard to the pulse. No matter whether it is quick or not, we say it is a *sharp* or *jerking* pulse; whereas, on the other hand, that which takes place (as it were) deliberately, is called "pulsus *tardus.*"

Examine the Pulse at both Wrists.—I may mention the great importance of feeling the pulse at both wrists. If we feel the pulse at the left wrist only, we may often think that the patient, from extreme debility, cannot bear bleeding; but if we feel it at the right also, we can frequently form a very different opinion. Nothing is more common than for the pulse at the two wrists to vary exceedingly; and it is the pulse at the *right* wrist that, in the greater number of cases, is the correct guide. The difference is so great, in so large a number of cases, that it should be a general rule to observe both pulses. I have never myself seen the pulses different in point of *time*; but there is a great difference with respect to *force*. It is also certainly right, in cases of great nicety,—where we are in doubt as to the means to be used,—to examine likewise at the heart; and in cases of local disease of that organ, it is also right to examine the heart itself; for, in some diseases, we have simply, from an affection of the heart, a very violent pulse;—such as would lead us to bleed to a great extent. But, in those cases, the pulse is not an indication of the general strength of the patient; but receives its character solely from the disease of the heart. On the other hand, in some diseases of the heart itself, we find a very small pulse; and, on examining the heart, we hear it beat violently; but, owing to a diminution in the aperture, the blood escapes in small quantity.

Irregularity of the Pulse.—I should likewise mention, with respect to the pulse, that its rate, size, and force, are sometimes irregular. It will vary in strength and size, at different beats; and it will also vary in frequency. We sometimes have a pulse merely *irregular*;—beating always with nearly the same *force*, but at an irregular *rate*; and that is an "irregular" pulse, in the common acceptation of the word. But, besides that, we frequently find it irregular in *force*, *size*, and *frequency*; so that it will give a strong pulsation or two; then a number of strokes of no strength at all; and, again, it will beat violently. Irregularity, therefore, does not refer to *frequency* only, but likewise to *force*. Sometimes the pulse intermits.

The Pulse varies according to Age.—We must also remember, as physiologists, that the pulse differs in every age;—that the younger we are, the more quick is the pulse; also that the pulse of the female is quicker than that of the male; and that, generally, the inhabitants of a warm climate have a weaker pulse, than those in a more temperate latitude. It is necessary to take all these things into consideration; because, if we were to find the pulse of a child 120, and that of an adult labouring under fever

likewise 120, we should commit a great error in supposing that the child likewise laboured under fever. It is necessary, therefore, to remember that the pulse varies according to age, sex, and climate; and that in young children it is particularly quick. I had an instance of the great use of examining a patient in bed, and not being contented without what is contemptuously called "a *mechanical* examination", in an enlargement of the abdomen:—

Case.—I was called to visit a pregnant lady, about thirty years of age, whose pulse was about 80 or 90; but on listening to the abdomen,—she being single, and having some disease (as she said),—there was another pulsation, about 128. The pulsation did not arise from any of the branches of the iliac arteries; for their pulsations would have been the same as at the wrists. She had a pulse of 80; something within her had a pulse of 128; and what that was, I left her to settle by herself. All that I could say was, that if she waited patiently, the whole of the disease would come away, to a certainty, in two or three months.

The pulse has been called, in the most ancient times, "res fallacissima",—the most false of all symptoms; but the truth is, *all* symptoms are delusive, if taken separately: it is the collection which enables us to form our judgment. The varieties which I have mentioned, are sufficient for all practical purposes, and are the only ones that I have observed; but we find, in books, an extreme *minuteness* on this point; and, I think, a great deal of absurd trifling. The Chinese, I understand, have made most minute observations on this subject. They describe all sorts of pulse;—such as (I dare say) no one ever observed, and no one ever will.

As to the two parts of the body hitherto mentioned,—the face (or, rather, the head altogether), and the hand, our observations upon them are chiefly made by sight and by touch. The head and the hand, of course, when they themselves are affected, give all the symptoms common to other parts of the body. When either of these parts is inflamed, the various local symptoms present themselves. It is not, however, of local symptoms that I am at present speaking; but of symptoms indicating the state of the other parts of the system in general.

State of the Breath.—However, there is another sense that may be employed with respect to the head; and that is the sense of smell. The breath that proceeds from the mouth, has sometimes peculiar odours; which, if we do not take pains to notice, we are at any rate compelled to observe.

The Neck.—To proceed, downwards, however; the *neck* affords a certain degree of information, but not much. A *long*, *thin* neck is frequently taken, in conjunction with other symptoms, as a sign of phthisis; whereas, a *short*, *thick* neck indicates a disposition to fulness of the head and chest. The pulse in the neck is also an indication of different diseases. In many affections of the head, the carotids[a] will throb violently,—so as to be seen at a distance; and in many affections of the chest, the same circumstance is observed. Here, again, we see the necessity of attending to more symptoms than one. A great throbbing of the carotids may arise either from an affection of the chest, or of the head; for they both give rise to it. The pulsation of the jugulars[b] is likewise frequently an indication of thoracic disease; for a difficulty in the transmission of the blood through the chest, will give rise to a great pulsation of the jugulars. I need not

[a] From κάρηνω, *to cause to sleep*; because the tying of the vessels in question produces coma.

[b] From "jugulum", *the throat*;—so called from "jugum", *a yoke*.

say, that tenderness of the neck indicates various diseases. By observing tenderness in that situation, it is frequently easy to ascertain the existence of disease in the larynx; when, otherwise, there might be doubt as to the nature of the affection.

The Thorax.—With respect to the *chest*, it affords us a vast source of information. Its size and shape indicate the general constitution. Phthisical patients generally have a narrow and flat chest;—contracted in various directions,—shallow and flat in the front, and narrow at the sides. If a person be disposed to apoplexy (from mere plethora and congestion), and in gouty persons, the chest is disposed to be circular. Frequently the chest is deformed; and frequently it acquires an enlargement in various parts, from disease in the pleura. When a collection of water or pus (particularly of pus) takes place in the pleura, it is not uncommon to find that the sides of the chest have become enlarged. It is, therefore, frequently of great importance in thoracic diseases to strip the patient, and look at his chest; for we may frequently discover by the eye a slight deviation in its two sides, which we cannot observe by the touch. A deviation so slight, that it would escape us if we resorted to measurement, is frequently perceptible to the eye.[a] Of course, the touch will give considerable information with respect to tenderness; and also with respect to the state of respiration, and the state of the heart,—by the thrill which we experience. In some cases of difficulty of respiration, we find under respiration a thrill; and in certain obstructions of the heart itself, we find, on pressing over a part of the heart, a similar circumstance takes place,—corresponding with the action of the heart. In some cases of aneurism[b] of the aorta[c], and of diseases of the heart, we find by the hand a strong pulsation.

Respiratory Sounds.—But although the sight and the touch give this information, there is a third sense which imparts especial aid with respect to diseases of the chest; and that is hearing. The function of the lungs differs from the function of many other parts, in this circumstance.—It is performed with a noise; and so, likewise, is the function of the heart. The functions of the brain and the liver go on without any indications appreciable by our senses; but it is peculiar to the function of the lungs and of the heart, that a certain sound should take place. If this noise take place in health,—in sound physiology, it must be expected that when the function of these parts is disturbed, the *physiological* sound will become *pathological*;—that the sound will be altered; and such is actually the fact. If this be the case, it is our duty to attend to it; if it be not the case, let those who say so prove that they are correct. We declare it is so; and we ask those who entertain a contrary opinion to listen for themselves.

Indications furnished by Percussion.—As to the lungs, it will sometimes be found that the healthy sound of respiration ceases altogether. A lung becomes impervious at a certain part;—the air will not go through it; and this may arise from an obstruction to the course of the blood into the lung. But it may also arise from the lung itself becoming consolidated; or from external pressure of the lung;—the dropsical pleura preventing the lung from expand-

[a] The chest may be *enlarged* from collections within of air, water, or pus. It may be *contracted* (generally on one side) from pleuritic adhesions, and after paracentesis. Adhesions of the pleura cause difficulty of breathing in the lung to which they correspond; so that the muscles on the affected side are not used so much as on the other. This causes, on that side, a diminution of bulk.—*Dr. Fletcher.*

[b] From *ανευρυνω, to dilate.*

[c] From *αηρ, air*; and *τηρεω, to keep*;—the vessel in question being supposed, by the ancients, to contain air *alone.*

ing. We may thus ascertain, however, that respiration is not going on in that spot. Besides an absolute want of sound, in certain diseases of the chest, there is in others an *unnatural* sound;—the sound of respiration does not *cease*, but becomes strangely *altered*. Information is afforded, not by listening only, but by *striking*. If the chest be struck, the lungs in health give out a hollow sound. The lungs being filled with air, a hollow sound is necessarily produced. If something takes the place of air;—if the lungs become consolidated, or filled with fluid, or surrounded by it,—it stands to reason that, if we then strike that part of the lung, the air being absent, a dull sound will result. This is actually the case. These things are physical necessities;—they occur simply from the common law of physics.[a] They must occur; and if they do, we ought to apply them to practical purposes.

Nothing, however, would be more absurd than to attend to these auricular symptoms solely. The fault of those who merely employ the ear, in diseases of the chest, is just as great as the fault of those who do not employ it all. There may often be a sufficient number of other symptoms to point out the nature of the affection, without employing the ear; but whether that be the case or not, it is as much our duty to attend to other symptoms, as to those that we learn from the ear. Frequently, by looking at a patient while he is breathing, we find what is the state of respiration. We find that, like the pulse, it is more frequent than natural, or not so frequent as natural;—we may have the "respiratio *frequens*" and "respiratio *rara*", corresponding with the "*pulsus* frequens" and "*pulsus* rarus." Now and then we find respiration performed suddenly;—the inspiration and the expiration are sudden; and that is called "respiratio *celer*"; and the opposite state, where the chest expands slowly, is called "respiratio *tarda*";—corresponding with the "*pulsus* celer" and "*pulsus* tardus." These things may be learned simply by the sight. The respiration undergoes alterations similar to those of the pulse;—it may be *regular* or *irregular*, *slow* or *quick*, *sudden* or *gradual*. It may be *deep*, or exceedingly *shallow*,—little air being taken in at a time; and, on the other hand, we may have a *full* respiration. It may be *full* and *deep*;—corresponding with a full and strong *pulse*. I do not mean to say, that the pulse and the function of the lungs take place synchronously; but, as we have in the pulse quickness and slowness, fulness and smallness, jerking and sluggishness,—so in respiration we have frequency and slowness, shallowness and depth, suddenness and sluggishness, irregularity, and so on.

Dyspnœa and Orthopnœa.—When respiration takes place with difficulty, it is called, in medical language, "dyspnœa"; and if it be so difficult that the patient cannot breathe unless he sit upright, it is called "orthopnœa."[b] Orthopnœa is merely an intense dyspnœa.

Respiratory Sounds.—Independently, however, of the *frequency* of respiration or its *slowness*, we may hear particular sounds. We may hear a *wheezing* sound, which is called "sibilous"; or we may sometimes hear it performed with a *snorting* sound, which is called "sonorous." Even without putting the ear to the chest, or employing a piece of wood as an intervening substance, it may sometimes be heard when standing at a little distance.

Alterations in the Voice.—The *voice*, also, affords much information. The voice is frequently suppressed, faint, harsh, and shrill; and these various

[a] From φυσις, *nature*.

[b] From ορθος, *erect*; and πνεω, *breathing*.

changes will indicate great debility; or they will indicate particular diseases of the lungs themselves, or of the larynx, or of the air-passages. From listening to the voice,—with the ear in contact with the chest, or with the intervention of a piece of wood, or any similar substance,—frequently the voice does not afford the ordinary sound; so that some disease may be predicated to exist within the lungs.

Cough.—From a *cough*, too, we learn much with the naked ear; and the varieties generally enumerated are "slight", "severe", "harsh", "crowing", "hooping", "shrieking", "tearing", "hacking", "loose", and "dry." There is an infinite variety with respect to coughs. "Slight", "severe", "crowing", and "hooping" varieties, about which I need not say any thing. We occasionally hear a cough "tearing the patient to pieces"; and it frequently indicates more disposition to spasm, than to actual inflammation. Now and then I have heard a cough, which has been regularly followed by a shriek, and absolutely alarming. At the end of every set of expirations, I lately heard one deep inspiration, not attended by a hoop (as in the hooping-cough), but by a shriek;—as though the individual were about to have a dagger plunged into her.

Alterations in the Heart.—With regard to the *heart*, we obtain great information by examining the chest. Not only by the touch can the force of the heart be ascertained; but by listening, the various alterations in its sound may be heard. Here, again, it is very necessary not to attend to any one symptom, or to the occurrence of any one sound; but to attend to the whole set of symptoms. Instead of the usual double sound which is heard in a healthy person, when the heart is affected in a certain way, we hear a sound as though a pair of bellows were blowing; sometimes as if a file were in action; and sometimes as if a substance were being rasped. If we attend to these alone, we may be led into error; but frequently, at the same time, great difficulty of breathing is observed on the slightest motion; also a swelling of the legs, and a deficiency of urine; and we are led to believe that organic disease is present. In other cases we hear only the sound; and then we should not be justified in saying there was organic disease, unless it is observed time after time. In observing these sounds of the heart, the greatest care is necessary not to form a hasty judgment at first. We may also observe a sufficient proof of organic disease, by attending to the general symptoms; but frequently there are no other circumstances present. These sounds may arise from temporary causes, and not be heard on two successive days:—showing that these symptoms,—like those of the pulse, and almost all other symptoms,—are never to be taken alone, but only in conjunction with others; and, then, only when they have been examined carefully and repeatedly.

Abdominal Signs.—With respect to the *abdomen*,—to descend still farther,—the chief symptoms in that region are to be observed by the sight and touch. The hearing affords no great information respecting the abdomen, except sometimes on striking it, if it be enlarged. If we strike it,—especially with the intervention of some little substance (either the finger or a piece of ivory),—we learn whether the tumour arises from liquids or solids, by its emitting a dead sound, as if we struck the thigh; whereas, if it arise from mere air, there is a hollow sound, like that of a drum. By going over the abdomen carefully, we may ascertain whether there is enlargement of any organ, and we ascertain the shape of an enlarged liver with the greatest accuracy;—the dulness occurring where we strike, over the enlarged organ, and the hollow sound, where the abdomen

is in its natural state. This is the only point in which the ear is of much assistance. The ear is of the greatest use in diseases of the chest; but in the abdomen we must more particularly have recourse to sight and touch.

If we expose a patient, in the case of abdominal disease, we may discover an alteration of figure which the hand cannot at once detect. Nothing can be more absurd than for a practitioner to prescribe, at once, for a patient who comes to his house for disease of the chest or of the abdomen. It is very well to prescribe in that way for diseases of the skin, the head, and other affections; but with respect to diseases of the chest and the abdomen, if we do not listen, or have the patients more or less undressed, it is impossible, in many cases, to form a correct opinion. We may form a guess, and we may be right; but shall not be able to form such an opinion as a philosophic mind would always wish.

With regard to the abdomen, by the sight we may discover enlargement, either local or general; but it is certainly by the touch that we acquire the greatest information. We may feel an enlargement of various parts; we may feel the induration of different viscera; and if there be fluid, we may ascertain its existence by the occurrence of fluctuation. But one great use of applying the hand to the abdomen, is to ascertain the existence of inflammation. Inflammations of the abdomen are, in general, easily detected by the hand pressing upon it;—owing to the circumstance of the abdomen having no bony coats; and it is always necessary, in acute diseases, carefully to examine the abdomen by means of the hand. In fever, and particularly in various affections of the alimentary canal, if we do not examine the abdomen carefully with the hand, we may overlook inflammation; which, if neglected, may prove dangerous. In fever, at any rate, it is right (every day or two) to feel the abdomen carefully;—beginning at the epigastrium (which is the part most frequently affected), and going more or less all over it. But in every case where the abdomen is affected, it is of the greatest importance to make these minute observations. It is nonsense to say that a physician is to use his pen, and a surgeon his hand. Every physician must be more or less a surgeon, and every surgeon must be more or less a physician. It is as impossible for a physician to do without the use of his hand, in the case of the abdomen, as it is for a surgeon in the case of fractures; and it is not creditable to any physician to pride himself upon not making these "*mechanical* examinations",—as (I believe) they are contemptuously called.

Characters of Excretions.—With respect to the *excretions* of the body, the sight and the smell give us the chief information. It is by the sight that we judge, chiefly, of the character both of the fæces and the urine; the smell, however, gives certain information in these particulars; as it also does with regard to the excretion of sweat. The sweat, in many diseases, is exceedingly sour; and in others it has peculiar odours, of which I shall speak hereafter. However, we sometimes are more minute in our observations respecting the urine. At any rate, it is necessary not to depend upon the sight and the smell merely; but to employ chemical means for ascertaining its quality. It is frequently requisite to ascertain whether the urine is acid, or neutral, or alkaline; it is right, frequently, to see whether it contains albumen or not; and, in other cases, it is necessary to ascertain whether it contains sugar. The most minute observations are sometimes necessary; and, of course, it is only with respect to the excretions that chemical minuteness is at all of service.

As to one sense,—that of taste,—I believe it can only be employed with regard to excretions; and, I presume, with but one of them,—the urine. Some go so far, in professional enthusiasm, as to wish us to taste every thing; but it is not usual except in the case of the urine; and then, for the most part, it is better to get the patient to taste for himself. However, this is not *absolutely* necessary with regard to the urine; because, by evaporation, and by weighing the urine, we can easily ascertain whether it contains sugar or not. I never yet in my life tasted it; but I have no objection, in diabetes, to taste the saccharine extract; for that is not urine.

Alterations in the Surface of the Body.—Having gone through the chief organs of the body, I may say that the *whole surface* together gives the same information as the head; but in a very inferior degree. We gain certain information; but it is, undoubtedly, far less than we gain from inspecting the face. From examining the whole body, we learn whether there is a degree of fulness or emaciation. By observing its plumpness, we can tell whether the patient is in condition or not. We observe, likewise, the dryness or moisture of the skin, and the firmness of the flesh. We observe whether or not it is swollen by dropsy. It is to the surface of the body that we employ the sense of smell, with regard to the excretion of sweat. On the surface of the body we can ascertain the increased temperature of the patient; and, for more minute observation, a thermometer is employed. It is generally put into the *hand*, —one of the two principal parts; or put under the tongue,—a portion of the *head*. Every part of the surface of the body has its own affections; and it is there that not only the chief symptoms of cutaneous diseases,—the symptoms of all its own affections, are to be found; but there we often observe affections of parts beneath. In inflammation, for example, of the dura mater, from an injury, the surface immediately above frequently becomes œdematous. We learn the state, not only of the skin itself locally, but of parts beneath it, by looking at the skin immediately superjacent.[a]

Therapeutics.—These are the chief observations which I have thought it necessary to make, in a general way, on the third branch of general pathology, called "semeiology," or "symptomatology." The fourth division of general pathology is "therapeia"; or the general treatment and prevention of diseases.

SECTION V.—GENERAL TREATMENT OF DISEASES.

Vis Medicatrix.—With regard to most diseases, nature has a constant tendency to rid herself of them. It is ordained by Providence, to a great extent, that the injurious causes to which we are exposed should have but a temporary effect. Either the body has the power of resistance, or the causes exist temporarily; either from being applied but temporarily to the body, or from being able to exert no more than a temporary influence. In this way it is that, generally speaking,—although there are many excep-

[a] The skin is pale, rough, and dry, (forming the "cutis anserina",) in the cold stage of fever. It is pale, but not rough, in syncope. In the hot stage of fever it is red; and its temperature is likewise much raised, especially in scarlatina. The skin is green in chlorosis, yellow in jaundice and yellow fever, and sometimes blackened from the internal administration of nitrate-of-silver. It is dry in diabetes and dropsy, has an acid odour in miliary fever, and in ramollissement of the brain its odour resembles that of a mouse.—*Dr. Fletcher.*

tions,—there is a tendency to shake off disease. This power of the body to shake off its morbid state, is called by writers the "*vis medicatrix naturæ*" [a], or "*autocrateia.*" [b] For example: if any thing too acrid be taken into the mouth, a great flow of mucus and saliva is the consequence; which has a tendency to dilute the acrid matter, and wash it away. So with respect to acrid matters taken into the stomach;—the stomach has a tendency to reject them; or if they be passed through the stomach into the intestines, the intestines are excited to action, and they are got rid of. This is the general tendency of the frame.

Temporary Diseases.—Again: many causes of disease are only temporary. A person is exposed to a great cause of disease;—the cause ceases; and of course, in many instances, the effect ceases likewise. It is not a necessary consequence, however, that the effect should cease because the cause is removed; but it very frequently happens thus. Again: there are other causes which cannot produce an influence upon the body, however long they are applied, for more than a certain period. If we take the poison of small-pox, it produces a disease of only a certain duration. The patient may die; but if not, the disease can only last for a certain time; and when it has once occurred, the body, in the greater number of cases, becomes insusceptible of it again. These are the various means which nature has provided for getting rid of disease;—for getting rid of noxious causes before they produce actual disease; and for getting rid of diseases themselves.

Some have so great a confidence in nature, that they leave every disease to itself; and that sort of treatment is called "the medicine of expectation" ("medecine expectante"). Such treatment often does well;—it is the best in many cases, both medical and surgical; but it is totally inapplicable to a large number. No one, with a violent inflammation of the lungs, would consent to sit down quietly, in the hope that he would grow better day by day; when he knows that, by the lancet, he may obtain immediate ease, and get rid of the complaint. When a person has taken poison into his stomach, of course he would be mad to wait for nature to effect a cure. He would send for the physician's medicine, or for the surgeon's stomach-pump.

Prophylactic, Curative, and Palliative Treatment.—The treatment of the diseases of the human body is either "preventive" or "curative." We either attempt to prevent disease from occurring, or we attempt to remove it; and when we cannot remove it, we attempt to palliate it. The treatment of the human body, in the way of preventing its becoming the subject of disease, is called "prophylactic" [c]; that which attempts to cure disease, is called "curative"; and when we cannot attempt to cure a disease, still we may do a great deal in the way of palliation;—so that medicine is "prophylactic", "curative", and "palliative." It is very often a great point to enable a person to live (while he *must* live) in comfort and happiness; and if he must die, it is a great point to enable him to die easily. In many cases we have to adopt both curative and palliative treatment together;—that is to say, we aim at curing the disease; but we adopt palliative measures, all the time, for the purpose of lessening any one symptom, or particular symptoms, which it is a desirable object to get rid of, or lessen, before the cure of the disease enables us to do so. For example: in the case of inflammation of the lungs, although we may at-

[a] "The curative power of nature."

[b] From αυτος, *itself*; and κρατιω, *to govern.*

[c] From προ, *before*; and φυλασσω, *to defend.*

tempt to cure the disease by bleeding, it is sometimes of the greatest importance to put an early stop to a violent cough, by a narcotic.

Rational and Empirical Treatment.—We can hardly be said to treat disease, when no disease exists; but we must allow an extended use of terms. Whether our means, then, are to *prevent* diseases ("prophylactic"), or whether they are to *cure* them ("curative"), or whether they are to *palliate* them ("palliative"),—the means in question may be of two kinds, "rational" and "empirical." In the treatment of many diseases, as well as in their prevention, we act *rationally*;—we proceed upon general principles; and the whole treatment is in the highest degree philosophical. We make an accurate diagnosis, in the first instance; we then see what is the wrong state of the system, and employ such means as are evidently calculated to remove that state. But in certain diseases, and in certain varieties of disease, we are obliged to act *empirically*;—to act in a certain way, without knowing why we are likely to be successful.

This empirical mode of practice is of two kinds. Sometimes we have a specific remedy for a disease, without knowing why; and, in other cases, it is impossible to know the exact variety and character of the disease; and we fire at random a shot that can do no harm, but which may do good. The treatment of inflammation is in the highest degree "rational"; the treatment of various spasms is the same; and the treatment of continued fever, too, I must think altogether "rational." The treatment, however, of ague, of itch, and of syphilis, is "empirical"; for it is impossible to know why a few grains of sulphate of quinine cure ague; why a few grains of sulphur will cure the itch; and why syphilis will cease sooner if we exhibit mercury, than if we do not. No one would *à priori* imagine, that any of these remedies could have such a peculiar property. There is nothing in the nature of the disease, or in the nature of the remedy, that would lead us to any such conclusions. We are also frequently obliged to be "empirical", where we cannot ascertain the proximate cause of a disease. For instance: epilepsy arises, in innumerable cases, from an unknown cause situated in the head, or in distant parts. If we can ascertain that it arises from irritation, our treatment is "rational";—we remove the cause. If we can ascertain that it arises from an inflammatory state of the system, our treatment is "rational";—we remove the cause. But sometimes we cannot conceive that it arises from either of these sources; and then we use certain remedies that are known occasionally to do good;—not that they are a specific against epilepsy,—as bark is against ague, or sulphur against itch; but because they continually do good in the disease. They are not specifics; for often they will not cure one case out of many; and in many cases they are totally inapplicable; but still they frequently do cure the affection. I allude to copper, zinc, nitrate of silver, &c.

Indications and Contra-indications.—The mode of treatment which is pointed out, from the circumstances of the case, is called the "indication"; and things which the nature of the case forbid us to do, are called "contra-indications." To discover the indications which are necessary in the treatment of a disease, we must make a careful diagnosis of the nature of the case; then we must make an equally careful diagnosis as to the variety of the particular disease; and then ascertain the stage of the affection, the exact strength of the patient, and the incidental circumstances. For example: we ascertain whether the place in which he lives, at all accounts for his disease; or whether the season of the year is such as is likely to have affected him. We must likewise observe whether there is any peculiar "constitution" of the period. Sydenham used to mention

the character of epidemics as "the constitution of the year." Continued fever has sometimes been attended by so much tendency to debility, that evacuations were in the highest degree improper; and the patients did much better when they were merely allowed to take simple food, with scarcely any other treatment. This was the case during several months of the year 1831. If the patient was left alone, or treated with what (in truth) was no treatment at all, he has in most cases done well. If the least evacuation was attempted, the disposition of the disease was to great prostration of strength and rapid sinking. It is necessary, therefore, to know the constitution of the period; and, but for this, I certainly should have destroyed many patients, by treating them as I had been accustomed to do. However, I was warned by the experience of others, and by careful observation of what was going on.

Individual Peculiarities.—It is necessary, also, to know what are the contra-indications;—whether there is any peculiarity in the patient. Some patients will not bear a remedy which is very appropriate to a disease. The disease may appear evidently to point out the necessity of a certain mode of treatment; but a peculiarity in the individual may render it exceedingly improper. This peculiarity sometimes relates not only to particular medicines, but to particular articles of food; and sometimes there may be some other disease present, which forbids the employment of a particular remedy. For example: if a person have a hernia which cannot well be kept up, we should try to do without an emetic, lest we should force the intestines down too violently. We are not, therefore, to be satisfied when we have given a name to a disease. It is a great point to make a good general diagnosis; but that will not do alone. We must make a more accurate diagnosis still; we must ascertain its minute variety, individual peculiarities, and all the other circumstances that I have just now mentioned.

Regimen and Drugs.—The indications of treatment are generally divided into two classes,—"regimen" and "pharmaceutical means";—the former consisting of injunctions with regard to the temperature of the place,—to food, exercise, rest, and every thing of that description; and the latter respecting drugs.[a] In prescribing medicines, it is necessary to recollect that, however excellent they may be, they are frequently rendered abortive by our want of attention to something else. There can be no doubt of the use of a large number of remedies,—both drugs of the Pharmacopœia[b], and other remedial means; but I have seen them fail, not through any fault in themselves, but through something else that was not attended to when they were employed. For example: if mercury be given to arrest a violent acute inflammation, we cannot expect it to have that effect if we neglect to bleed the patient; and even though, in addition to giving mercury, we do bleed, we cannot expect to succeed unless we are particular with regard to diet. So, in diseases of the skin, there are many remedies which have a particular operation which we cannot explain. They are not exactly specifics; but they do great good. Yet the skin, in the midst of these diseases, may be in an inflammatory state; and if we do not bleed and enjoin low diet, we cannot remove the affection. As no one *symptom* can be depended upon, so it is with *reme-*

[a] The indications of cure are of four kinds:—1. Prophylactic. 2. Curative. 3. Palliative. 4. Conservative. Those comprised under the last head are designed to guard against a relapse. We fulfil these indications by three classes of remedies:—1. Dietetic. 2. Pharmaceutic. 3. Surgical. —*Dr. Fletcher.*

[b] From φαρμακον, *a medicine*; and ποιεω, *to make.*

dies; and when we prescribe a remedy for a patient, we must take into consideration all the other points on which it is necessary to give directions.

But notwithstanding the most scrupulous attention to all the circumstances I have just enumerated, we shall often be disappointed in the cure of a disease; but we are not to be dismayed on that account. Our profession is capable of effecting the greatest good in the prevention of disease. By improvements with respect to cleanliness, with respect to air, with respect to food, and every thing else of that description, diseases which formerly prevailed to a great extent are now scarcely known; and we can do absolute good, to a large amount, in curing disease when it has occurred. A great many diseases are inflammatory; and over inflammation, by means of bleeding and other remedies, we have the greatest power. When we cannot eradicate a disease, still it is of great importance, and it is also a great blessing, to be able to mitigate pain; and it is to be remembered, that although we fail in the cure of many affections, yet, if we make the attempt, more knowledge will be attained by degrees; and those who follow us will be able to do what we cannot.

I have now made the chief prefatory remarks which I deemed necessary, before entering upon the consideration of particular diseases,—upon "*special* pathology." I have confined myself to an exceedingly superficial view of the subject of "*general* pathology"; and to the explanation of a few of those terms which I shall most frequently have occasion to employ. More minute remarks I shall reserve till a subsequent period. For example: when I come to speak of the causes of inflammation, I shall particularly dwell upon the *modus operandi* of various changes and degrees of temperature in producing disease; and when I come to speak of diseases supposed to be contagious, I shall enter upon the subject of contagion. I think it much better to treat these matters in this way, than to treat them in the abstract before entering upon particular diseases; for by this means they will not only be better understood, but we shall be relieved from the tediousness of dwelling long at a time upon general subjects.

SECTION VI.—METHODICAL NOSOLOGY.

Methodical Nosology.—I mentioned that one part of general nosology, or one part of general *pathology*, – one branch of that part of pathology which is called "nosology",—is the arrangement of diseases.[a] One branch (if I may so speak) of "general nosology" is "*methodical* nosology." We frequently hear the arrangement of diseases spoken of simply as "nosology"; but that is incorrect. The arrangement of diseases is not simply "nosology," but "*methodical* nosology";—"nosologia methodica."

It was long before an attempt was made to arrange diseases. I believe Felix Platerus was the first who struck out the idea of arranging diseases methodically; he was followed by Baglivi, an Italian physician, and Sydenham. However, it was a French physician who first actually arranged them systematically; – Sauvages, who published his work in 1762. It was in that year that the first methodical nosology was presented to the world. After him came the celebrated Linnæus, who arranged every object in nature. He published his "Nosology" in Sweden, in 1763. Another physician, Vogel, published one in 1764. No sooner was the thought put in

[a] See Page 26.

practice, than every body went to work. The arrangement of Cullen was published in 1769 [a]; another was published by Dr. Macbride, and one by Sogar, at Vienna, in 1771; then one by an author named Vitenus; one by Dr. Thomas Young, the celebrated English philosopher; and one, still more recently, by Dr. Good. There have been others, but these are the chief.

Now, however useful it may be slightly to arrange diseases,—for the purpose of memory, and for the purpose of general views,—I think it must be confessed, that all these various "methodical nosologies" only perplex and encumber the mind. I formerly studied the arrangement of Dr. Cullen very minutely, and had great part of it at my fingers' ends; but I confess that my knowledge of it now is but of a very superficial kind, and that it was never of any use to me. The arrangements of Drs. Young and Good appear to me just as useless; and I would not advise others to plague themselves about nosological arrangements. My own experience tells me, that it is a much greater plague to recollect the arrangement, and all the hard words, than to recollect the things for which the arrangement is made. I never found it of the slightest use;—any more than the barbarous jargon of the "*Propria quæ maribus*", and "*Quæ genus*", of the Latin grammar.

Inconsistencies of Nosological Arrangements.—On the inconsistencies and defects of these various arrangements, I will not dwell; for if we turn to any methodical nosology, we shall find them in sufficient abundance. We find exceptions made to the plan which the author has laid down in his arrangement; and we find the most gross absurdities. If we turn, for example, to Cullen's arrangement, (which is one of the best,) we shall find that a large number of diseases, which are daily occurring, have no place in it. Such was his arrangement, that not only was there no place for many most important diseases, but he arranges itch and fracture together. But although I think little of Dr. Cullen's arrangement, there can be no doubt that it was far better than that of any of his predecessors; and I must be allowed to pay a tribute of respect to his memory, as one of the most sagacious and best of men, that ever joined themselves to our profession. I should be very sorry to endeavour to captivate the minds of any, by attempting to lower any one in their estimation. Nothing can be more contemptible; and, as regards Dr. Cullen, nothing could be more unjust. We find in his work the utmost candour, and the soundest information; and although he indulged in hypotheses to which some Scotch physicians have been prone, yet, independently of that, his descriptions are elegant and simple, and his definitions admirable. It is to be remembered that his work on the Practice of Medicine, was not considered by him a perfect work; and he modestly called it "First Lines",—a mere outline; but such as they are, we shall find them, according to the information of that day, exceedingly useful; and it is on account of the excellency of the original work, that I should perhaps prefer recommending an edition of Cullen, with notes, before the work of any other individual.

Dr. Elliotson's Arrangement.—An arrangement is certainly useful; although I am not an advocate for a *methodical* one (so called); and in my opinion, the most natural mode in which we can attempt to arrange diseases in our mind,—that which serves best for the purposes of recollection, is a two-fold arrangement; first, as to the nature of affections in general,—whether they are inflammatory, structural, functional, mechanical, or para-

[a] See Note to Page 24.

sitical; and then, secondly, as to the part in which the affection occurs. This is the arrangement which I shall follow. I shall first consider general diseases,—such as affect every or most parts of the body;—inflammation, scrofula, and various other organic diseases; and afterwards, having considered all the affections which may attack any part of the body, I shall proceed to consider those affections and all others, whether functional, mechanical, or parasitical, as they attack the body from the head downwards, *a capite ad calcem.*[a] I think we all make two inquiries, in considering any case;—the one is the *nature* of the disease, and the other is the *situation* of it. This is the utmost assistance, I think, that the memory can have from arrangement; and this is the plan which is continually followed by *practical* writers. They write on particular diseases, whatever they may be (inflammation, cancer, &c.); and of the whole diseases of particular organs, and sometimes of particular regions. One writer publishes a work especially on diseases of the urinary organs; another, entirely on diseases of the nervous system; another, entirely on diseases of the head; another, on diseases of the chest; and this course we naturally fall into. But, independently of that, we must make observations upon the general affections to which all parts of the body are liable. I am quite satisfied that an arrangement of this sort,—by which we first consider general affections, which may attack any one part of the body; and then consider the affection as seated in this or that part,—will afford us all the assistance that arrangement can give; and I hope we shall never plague ourselves farther with methodical nosology.

[a] "From head to heel."

PART I.

GENERAL DISEASES.

CHAPTER I.

INFLAMMATION.

Inflammation [a], —the first disease of which I shall speak,—is the most general of all affections.

General History.—It will attack any part of the body that is vascular. It is also one of the most frequent affections. It is a disease which scarcely any person escapes, and which is seen every day. It sometimes occurs simply by itself; and sometimes it is the concomitant of a variety of other diseases. Many diseases are always inflammatory, though they are not simple inflammation;—though there is something more than inflammation, yet inflammation is united with them. Many other diseases are *frequently* inflammatory, but not *always*. Inflammation continually occurs as a means of benefit to the body. It is not only a morbid process; but a process frequently set up by nature for the purpose of restoration, relief, and prevention. It is a disease, too, which proceeds from a vast number of causes;—causes to the action of which we are continually exposed, whether we will or not.

[To speak in the language of rigorous pathology, however, we may consider inflammation as a certain state of the capillaries of any given organ or part; induced either by causes resident in the general system, or by circumstances operating from without.

It would, in ultimate reasoning, be difficult to conceive any disease, as wholly independent (in its beginning and progress) of that excited condition of the circulation to which the term "*inflammation*" has been assigned. For practical purposes, however, it is better to view some affections in the light in which they are made to appear by their respective names,—as tubercles, and other progressive organic changes,—than to proceed upon the principle which regards all as inflammatory. The term "*inflammation*" is thus restricted to affections which, in their treatment, require a continued reference and attention to this state.

It must appear evident, that the danger of inflammation will, in great part, be determined by the circumstances of situation, structure, and measure of importance attached to the affected structure or organ in the economy of the constitution, and the extent to which it has proceeded before the application of remedies. We are, therefore, justified in saying, that the consideration of inflammation is more important than that of any other affection of which the body is susceptible. Nor is this the only ground on which its superior claim to attention rests. It has been remarked, that probably no appreciable morbid action occurs in the body, without inflammation. A solution of continuity, a wound, an ulcer, a contusion, a fistula

[a] From "inflammo", to *inflame*, or *burn*.

all require for their recovery the supervention of inflammatory action. It is by determining this action, that venereal and other viruses appear to act upon the inoculated part, and subsequently on the general system,—under the character of eruptions and other cutaneous affections;—tumours, nodes, condylomata, papillæ, lepra, and so on. It is often by means of inflammation, that the system rids itself of morbific causes. It is often the crisis of fevers. By exciting it, art accomplishes the cure of many diseases. Probably, likewise, it excites the developement of malignant products, and thus becomes an extensive cause of death.—*T. Williams.*]

Its Protective Power.—Inflammation is the process frequently employed by nature, to prevent the escape of matters into parts where violent inflammation would be produced; and it is established to prevent its own occurrence in another spot. For instance: when an ulcer takes place in the stomach or in the intestines, if it proceed unchecked, the contents of the stomach or the intestines are poured forth into the cavity of the peritonæum, and a violent inflammation is set up;—an inflammation, in the greater number of cases, fatal. Nature, however, very frequently excites inflammation outside the organ, exactly at the part corresponding to the ulceration within; by which means it is glued to the surrounding parts. The blood becomes retarded in its course through the neighbouring capillaries, and the surrounding textures become loaded with a glutinous, serous fluid; in which, subsequently, progressive changes occur, and end with its more or less perfect organization. By slow gradations, there take place in it transitions which indicate that the other constituents of the blood have exuded through the vessels; and a part of the fluid effused assumes a gelatinous consistence;—forming layers, or flakes, which gradually acquire complete solidity and organization. This is the interesting process by which the surrounding parts are agglutinated; and the extension of the disease of the stomach or intestines, by ulceration, into the peritonæal cavity, is effectually prevented. Thus, a slight inflammation is set up in one spot, to prevent another, which would be fatal to the patient. The adhesion of the stomach, sometimes to the peritonæum, and sometimes to the liver, is thus explained.

Nature, further, frequently employs inflammation to give exit to something which is injurious to the body. When a biliary calculus is impacted in the ducts, and is too large to escape, it sometimes happens that these ducts become attached, by inflammation, to the duodenum or other intestines. The inflammation, after it has excited adhesion, proceeds, perhaps, to ulceration; and when the latter occurrence has taken place, the calculus escapes through the opening into the intestines. The inflammation, in the first place, is set up to prevent the communication which would afterwards take place into the peritonæum;—so that the bile and the calculus shall not escape into it; and when all these parts are firmly glued together, and the danger prevented, then, at the particular spot, inflammation goes on to ulceration. Ulceration takes place into the intestines; and in that way an exit is given to the foreign body.

Its Sanative Power.—When a part of the body mortifies, whether through inflammation or not,—when a part has become dead, and useless to the body, and even injurious to it from its presence,—inflammation is employed for the purpose of separating it. At the boundary of the living part, inflammation occurs; a red line appears at the extremity of the healthy part, where the dead part begins; which indicates the circular course of the inflammation, and which afterwards proceeds to ulceration. A furrow of ulceration takes place; until the part is ulcerated through, and the dead

portion falls off;—having been separated by the ulceration of the living disease.

[There is nothing in the whole domain of medical science, which brings under our view phenomena of greater wonder and perfection, than those processes by which, through the agency of inflammation, nature oftentimes averts impending death. By elaborate and numerous dissections, Abercrombie has shewn that a portion or coagulum of blood, extravasated into the substance of the brain, passes through a curious series of changes, both in consistency and colour, before the work of recovery is completely accomplished.

Physiology teaches, that whenever blood passes beyond the limits of the living vessel, its *vitality* becomes extinct; and that it undergoes certain changes;—separating into its elementary parts, in obedience to common physical laws. The aggregate result of these changes in healthy blood, is called "coagulation"; which, in a subsequent page, will have a full explanation. When, therefore, an extravasation of blood takes place into the hemispheres of the brain, or into the expanding track of the crura cerebri, or corpus striatum,—its most frequent situations,—the process of spontaneous coagulation indicates the death of the blood. In consequence of the pressure of the circumjacent mass, there is not a perfect separation between the serum and crassamentum;—the latter containing within its substance a large proportion of serosity, which renders the clot loose and flabby. It is evident that the presence of this extraneous coagulum in a living structure, must determine that action by which the work of reparation is commenced, and in less severe cases wonderfully completed;—circumscribed inflammation immediately occurs in the brain surrounding the deposit of blood.

The continuance of it in a subdued degree, for some time, enables the surrounding parts to effectually protect themselves against the influence of the foreign matter;—by forming a circular wall of membrane; called, in surgery, the "*pyogenic*";—from its reputed property of secreting pus. When this is being formed, it is obvious that the pressure of the coagulum against the brain in immediate contact with it, and the surrounding inflammation, must conspire to cause a breaking down of the medullary matter;—it is accordingly found, that a cavity is formed for the reception of the clot; which is limited by the membrane of which we have spoken. Provided the clot be small enough to be compatible with the continuance of life, the paries of the cavity begins its function;—that, namely, of carrying away, by absorption, the contained blood. The serum first disappears,—leaving three portions of different colour;—the thicker yellow part of the serum,—the fibrin,—and the red particles. A ready explanation is here found of the various shades of colour, which the effused blood presents in the progress of absorption. The combinations of these three portions, would produce a compound colour, approaching black or dark yellow; and a variation in the proportion of any one or two, would necessarily cause a corresponding variation of hue. Thus, then, these interesting appearances are accounted for. The clot subsequently disappears altogether, and the cavity becomes occupied by a serous fluid,—the produce of its membrane; since it does not resemble the serum of the blood. Afterwards, this serum itself disappears, and leaves the cavity empty. By the pressure of the superincumbent mass, the walls become approximated; adhesion occurs; and thus obliteration and recovery result. There is no instance, in pathological science, which presents us with a more beautiful example of the curative effects of inflammation.

Surgery supplies us, in great numbers, with other cases, scarcely less ad-

mirable. It is under the guiding agency of these processes of inflammation, that collections of matter in the interior of the body, are brought safely to the surface, or some organ communicating with the external air. Abscess of the liver, bursting into the bronchi, colon, or surface ;—the formation of an artificial anus, by the agglutination of the opposing layers of peritonæum, and their subsequent ulceration ;—the adhesion of serous coverings of cavities, limiting the extension and quantity of effusion ;—the spontaneous and artificial obliteration of the cyst of the tunica vaginalis in hydrocele, and of the cyst in ovarian dropsy ;—may be enumerated as examples of the salutary effects of inflammation. The genius of Dupuytren recognised this principle, when he proposed his operation for artificial anus :—the suggestions of Dr. Marshall Hall, with respect to the surgical cure of *prolapsus uteri* (by causing adhesion of the sides of the vagina) and the obliteration of the vascular plexus, in nævus, by the frequent introduction of a needle, had immediate reference to the restorative power enjoyed by inflammation :—a knowledge of this principle likewise led Sir A. Cooper to the cure of varicocele, by removing a portion of the integument from the upper part of the cord—and thus, by the formation of a binding cicatrix, prevent the enlargement of the spermatic vein.—*T. Williams.*]

SECTION I.—GENERAL DEFINITION.

The general definition of inflammation is,—" redness, swelling, heat, and pain " ; that is to say, *morbid* heat,—*morbid* redness. Swelling and pain require no definition, but redness is healthy in some parts ; and therefore we must understand " *morbid* redness " ; and with respect to temperature, *morbid* heat. These are the four chief symptoms of inflammation,—those which make the definition in general. The words of Celsus are,—" rubor et tumor, cum calore et dolore."[a]

These are the general constituents of inflammation ; and if they do not all exist in all cases, still the greater number are usually present. Sometimes one is absent, sometimes another ; but the *redness* is never absent. The redness is certainly indispensable to our idea of inflammation ; and it will sometimes exist without swelling, without heat, or without pain ; or with the absence of any two of them ; and now and then the redness will exist alone. Whether the state should then be called " inflammation " or not, may give rise to a difference of opinion. Frequently, however, inflammation exists, without any perceptible swelling. We must conceive the part to be a little increased in size, because there is more blood than natural ; but without a sufficient enlargement to justify us in using the word " *swelling* " ; there may not be much increase of heat, and pain may be wanting ; and it is to be remembered, that both the increase of temperature and the redness (by which we understand a *morbid degree* of them) may arise from other circumstances than inflammation ; as may also the swelling and pain.

Redness.—Still, although redness is indispensable to inflammation, it is not every redness that we have a right to call " inflammation." A certain degree of it is necessary to the idea of inflammation. How much, cannot be specified ; but, like sensations in general, it must be experienced to be learned. The requisite intensity will vary in different parts, according to their natural colour. A blush, or momentary rosiness, is not considered an inflammation ; and every part is liable to this momentarily in health. As

[a] " Celsus de Medicina ", Lib. 3, Cap. 10.

regards the cheeks, a degree of redness there would not be considered inflammation, which we should be fully justified in calling so, if it affected other parts of the body. The most intense redness, if it last only for a moment, we should not call "inflammation." In the cheeks it must be,—supposing the person has a natural colour,—a very deep red indeed, and more or less permanent,—at least not a *transient* redness, though *intense*,—to enable us to say that the cheeks are inflamed.

Again: the same degree of redness,—the same intensity of it, would not be considered inflammation if alone, which would be considered so if there were also pain and morbid sensibility. If we saw in the cheeks a great redness, we should not hesitate to call it "inflammation", if we found the part were morbidly sensible; or if the patient complained of its smarting, and being painful independently of pressure. Although the redness might be less intense, and might not continue so long as alone to justify us in calling it "inflammation", yet provided it were in a part which is not naturally red, like the cheeks,—not liable (like them) to occasional flushing and rosiness,—a much less degree of it, and a much shorter continuance, might give us the idea of inflammation. Thus we see how many things are to be taken into the account. A knowledge of these things cannot be gained at once; and many circumstances must be called in to aid us in our judgment. When persons are speaking of redness in connexion with inflammation, instead of the mere expression "*redness*", we ought to say "*morbid*", or (perhaps) "*preternatural* redness"; because what is morbid redness in one part, is not morbid redness in another;—redness preternatural to the part affected.

[In the experiments of Hunter upon the ear of the rabbit, and the observations of Kaltenbrunner, redness appeared as one of the earliest consequences of an injurious impression upon the part. In the web of the frog's foot, it has been oftentimes observed, in an unequivocal manner, that an augmentation of colour is co-equal with the initial lesions, in the capillaries of the part undergoing inflammation. Nor is this, *à priori*, improbable;—as will afterwards be rendered obvious, when describing the microscopic changes in the affected capillaries. It will then be explained, that the *first* appreciable deviation from the ordinary condition of the part, consists in a diminution of the calibre of the minuter arteries, and capillaries. In obedience, therefore, to the recognised hydraulic law, the rapidity of the contained current will increase in a ratio directly as the contraction. But it will be readily conceived, that the augmented velocity of the current will not adequately compensate the straitened capacity of the channel. It is therefore concurrently remarked by different microscopists, that the *detained* blood, by its mechanical distention, and, according to Müller, its *vital* stimulation, excites the capillaries in the immediate vicinity of the *primarily* irritated vessels; and thus, quickly diffusing the original cause, induces a vigorous activity in the capillary circulation of the inflamed spot. This exalted action, then, unattended by any visible organic change,—distinguished only by a circumscribed acceleration of the circulating fluid, and a diffused blush of arterial redness,—specifically constitutes *irritation*. Without anticipating what, more appropriately, will come under another chapter, it may be observed, that this redness, for its character or shade, is dependent upon several circumstances. The *nature* of the affected part has considerable influence alike upon its intensity, and tint or shade. The quality and nature of the causative agent, however, exercises still greater influence over the *character* of the resultant inflammation.

With a view to determine, with greater exactitude, the extent to which

different agents—externally applied, or injected into the trunk of the vessel distributing its branches over the inflamed part—modified the *colour* and character of the consequent inflammation, I instituted a series of experiments, originally suggested by the researches of Majendie; in which he artificially induced fevers, of different types, by the introduction of septic poisons into the system. Decomposed matters of a vegetable kind, generate fevers of an *intermittent* character; while those of an animal nature, induced the *continued*-typhoid species.

In these investigations, I found that diluted muriatic acid, injected into the carotid artery of a rabbit, considerably exalted the circulation of the ear, and produced a *scarlet colour*. The red particles appeared contracted in size; and, therefore, a greater number pass through the capillary, than under the agency of ordinary stimuli. Common water produced an evident enlargement of the calibre of the vessels, a subdued and confused redness, with a visible alteration in the figure of the *particles* flowing through the part;—an appearance which finds a plausible explanation in the action of water upon the red particles only of the body;—carrying away, by rapid solution, the envelope of colouring material. Liquor potassæ produced a similar appearance under the microscope. Various fluids, in different stages of decomposition, were likewise introduced by means of a fine syringe; but in none of the cases were there distinguishable effects of a distinctive character. In all, the blush induced presented a dark colour, or one approaching brown. While they are acknowledged to be imperfect, these inquiries reflect important light upon the *varieties* of *colour* presented by inflammation, under varying conditions of the general system, and the quality of the blood, irrespective of the structure or organ in which it exists. Nor is the discrimination of *shade* presented by an inflamed part unimportant; since, in the treatment of disease, success will often paramountly rest upon ascertaining whether an inflammation be simple or malignant, ordinary or specific. In surgery, it is quite orthodox to regard an inflammation discovering a blue, or purplish tint, as associated with the operation of some poison in the system. It is universally known, likewise, that these cutaneous and other inflammations, which depend upon the circulation of a syphilitic virus through the body, are marked, characteristically, by a coppery shade. These practical facts, then, interestingly teach the consequences which result from attention to the *character* of the redness, in different species of inflammations. It may here be noticed, as a physiological circumstance of interest, that Haes, and Wedemeyer, in experimenting upon the relative power of the arteries and capillaries, observed, that when stimulating fluids were injected into the torrent of the circulation, they exerted their chief effects upon the capillaries; but themselves passed through the capillary vessels at a much slower rate than the blood;—demonstrating that some adapting vital affinity subsists between the blood and the living membranes of the vessels; thus rendering its onward movement rapid and free.—*T. Williams.*]

Heat.—We will now proceed to the consideration of the other symptoms; and first of *heat*. For the same reason which makes one adopt the epithet "*preternatural*" or "*morbid*", with regard to redness, we should likewise affix the same epithet to heat; because the body,—in this country (at least), and in most others,—is hotter than the surrounding temperature; and therefore it is always hot. A preternatural heat, if not very great, is not of necessity inflammatory. A certain intensity, and a certain duration, are necessary to constitute inflammation in the case of heat, as well as in the case of redness. The greatest intensity of heat, if transient, would not be considered inflammation. The burning heat upon the cheeks, the palms

of the hands, and the soles of the feet, in hectic, is never considered inflammation, even though it be combined with preternatural redness. The most intense heat, and also the most continued, is not of necessity inflammation, unless it be united with a permanent preternatural redness. The example of hectic shows, that even a combination of heat with intense redness is not sufficient to give the idea of inflammation; for in these intense spots in hectic there is no pain, nor are the parts most affected tender on pressure. In addition to the temporary duration of the morbid heat, there is no swelling in that affection; and therefore we have still greater reason for saying, that it is not inflammatory.

With regard to heat, the temperature of the affected part appears much higher to the patient, than it really is;—a circumstance which arises from the morbid sensibility of the parts. In palsy it is not very uncommon, when there is no increase of temperature,—no inflammation, for the patient to feel every thing hot; so that if he sit on any thing without his clothes, it causes a sensation of heat; or if he put his hand on any substance, whatever it may be, it appears as if it were heated. This is a peculiar state of the system, which is not inflammation. There is in inflammation a general morbid sensibility of the part; and therefore the degree of heat which actually occurs, produces greater effects than it would in any other part of the body. But although, from the morbid sensibility of the part, the increase of heat appears greater to the patient than it really is, there can be no doubt that in inflammation the temperature is raised. When the nostrils are inflamed, or the bronchial [a] membrane, or the throat, the air that we expire is so heated in passing over the parts, that (as it comes out at the nostrils and lips) it is felt to be burning. If the hand be applied (in a state of perfect health) to the inflamed part, it feels hotter than usual; and if the thermometer be used, the point is ascertained to a nicety. The parts inflamed appear hotter, by many degrees, than other parts of the body. It is not uncommon to find them at 107°. John Hunter made experiments, to show that the temperature of inflamed parts was but little augmented;—at least not higher, nor even so high, as that of the blood at the heart and in the chest;—that if the parts had naturally a lower temperature than the centre of circulation,—as for instance, the hands and the feet,—when they became inflamed, their temperature never rose so high as that of the centre of circulation. The general temperature is said to be 98°; but it varies in different parts. The farther removed from the heart, the lower it becomes; because there is less circulation there, and the parts are more exposed to the temperature of the surrounding atmosphere.

John Hunter's Experiments.—John Hunter produced inflammation in the thorax, peritonæum, rectum [b], and vagina; and he found the heat but one degree and a half higher than before the inflammation; and he frequently found it unaltered. He states that the temperature of the vagina, at the utmost, increased to $101\frac{1}{2}°$; but he found the temperature of the tunica vaginalis only 92° in health; whereas, when inflammation was produced in it, it rose to $99\frac{3}{4}°$;—98° being about the natural temperature of the body. It is to be remembered, however, that the scrotum is a part very much exposed to the surrounding air,—a depending part; and is therefore as much exposed to the atmosphere, as the hands, feet, ears, or nose. He infers, further, that the heat is never raised above the natural standard at the centre of circulation. If the natural temperature of the tunica vaginalis be

[a] From βρογχος, *the throat.*

[b] From "rectus", *straight*; owing to an incorrect notion as to its course.

92°, certainly the increase to 98$\frac{3}{4}$° is very considerable. He remarks, that he once found the abdominal fluid raised as high as 104°, and that if inflammation attack any part with a temperature of 98°, the heat may proceed beyond that of a healthy person. Now, however correct these experiments may be, it is only necessary in the case of erysipelas to take a thermometer, lay it upon the inflamed part, and cover it up. It will be seen that the temperature, although it be erysipelas of the *leg*, is often raised to 104, 105, 106, or 107 degrees.

Everard Home's Experiments.—That the temperature of the body may be increased very considerably, in various circumstances, is shewn by the following facts. Sir Everard Home[a] observed the oviducts of a frog when about to spawn, and when a great local activity of circulation was going on, to be two degrees higher than the temperature of the heart. There was no inflammation here; but merely a great activity of circulation, *approaching* to inflammation;—such as occurs in the generative process; and the result was as I have stated. If, then, a mere natural process, short of inflammation, will raise the heat above that of the centre of circulation, we may well suppose what inflammation will do. Even in vegetables, when a certain process is going on with great activity, a very considerable increase of temperature takes place. When the *arum cordifolium*, and the *arum maculatum*, are about to burst, the increase of temperature is such, that by placing a considerable number around a thermometer, the latter has been raised very considerably. Twelve were placed around a thermometer; when so high a degree of heat was developed, in the physiological process of bursting, that the instrument was raised from the temperature of 70° to that of 143°. Even in fever, by placing the thermometer under the tongue, we find the temperature raised many degrees; and the same occurrence takes place in acute rheumatism. In one case of phlegmasia dolens, on placing the thermometer on the thigh, and covering it with the hand or bed-clothes, I found it rise to the same degree of heat that is frequently observed in fever, and in acute rheumatism;—namely, to 107°. Indeed, one gentleman says that, having introduced a thermometer into the vagina, during labour, he has observed the temperature of the uterus to be 120°. During the violence of the spasm in tetanus, the temperature is frequently as high as 107°. There can be no doubt, therefore, that inflammation is frequently attended by a great increase of temperature.

But as increased heat may exist without inflammation, so inflammation—that is to say, redness and swelling, of an undoubted inflammatory character—may exist without any preternatural heat. Inflammation—that is to say, preternatural redness and swelling, going on to suppuration—may exist without any increase of heat;—a state which has been called "*passive* inflammation." Some regard this condition as only one of congestion. But it will go on to suppuration; and therefore may be called "inflammation", although there is no increase of heat. Discrepant notions have prevailed with regard to the limits within which the term "*inflammation*" should be restricted;—some supposing the presence of pain, others of heat and redness, necessary to constitute this state. Andral calls any state in which there is a morbid collection of blood, "hyperemy",[b]—excessive quantity of blood

[a] It is only an act of literary justice to John Hunter, to caution the reader against receiving any thing which Sir E. Home has published, as his own;—since the exposure that recently took place before a parliamentary committee, has associated the memory of Home with eternal infamy,—as the foulest literary robber that ever disgraced the annals of science in this, or any other, country.—*T. Williams.*

[b] From ὑπερ, *in excess*; and αἱμα, *blood.*

in a part; when it is actively inflamed, "*active* hyperemy"; and when a passive state occurs, he terms it "*passive* hyperemy." Thus he gets rid of the difficulty altogether, by no longer using the word "*inflammation*"; but by using a word signifying "congestion of blood", and applying one epithet ("active") or another ("passive") to it.

[In prosecuting our enquiry to the ultima ratio of *heat*, as a feature of inflammation, it is necessary to the proper understanding of the subject, to embrace in the estimate several elements or conditions. For while it is freely admitted that the nervous system exerts no inconsiderable influence upon the functions of the capillary system, as established by the experiments of Wilson Philip, and subsequently verified by the observations of Müller; we cease to regard the operation of the nerves as essential to the production of inflammation, when this state is often unequivocally manifested in paralysed parts;—and in parts in which the sentient and motor nerves have either undergone destructive disease, or been submitted to a surgical operation. The physiological truth of this statement, was painfully exemplified by a case which I attended with Mr. Pilcher; in which it was found, post mortem, that caries of the petrous portion of the temporal bone had, by extension inwards in the direction of the base of the brain, disintegrated (by gangrenous ulceration) the whole substance of the casserian ganglion, involving the sentient and motor portions. The walls of the tympanic cavity, also, presented a necrosed and carious appearance; which, on closer examination, was found to have destroyed the facial nerve, while in its course through the canal of Fallopius. A few weeks before the occurrence of death, inflammation—distinguished by heat, swelling, and redness, but no pain—came on, and proceeded to diffusive ulceration. It is, therefore, unquestionable, that in calculating the pathological circumstances to which the heat of an inflamed part is due, it is essential to correctness, to compute the value of each condition in its separate influence, and the compound result of all, in their aggregate agency. It is now conclusively established, that the quantity of blood contained in affected capillaries, is not only increased in consequence of an enlargement of their diameter; but that, in addition, an absolutely augmented quantity of blood passes through the inflamed part, in any given time. Nor is there wanting another condition, which contributes much towards the production of heat. It is a recognised fact, that in every species of inflammation, effusion occurs, to a varying extent, of albumino-fibrin,—or this modified by constitutional influence. Now it has suggested itself to me, that the rapid elevation of temperature which happens in some acute inflammations, may be satisfactorily explained on the supposition that this effused material, acquiring the solid form with different degrees of rapidity, will proportionately evolve heat. It is a circumstance which falls under the common physical law, that the increase of heat bears a certain direct relation to the rapidity and extent of the contraction and solidification of a liquid. This affords the most rational explanation of the pungent heat which occurs in extensive *pneumonia*. Extensive effusion happens, and red hepatization; at which stage, being the one of *maximum* condensation, authors state the pungency of surface to be greatest.—*T. Williams.*]

Swelling.—If we consider the third of the symptoms (swelling), we shall find that it also may exist without any inflammation. Swelling, although frequently a symptom of inflammation,—more frequently than not,—may (just like an increase of temperature, or an increase of redness) exist without inflammation. Any injury produces a swelling. The mere displacement of a part (the dislocation of a bone, or hernia), the effusion of

hæmorrhage, a collection of water, any morbid growth (whatever its character), or the presence of air within the body,—will produce swelling. For a swelling to be considered inflammatory, it must be united with pain or a preternatural redness; and even then it may be chiefly dependent on other causes. In dislocation, for instance, inflammation of the ligaments and integuments may occur,—producing pain; but the swelling arises chiefly from the displaced bone. Again: it is to be remembered that inflammation may sometimes exist without swelling; as is occasionally noticed in ophthalmia[a]; in which the turgescence often gives rise to no perceptible swelling. Frequently, however, this affection, and many superficial inflammations of the skin, are not attended by any swelling. A part will appear inflamed, sometimes without the presence of pain or increase of temperature; but marked by excessive redness and excessive swelling. The congestion is extreme; and gangrene, in such a case, is very likely to take place.

It is therefore evident, not only that the symptoms will arise from various other causes than inflammation, but that, when they do occur, they are frequently out of proportion to each other. Sometimes a little inflammation is attended by very violent pain; and sometimes a little inflammation,—a little increase of heat, is attended by the most violent swelling. There is no necessary proportion between any of these symptoms.

Pain.—The last of the marks of inflammation (pain), may arise from many other causes than inflammation. Pain will arise from a mere spasm.[b] Nothing is more painful, for example, than cramp in the legs. Pain frequently arises from scirrhus, or cancer; which some call "chronic inflammation"; but certainly there is something superadded. Pain, too, is frequently neuralgic; being dependent on a violent affection of the nerves, in which no inflammation can be detected during life, and no effect of inflammation discovered after death. Pain continually arises from inflammation; but it continually arises, also, from the other sources just pointed out; and sometimes it is *absent* in inflammation. A part is violently red, and violently swollen, without any pain at all; and sometimes nothing is worse than this state; for the part may fall into gangrene.

Characters of Pain.—The character of the attendant pain varies with differences in the structure of the part in which it occurs. If the part be unyielding, then the pain is of a tense character and great in severity; hence inflammation of the theca of a tendon, is generally attended with great agony. From a similar cause, also, when matter is formed and cannot escape, the pain is most agonizing; whereas, on making an incision, so as to allow the escape of even the smallest quantity of matter, and so relieving the tension, the pain instantly disappears; and thus the great irritation of the system, which, perhaps, amounted to a violent delirium, also vanishes. Hence, too, the great use of incisions in certain inflammations of the skin and the cellular membrane; where the latter becomes excessively gorged with fluids, and the skin is distended over it,—producing the greatest agony; but a few incisions afford immediate relief. If it be inflammation inclining to suppuration, the pain is of a throbbing character. If the skin be affected, the pain frequently assumes a smarting or tingling character. If a mucous membrane be inflamed, there is frequently a burning and pricking pain; while inflammation of a serous membrane is characterized by a stabbing sensation,—as though a knife were being plunged into the part. This difference in the character of the pain in inflammation of serous and

[a] From *οφθαλμος, the eye.*

[b] From *σπαω, to draw.*

mucous membranes, is owing, I presume, to the fact, that serous membranes, in general, are tense, and therefore give rise to the most violent pain when inflamed; whereas mucous membranes are all of a more yielding character; and, consequently, inflammation of them is never attended by this violent stabbing pain.

Sometimes there is merely a soreness;—no pain is felt unless the part be irritated mechanically, or some particular stimuli are applied. Again: parts which have little or no sensibility in health, acquire a degree of sensibility, under inflammation, which is frequently very intense. Many parts that may be cut in health, without the individual experiencing any sensation, cannot, when inflamed, bear the slightest motion or pressure. If, therefore, parts which show no sensibility in health, become very sensible in inflammation, we may fairly suppose that parts which are naturally sensible in health, may become very painful when in a state of inflammation.

Pain affected by Pressure.—The pain of inflammation is generally increased by pressure,—at least by *sudden* pressure; while pain arising from spasm is generally *relieved* by pressure. This is very strikingly shown in colic and enteritis. In the latter, the pain proceeds from inflammation, and is aggravated by the slightest pressure; while, in the former, which is spasmodic only, pressure rather diminishes than augments the pain. It is necessary to remark, however, that although the pain of inflammation is increased by pressure, it is rather due to its sudden or partial application. For, if pressure be applied suddenly to an inflamed part, or if it be only applied to a part of the inflamed surface, then the capillaries cannot be emptied with sufficient rapidity, and pain results from the degree of tension which is produced. If, however, the pressure be applied slowly, or over the whole surface,—so as gradually to empty the capillaries, or diminish their contents,—then little or no tension is produced; and, consequently, pain is either absent or very trifling.

[It is necessary to observe, that every mode of making pressure upon an inflamed part is not attended with augmented suffering. It is rather the abruptness of pressure that causes the acute sense of pain, than the gradual increase of its force. In those instances in which inflammation is circumscribed by fascial and tendinous structures, the *relief* afforded by progressively augmented pressure is not unintelligible, when the anatomical arrangements of these structures is remembered. It will immediately be seen, that when the cellular tissue subjacent to, and firmly bound down in the hand and foot respectively, by the palmar and plantar fascia, the whole hydraulic force of the blood—which is very considerable (as measured by the ingenious experiments of M. Poiseuille)—is made to operate upon the nerves of the part;—in consequence of the forcible resistance offered, to distension, by the ligamentous bands by which it is invested. Now it is obvious that the fascia—while it fixes a resisting limit to the distending power of the blood, and the product of the inflammatory excitement, effused into the cells of the subjacent structure—allows a very large quantity of blood to enter the inflamed vessels; and therefore to exercise injurious pressure upon the surrounding nerves. But when pressure is uniformly exerted, and made to occupy an area corresponding in extent with the seat of the inflammation, the *entrance* of the blood into the affected part is interrupted, and therefore its force upon the nerves taken away. The mitigation afforded by such means, however, is only temporary. The great surgical principle of treatment, in all fascial abscesses, consists in making incisions upon the part with unhesitating freedom. This is ex-

emplified in the formation of matter in the thecæ of tendons, under the plantar and palmar fasciæ, beneath the sheet of the fascia lata, epicranial aponeurosis, and the temporal, deep, cervical and perinæal fasciæ.—*T. Williams.*]

Pressure, a Curative Agent.—Pressure, therefore, has been recommended as a means of cure, by certain writers, in some inflammatory diseases. It was advocated, for the cure of gout and rheumatism, by Dr. Balfour, of Edinburgh; and by Velpeau, in erysipelas. But it frequently happens that, although relief may be given in some cases, considerable aggravation is excited in others. It is necessary that the part should be equally compressed; for any deviation in this respect, by which a part of the vessels might become more distended, would only increase the mischief. Very frequently, too, inflammation does not depend altogether upon local causes. There is a tendency to it in the constitution. The circulation of the part, although impeded, suffers little diminution in its impetus; the large arteries around are found to throb violently against the part compressed; and pressure frequently cannot be borne at all. On all these accounts, it is exceedingly difficult to cure inflammation by pressure. As a general rule, however, we may say that the pain of spasm is *diminished* by pressure, and the pain of inflammation *increased* by it; and this criterion is continually resorted to, as a means of diagnosis;—as a means of distinguishing whether pain be inflammatory or spasmodic.

Inflammation is generally known by pain, increased on pressure; by feverishness; and by a disturbance of the function of the part. When a person is observed labouring under disordered function, under feverishness (pyrexia), and under pain increased by pressure, a strong presumption is afforded, that the proximate cause of these symptoms is inflammation. Sometimes there is no pain experienced, but simply disturbance of function and feverishness; and when such is the case, the presence of internal inflammation may be questioned. When a part can be seen, the symptoms which I have already mentioned (pain, heat, redness and swelling),—few or more of them,—will be sufficient to characterize the complaint; but we are certain also of the existence of inflammation, even when the part is invisible,—when we cannot ascertain whether it is red, hot, or swollen, or not; but where there is pain increased on pressure, the function of the part is disturbed, and the patient labours under what is called "feverishness", or "pyrexia."

SECTION II.—APPEARANCES AFTER DEATH.

The foregoing are the symptoms of inflammation during life; but they may have existed at that period, and yet none of them remain after death. The pain and the heat, of course, must disappear; but the redness and swelling might be expected to remain. When, however, the part inflamed during life is seen, or such symptoms have been present as to leave no doubt of the existence of inflammation, in both cases it may be found, on examination after death, that no marks of inflammation are discoverable. Yet the absence of these marks does not, in any way, invalidate the opinion formed during life; for it will sometimes happen that, after death, every mark of inflammation will disappear. In inflammation of the surface of the body, or the eyes, visible enough during life, we find both parts pale after death. The skin, perhaps, will be slightly swelled; but the swelling will be greatly diminished, and the redness entirely gone. After apoplexy, frequently nothing is observed; although, during life, the head appears to be bursting

from an accumulation of blood, and the patient dies of the complaint, yet, after death, no morbid appearances can be discovered.

[There are many observations made by Dr. Carswell, in his "Elements of Morbid Anatomy", which render it probable that all variations of appearances presented *post-mortem*, by parts which were, *ante-mortem*, unequivocally inflamed, are referrible to two circumstances;—that of position, and that relating to the extent or grade of inflammation before death. Although Dr. Carswell does not carry the explanation further, I think it may with probability be suggested, that if any disorganization has occurred, even to the extent of causing a stagnation and coagulation of the blood in the inflamed part, and therefore the adhesion of its red particles and fibrin to the sides of the vessel, no disappearance after death can occur. It is evident, however, that at any limit short of this extent,—as in congestion and irritation only,—a more or less complete disappearance of the blush may take place, when the operation of the exciting causes ceases, by the occurrence of death. This explanation is further supported by the valuable practical views of Dr. Carswell. He states it as a circumstance, the truth of which is established by his extensive pathological researches, that the *permanence* of the redness, and vascularity of inflammation after death, is the only character, under doubtful circumstances, by which its existence can be determined, and its distinction from other local congestions with which it may be confounded, conclusively made out.—*T. Williams.*]

Redness.—On the other hand, it is not every preternatural redness, discovered after death, that is inflammatory. It is not unusual to find an intense redness of the internal parts in the bodies of patients, who did not, during life, present any symptoms of inflammation; and such an appearance is not enough to justify belief in its previous existence; for, just as the redness of inflammation will frequently disappear after death, so, after death without any antecedent inflammation, morbid redness of the parts may occur. If the patient have died with great difficulty of breathing, a large accumulation of blood has taken place in the lungs; and the liver may be found gorged with blood, and the mucous membrane of the stomach and intestines exceedingly red;—not from inflammation; but simply because the blood was obstructed in the lungs, or in the heart; and from the consequent occurrence of congestion. In a case of great debility, a continuance of the patient in one posture during the latter period of his existence, will cause such an accumulation of blood as, after death, to give rise to great redness; and these appearances are always greater, in proportion to the number of capillary vessels in the part to which the blood inclines by its gravitation. The blood will not merely accumulate in the vessels, but will transude from them, and dye the surrounding parts perfectly red, and prevent the distinction of the appearance from inflammation. This is particularly the case in hot climates and in hot weather. Dr. Davy, the brother of Sir Humphry, says (in a paper published in the tenth volume of the "Medico-Chirurgical Transactions"), that in hot countries he has often found it impossible to distinguish the redness of inflammation, from the redness of transudation, or from the redness acquired by a piece of membrane merely steeped in blood; and from all his observations and experiments he draws the conclusion, that if, in a hot climate, a body be not opened within twenty-four hours after death, the surfaces become red; that the serum of the cavities likewise becomes bloody, and that the viscera become livid; so that no opinion can be formed as to what was the state of the parts during life. The reason is this;—the hotter the temperature (within certain limits), the sooner does decomposition take place; and the

more a part is decomposed, of course the more easily does transudation occur. The solids become more soft,—more spongy; and blood which comes in contact with them, easily pervades them, oozes through them, and dyes them, and any of the liquids which the parts may happen to contain.

Redness simulated by Transudation.—In dead bodies which have lain any time upon their back, especially in hot weather, the posterior parts all become livid, and filled with blood; while the anterior parts become pale. The body being usually placed on the back, the lungs, towards the posterior part, are heavy,—filled with blood,—livid; and, in fact, exhibit the same appearance as the anterior part does in violent bronchitis; and every one accustomed to make post-mortem examinations, allows for this occurrence. He never thinks of considering it a morbid appearance; it is simply the effect of the blood gravitating to the lowest parts. It is observed, also, when bodies are at all decomposed, that red streaks appear along the surface, in the direction of the various veins. As, after death, the blood accumulates in all the veins, and as the substance of their coats becomes more and more decomposed, the blood contained within the veins transudes; and thus the coats themselves become thoroughly dyed with blood, and the cellular membrane likewise around the vessels. The superficial veins may be traced in the dead body from this appearance. This is nothing more than a transudation of decomposed blood.

The observations made by Dr. Davy, many years ago,—respecting the importance of examining bodies early in hot weather, and shewing the importance of knowing that such appearances as are induced by inflammation may take place merely from decomposition,—have been all lately confirmed by Andral; who, to make his observations the more striking, has examined the same part of the body at different periods. Early after death, he has found an organ pale; but if it were afterwards so placed as to favour the gravitation of the blood to a certain portion of it, that part of the organ, when examined in a few days,—decomposition having proceeded,—had become intensely red.

The blood will not only accumulate in the solids in this manner, and not only exude in sufficient quantity to dye any liquids that may be within the cavities, but it will itself exude to such an extent, that a canal may be found containing a large amount of pure blood. By causing a considerable portion of intestine to be dependent, the blood has gravitated to such an extent, as to pass through the vessel into the cavity, and lie there in the form of a hæmorrhage. Two French writers (Rigot and Trousseau) have made numerous experiments upon this subject; and they say that they have frequently made the blood ooze from the inner surface of the intestines, by merely giving a portion of them this dependent position.

Effects of Time, Gravitation, and Obstruction.—The mere appearance of redness, therefore, is not sufficient to justify us in saying that a part has been inflamed. A part may be red because it was inflamed during life; but we must always take into consideration, whether the body has lain long;—so as to be partly decomposed, and to allow the diffusion of blood into the substance of the parts. Indeed, not merely does a degree of putrefaction allow this infiltration of blood into the parts, but the parts themselves become dissolved into a liquid substance;—they liquefy. As the body putrefies, it becomes soft; and a large quantity of liquid is produced, in addition to the pure blood; and assists materially in dyeing the different parts. We have therefore to take into consideration what is the period at which to examine the body, and also the position of the part;—whether it be such as to have favoured the gravitation of its own blood, and that of other

parts, in any quantity. We have also to take into consideration another circumstance, independent of time and of position;—that is, whether any mechanical obstruction existed during life. If there have been a mechanical obstruction to the return of the blood through the lungs and heart, the redness of the stomach will be explained, without the necessity of referring it to inflammation. There are, therefore, three circumstances to be taken into account;—the period at which the body is examined, the situation of the part as to gravitation, and the previous existence or non-existence of mechanical obstruction. A simple inspection of the parts which are red (provided there is nothing but redness), will give no information whatever; unless the symptoms during life have been ascertained, and the three circumstances to which I have just alluded observed.

Effusion.—There is, however, another circumstance, which will frequently enable us to say that inflammation actually existed;—I mean the presence of the products of inflammation. If the part be intensely red, and a layer of lymph effused, or a large quantity of serum,—perhaps *turbid* serum,—with flakes,—the redness may be regarded as inflammatory. The redness, it is true, may be increased by decomposition or by mechanical circumstances; but if the products of inflammation are observed, it may be concluded that the redness, in great part, is inflammatory. These observations are useful with respect to inflammation in the inner surface of the heart. The lining membrane of the cavity of the heart, especially at the valves, is sometimes very red, without any inflammation. Some persons will say there was inflammation during life; others will say there was not. Of course the point may generally be cleared up by minute observation;—by feeling whether or not the heart is soft, so as to allow the membrane to be stained by transuded blood; but if an effusion of lymph upon the membrane is seen, the redness is of an inflammatory character;—that it is the result of inflammation, either in part or altogether.

These are the observations which I have thought it necessary to make respecting the marks of inflammation during life and after death.

SECTION III.—PATHOLOGY OF INFLAMMATION.

Having described the various signs by which the presence of inflammation is indicated during life, and after death, let us, in the next place, examine what are the pathological conditions necessary to the production of these effects.

General Remarks.—That blood-vessels have a contractile power in the large vessels is well established; the capillaries likewise have been proved by Schwann to possess the same power. The action of the capillaries, and arteries, *contribute* to the circulation in health; and in disease they *alter* the circulation, according as they are constricted or dilated;—thus supplying more or less blood to the part itself, and those parts to which these vessels lead. But although it is quite certain that the arteries and capillaries have this power of contraction, and although I doubt whether it can assist in *furthering* the circulation, (though it certainly may, and certainly does *alter* it every day,) I cannot conceive that this increased action is compatible with increased redness and fulness. I cannot conceive that, in inflammation, when a part is redder and fuller than it should be, there can be increased action;—by which I mean, that the vessels can be at once more constricted and more dilated, than before; for if they were redder at the one moment, they would be paler at the

other;—the one state would counterbalance the other. But whether there be increased action or not, it appears certain, that there is a diminished motion of the blood, in inflamed vessels; this retardation is commensurate with the inflammation. This has been shewn by Vacca, Lubbock, Bichat, Allen, Dr. Wilson Philip, and recently, under the microscope, by Dr. Hastings. Still more recently, Gendrin has confirmed the observations which were made by Drs. Philip, Hastings, and others. They applied mechanical violence, heat, cold, and ammonia; and they perceived, by the microscope, that at first the blood moved more rapidly. There was an increased velocity; and a contraction of the vessels was seen, inducing paleness. After the increased action,—after the contraction of the vessels, the motion became slower; the course of the blood was retarded; the vessels became dilated; and inflammation appeared. In this they all agreed. If the part was already inflamed, the application of a stimulus had the immediate effect of quickening the blood's motion, and constricting the vessels; and then the inflammation ceased. If the stimulus were applied very violently, so as to produce most violent action, and extreme rapidity, of course this lasted a shorter time; and the second stage,—that of slow motion, dilatation of the vessels, and inflammation,—came on sooner. By applying the stimulus very violently, the second stage might be made to come on immediately. It would appear from these experimenters,—who are very numerous, reside in different countries, have succeeded each other, and have each repeated the experiments with a view to ascertain whether his predecessors were correct or not,—that, in an inflamed part, the blood moves more slowly; that the vessels are dilated; and that, by applying stimuli, you cause the vessels to contract, and the blood to move more rapidly; and that then the inflammation ceases for a time, till the blood is retarded again, and the vessels dilate. One would not expect that cold would have exactly the same effect as stimuli; but such was found to be the case. We all know that, if parts are cold, they become reddish; as is seen in the nose and cheeks in winter. They grow dark,—more and more red; till at last they become of a mulberry-colour; and congestion sometimes takes place to such an extent, that gangrene occurs.

The large vessels going to an inflamed part, are frequently felt to throb. If there be a whitlow upon the finger, the digital artery behind it throbs violently; and in inflammation of the face, the angular artery may be felt doing the same. In the case of headach, the temporal artery is in a similar condition. This, however, is no proof of increased action in these vessels; for the same occurs in an aneurism, or a dilated artery. When an artery is dilated (though weakened), softened, and unable to act as it did before, it will be found to throb violently. In that kind of inflammation which is called *passive*, and which some say is not real inflammation, but mere congestion, this enlargement of the surrounding vessels is wanting; so that there is no throbbing of the large vessels. When a mucous membrane is inflamed, its secretion will stop. The secretions of a part, at the height of inflammation, cease, or at least are greatly diminished; so that a spasmodic and constricted state must be supposed to exist; though, perhaps, the word "*spasmodic*" may be objectionable. Far more changes than these, however, take place. The blood is buffed and cupped; it contains more fibrin; and this fibrin is thinner than it ought to be. The blood, in the small vessels, becomes homogeneous,—broken down; the red particles are indistinct; and sometimes flocculi are seen in it, which are not visible in the immediate surrounding capillaries. When a part is mortified, the blood

around it is yellow; its various constituents separate; and it is evidently in a state of disease.

With respect to the symptoms of inflammation, the *redness* is very easily explained, from the existence of blood in vessels that ought not to contain it, and the existence of too much in those which *should* contain it. The *swelling* will arise from the same circumstance; and also from the increased secretion that is going on around. The *pain* will arise from fulness, and from the tension of all the parts. This is produced by the accumulation of blood; and by the excessive secretion around. But the pain will also arise, probably, from an increased degree of sensibility. There is, in every case, pain from fulness and tension; but the pain is felt far more severely, on account of the morbid sensibility. With respect to the *heat*, I presume it arises from the increased momentum of blood in the part;—the increased quantity which is circulating there. If the same quantity of blood were in the part, and motionless, of course the part would grow cold; but as the blood which is in it is far greater than usual, and still moves on so as to come round to the lungs, a greater number of changes giving rise to heat must take place. There is far more blood in the part than there should be; and as heat appears to be connected with the existence of blood which is circulating,—coming round to the lungs and undergoing chemical changes,—in proportion to the quantity of blood circulating, there must be increased temperature. If the blood ceases to circulate, or the circulation becomes languid,—so that it does not undergo a regular chemical change, then of course the part becomes cold. Momentum is composed of rapidity and quantity. The rapidity is lessened, but the quantity is greatly increased; so that, on the whole, the momentum is greatly augmented.

a. Microscopic Condition of the Capillaries.

Wilson Philip's Researches.—[It is to Wilson Philip that we are indebted for the introduction of the novel method of investigating the ultimate lesions induced by inflammation, through the assistance of the microscope. The mean conclusion which he deduced from his numerous observations, instituted so far back as the year 1801, is—that the primary step consists in an enlargement and debility of the capillaries of the inflamed part, while the larger vessels leading to the spot are oppositely affected; having their currents appreciably accelerated, and their pulsations increased in power;—observing, further, that the blood in the enfeebled capillaries became retarded, and eventually arrested in its course; and that, subsequently, the same condition extended to the neighbouring vessels.

At a later period (1809) similar researches were prosecuted by Thomson; and afforded results analogous to those of Philip;—differing from them only in the point which related to the arrest of the blood;—the latter arguing that the blood suffers only a retardation in its flow through the affected vessels. It will be readily remarked, that these experimental observations, while we concede to their authors great ingenuity, place us little in advance of the knowledge brought down to us by the theory of obstructed vessels propounded by Boerhaave; or the hypothesis which supposed the existence of a spasm of the extreme vessels, promulgated by Cullen; or the profounder surmises of Hunter, in reference to the influence of vital endowments on the parts undergoing inflammation. More recent observers, however, have made important additions to our knowledge, in reference to the state of the capillaries under the operation

of different substances, and the intimate changes in which inflammation consists. The experiment of Hastings, Kaltenbrunner, Wedemeyer, Koch, Oesterreicher, and others, have led to conclusions which enable us to entertain some definitive views, in respect to the pathology and therapeutics of inflammation.

Contraction and Dilatation of the Capillaries.—According to the inferences authorized by their experiments, the changes which follow the application of chemical and mechanical agents to the small capillary arteries and veins, may be classed under two orders; *dilatation*, namely, and *contraction*. It is right to remark, however, that in different hands the same agents produced different effects;—common salt, ammonia, alcohol, hot water, ice, opium, acids, and mechanical injuries, (on different occasions, but apparently under similar circumstances,) causing opposite results with respect to the state of the capillaries.

Contraction.—From the constancy of its occurrence, the fact has at length been generalized into a law;—that the *contraction* of the capillaries is attended by an acceleration of the contained current, while their *dilatation* is accompanied by a retardation. Although the blood, *cæteris paribus*, must, according to the recognised mechanical law, flow more rapidly in a contracted vessel, it is obvious, that if its fluidity has been diminished, or incipient coagulation induced by the agency of the substance applied, its velocity will be considerably retarded. On the other hand, in a *dilated* vessel, the circulation, *cæteris paribus*, must be slower: *increased rapidity* of the current, in such a state of the capillaries, can be accounted for only on the supposition, that dilatation from an external cause may diminish the friction between the parieties of the vessels and the molecules of the blood (*Müller*). Whether these two states, of diminished and increased diameter of the vessels, be explicable on mere chemical principles, or whether they are more properly referrible to the subtle influence of vitality, would be rendering the subject too abstract to inquire. But we may, with Hastings, conclude, that the alcohol employed in these experiments, in virtue of its affinity for it, abstracts the water from the cells of the tissue in immediate contact with the cylinder of the vessel: and thus, by removing the distending agent, allows the collapse of each cell by its elasticity, and consequent pressure upon the capillaries;—hence their contraction.

Turgescence with Dilatation.—The opposite state of turgescence with dilatation, has offered a more difficult problem for the acumen of microscopists to explain. It is conjectured, by Müller, that, under the excitement created by a stimulus,—the innervation of the part becoming more energetic, the organic affinity between the blood and the coats of the vessel and the circumjacent tissue, acquires additional force; so that the blood is detained in the part, and thus gives rise to accumulation. Another and not less plausible explanation is given by M. Poiseuille.[a] He regards the passage inwards into the vessel, of the fluid contents of the neighbouring cells,—caused by some peculiarity in the action of the agent,—as the manner in which *dilatation* takes place. It is not improbable that dilatation, when caused by the application of salt, is dependent upon endosmose alone, (*Müller*). The salt, when applied to the part, penetrates the tissue, until it reaches the capillary vessels; an attraction is then exerted between the salt and the blood, which has a tendency to dissolve the salt, as the salt itself has a tendency to be dissolved in the blood; in consequence of this affinity, the blood will be arrested and accumulated in the capillaries; which

[a] Ancell's Lectures on the Blood.—"Lancet" for 1839 and 1840.

subsequently become distended, and the circulation within them retarded. Majendie has carried further the attempt to make out a *rationale* for the action of these causes of inflammation; premising the discovery of a subtle fluid interposed between the innermost and middle tunic of the capillary, he labours to account for the phenomena resulting from the agency of these causes, by supposing that this attenuated stratum, like his sub-arachnoidean serosity, is absorbed and removed by the cause or substance applied. And, since the presence of this fluid is essential (by *lubricating* the internal tunic,—thus diminishing the friction between the revolving molecule and itself) to the integrity of the circulation, it may be supposed that its removal will be followed by the adhesion of the particles to the sides of the vessels; and a *dilatation* of their capacity will necessarily result.

It would perhaps be a speculation of too theoretical a character, to inquire into the relative merits of these several hypotheses. It has, notwithstanding, been thought desirable to supply the reader with a summary sketch of them;—as calculated to facilitate the study of the microscopic changes in inflammation. It may have been gathered, from the observations formerly advanced, that, according to the most recent and approved views respecting the ultimate character of these changes, whatever may be the nature of the agent employed to produce them, they pass with rapidity, varying with the circumstances, through three stages,—in theory intelligible, and in practice of the greatest conceivable importance. These stages are *irritation*, *congestion*, and *inflammation*.

b. Pathological Changes in the State of the Capillaries.

Irritation.—To pursue our investigation, in the order in which these stages occur in the living body, it will be required to understand, first, what is *pathologically* signified by the term "*irritation.*" I am the rather inclined to admit the probability of the explanations offered by Müller, Majendie, and Poiseuille, in reference to the mode in which contraction of the vessels (by the substances formerly enumerated) is occasioned; since the experiments of Treviranus, Wilson Philip, Baumgaertner, and Müller, have done nothing towards establishing the influence of the nerves over the minute vessels and capillaries. It is most likely then that salt, alcohol, galvanism, mechanical injury, acids, and so on, when they *do* produce a state of contraction in the capillaries, operate chemically,—by abstracting the water from the adjacent tissues, or vitally,—by increasing the contractility of the investing tissue. Whatever be the *rationale*, it is now generally allowed, by minute observers, that the state which is distinguished by contraction of the capillaries, and an accelerated circulation, constitutes *irritation*,—properly so called. In irritation, then, there is no slackening or arrest of the current of blood; but an opposite state of augmented velocity;—in obedience to a common law in hydraulics, of which the expression is—that the rapidity is inversely as the area of the tube. Upon reasoning still more closely into the consequences flowing from this condition of the capillaries, it will appear plain that the increase in the momentum of the current will not adequately make up for the contraction. It is accordingly observed, that the detained blood finds its way into the neighbouring vessels, and induces a similar state of circulation in them; until, at length, the whole circulation of the part acquires such vigour and activity, as to give to the spot an erythematous blush; this state, generally, is one of temporary duration only; but the period over which it persists, will depend upon the nature of the cause, the quality of the blood, and other

circumstances; and likewise the quickness with which the second stage (*congestion*) supervenes. As this is not the place to continue the subject of *irritation* to its practical bearings, we shall proceed to the consideration of the succeeding change.

Congestion.—It has before been intimated, that the microscope discovers two things to be present in congestion;—namely, dilatation of the vessel, and an obviously retarded circulation, without any detectible stagnation; although, frequently, something very nearly approaching to it is observed;—the amount of motion in the blood being so small, that it resembles more a semi-revolving or oscillatory movement of the globules, than an actually advancing stream. During this stage, the characteristic marks of inflammation are not perceived. It is unnecessary to re-argue the mode in which the causes and agents capable of producing this intermediate state operates. It may suffice to state that, whether it be by the endosmotic entrance of the salt, alcohol, and other materials, into the interior of the vessel,—causing a disturbance of the affinities, which may be supposed to exist between the several constituents of the blood, or whether it be simply by mechanically distending the vessel, which is the least probable, the *ultimate* effect is dilatation.

Inflammation.—Provided the same causes continue to operate, and other circumstances be favourable, this state of turgescence will be replaced by that of *inflammation*. The initial step towards the production of this, consists in the coalescing of a few of the globules of the blood, and the adherence of them to the side of the capillary. A change also appears to occur in the *quality* of the blood; for the particles thus aggregated, no longer present their ordinary figure. The circulation, at the central point of irritation, is now completely suspended; and, for some distance round, the retardation of the blood, and dilatation of the capillaries, become very evident,—producing *congestion*. A little further from the focal point of action, the circulation is more active; the *still* dilated vessels, and the globules of blood, become less distinct; at least, at the extreme limits of the areola, the circulation is accelerated, the capillaries are *contracted*, and the blood abounds in arterial molecules,—constituting a state of *irritation*. All these transitions may take place in a few minutes. There are other phenomena, superinduced upon this state, which are of the greatest physiological interest. From the change occurring under these conditions in the constitution of the blood, and the new affinities between the blood and the tissues which are brought into play, the colouring matter falls away from the red particles[a]; and the *liquor sanguinis* exudes from the capillaries,—the blood containing it in much larger quantity than under circumstances of health (as ascertained by Müller). The tendency to coagulation in this fluid, appears to be great in proportion to the quantity of fibrin contained in it; under intense action it solidifies quickly; it is a gelatinous fluid,—the invariable product of inflammation, modified, of course, in its quality by constitutional and other circumstances; it may either undergo organization, or rapid conversion into pus. When the former occurs, the red particles are *divested* of their coloured envelope; transude through the coats of the capillaries, by some mysterious vital process; re-acquire their red coats; and shoot, in various directions, through the effused fluid. Kaltenbrunner declares, that he has observed the red particles escaping from the interior of the vessel, and making arborescent tracts for themselves in the surrounding textures. This theory has always appeared to me very improbable, on physiological principles; since

[a] Gendrin.

the particles, thus extra-vascular, must immediately have their vitality extinguished. Nor are we to disregard the high authority of Müller upon this question. And without violating the rigorous laws of induction, we may argue in reference to the escape of the red particles, as he does with respect to pus-globules;—that as hitherto all physiological investigations are opposed to the theory which admits the existence of pores in the walls of the capillaries, and, further, as the size of the red globule equals—that of pus exceeding—the diameter of the minute vessels, there is no warrant for the inference, that the red particles escape as such from the inflamed capillary. That hypothesis is less objectionable, according to which the globules are considerably reduced in size before their escape from the vessel; and afterwards, by an action going on in the effused fluid, are restored to their former figure. Whichever theory we adopt, however, to account for the formation of new vessels in the inflammatory product, it is very certain that they take place. Gruithuisen, who was the first to make any decisive observations upon this subject, inclined to the opinion of Gendrin;—that globules appear as red points, throughout the mass;—gradually enlarging, and soon presenting a stellated appearance. Hastings, likewise, seems to regard this as the mode in which the liquor sanguinis becomes organized. And, lastly, it may be observed, that Sir A. Carlisle[a] attempted recently to prove that vascular organization, at its commencement at least, is dependent more upon physical, than vital laws;—that the red blood, generated on the surface of the plastic matter extravasated in inflammation, radiates irregularly in the direction in which it finds least resistance—by mere mechanical force;—presenting, as the vessels become completed, a dendritic form. This hypothesis, however, is wholy untenable on physiological principle; since these changes must appear to all, to fall within the influence of the "creative power", or "organic force", so beautifully shewn, by the masterly arguments of Müller, to regulate the building-up of all living matter. Although, in inflammation of a limb, the capillaries are extensively obstructed, it is known that the absolute quantity of blood passing through the arterial trunk and returning by the veins, is augmented in a ratio corresponding with the intensity of inflammation in the limb. Notwithstanding the plausibility with which these microscopic observations appear to explain the pathology of inflammation, there are many data presented in its progress which oblige the inference on our part, that an explanation on mechanical principles alone, is insufficient to embrace all. The act of resolution alone, by which the coalesced particles become disunited, and made again to circulate onwards, the capillaries resuming their former size and function, teaches that some creative organic force—wholly apart from mechanical laws—must, here, be in full operation.—*T. Williams.*]

SECTION IV.—COURSE OF COMMON INFLAMMATION.

Inflammation is usually divided into two kinds;—the one "common", the other "specific." "Common" inflammation is that which we see every day, where a local injury takes place, or when a part has been exposed to the vicissitudes of temperature; but the epithet "*specific*" is given to inflammation, when it runs a peculiar course; or when it arises from a peculiar cause, neither mechanical nor simply irritative. When inflammation runs a peculiar course, it is then by many called "specific";

[a] Guy's Hospital Reports; April, 1840.

but more frequently it receives that appellation only when it arises from a peculiar cause. For example: inflammation of the urethra, from the forcible introduction of a bougie, or of a catheter, would be "*common* inflammation"; but the inflammation of gonorrhœa, arising from a peculiar cause, is termed "*specific* inflammation." In *specific* inflammation, all the symptoms which occur in *common* inflammation are present; but some peculiarity is superadded.

Common Inflammation.—I will first describe the course of common inflammation. It may begin with pain, with a blush, and with a feeling of unusual warmth; but the redness is sometimes not in the form of a blush, but occurs in one particular point; from which it spreads. If the part be a secreting organ, its secretion will become changed in its appearance, and perhaps likewise in its odour, at the same time increasing in quantity. The pain and the redness increase in degree, and also in extent; and are succeeded by swelling, or tension, or both. The parts swell to a certain point; and if they cannot swell farther without difficulty, they become tense. As the inflammation proceeds, the secretion of the part generally diminishes again; though perhaps it does not come down to, or does not descend below, its natural amount; but the secretions still remain unhealthy in appearance, and perhaps also in smell; the constitution subsequently suffers;—the pulse becomes quickened, and it likewise becomes variously altered in its volume, firmness, strength, and regularity. The affection of the pulse is not always according to the danger; for in mere inflammation of the tonsils, or in mere rheumatism of the joints,—both of which are unattended by danger,—the pulse may be rapid and violent. The same remark may be made with regard to the temperature. The temperature of the whole body will sometimes be greatly elevated, although the inflammation may be one of no danger. In a case of mere acute lumbago, I found the pulse at 160, and the heat of the whole body 107°. I find, in a note which I made, that the patient required no blood-letting at all;—that he merely took "vinum colchici" for three or four days, and yet his pulse was 160; and—by the thermometer placed in various parts of the body, under the tongue, and in the axilla—the temperature was found to be not less than 107°. The heat frequently varies, too, in different parts of the body.

Besides the alteration of the pulse and the temperature, the patient becomes restless,—uneasy in any position; and complains of general soreness. The whole surface of the body frequently becomes tender; the head and loins frequently become painful; and sometimes the pain in these two parts is among the severest constitutional symptoms. The derangement of the system extends to the secretions, so that most of them become diminished and altered; and from this circumstance thirst originally happens. The tongue becomes dry or white; and sometimes, if there be much gastric disturbance, assumes a yellow character; and if there be little strength, dark. The skin becomes dry; though, in one particular inflammation,—active rheumatism,—it generally falls into profuse sweating. The urine becomes scanty; and though it remains clear, it is high coloured, and has a strong animal smell,—resembling gravy-soup. The bowels become torpid, and the fæces unhealthy, both in colour and smell. These are all instances of diminished or altered secretion.

Fever.—These constitutional symptoms altogether, are called by Cullen and his followers "pyrexia." We have no English word for this term, "*pyrexia*", unless we use "*feverishness*"; but "*ish*" implies only a slight degree of any thing, whereas the pyrexia may be very great; and therefore

the term "*pyrexia*" is always better. The word is used by Cullen to distinguish this constitutional excitement, in all circumstances, from those specific diseases, which (whether remittent, intermittent, or continued) he calls "fever";—to distinguish it from fever properly so called. Some persons denominate these symptoms "fever" in all circumstances. Others, however,—aware of the confusion which might arise from calling these symptoms "fever", and other specific fevers (such as typhus) "fever" also,—denominate these symptoms, when they are dependent upon inflammation, or some other local cause,—"*symptomatic*"; and they call the others,—fevers properly so termed,—"*idiopathic* fevers."[a] These symptoms, which are, by some writers, called "constitutional excitement", or "constitutional derangement", are, by others, called "symptomatic fever";—to distinguish them from real specific fever, which they call "idiopathic." Cullen, however, does not employ the word "*fever*", given to this state; but the word "*pyrexia*." For the purposes of clearness, it can make no difference whether, in the case of inflammation, we say "pyrexia" or "symptomatic fever"; for the object of language is to render our meaning intelligible.

It very frequently happens, that when the local disease first begins,—before it has increased to such an amount as to quicken the pulse, and induce the other symptoms which I have mentioned,—the person complains of chilliness, a general soreness, and even rigors; so that he shivers with cold;—the pulse at this time being small, the face pale, and the skin rough. From its deprivation of blood, and its low temperature, it is rough, and is called "goose's skin" ("cutis anserina"); and this state altogether is called "horripilatio." After the existence of these symptoms,—this cold stage, for a certain time, the inflammation appears, and the excitement of the whole constitution gradually comes on. Sometimes, therefore, inflammation begins; and, after a certain period, is attended with constitutional excitement; but sometimes, when inflammation begins, the system immediately falls into a cold stage, like fever;—exactly as happens in the cold stage of an intermittent; so that the local inflammation appears simultaneously with the constitutional symptoms.

Relation between the General and Local Signs.—The general symptoms are usually proportionate to the intensity and the extent of the local inflammation; and likewise to the importance and sympathies of the organ affected. Sometimes, as I have already mentioned[b], the general symptoms are disproportionate in their violence, and likely to mislead us in forming a prognosis of the case. If an individual have a temperature of 107°, and a pulse of 160, he may be inferred to be in eminent peril, provided the inflammation were not known to be inconsiderable, or seated in a part not at all necessary to life,—not at all of importance to the system; whereas, the same derangement attending inflammation of an important organ, or attending a very extensive inflammation of another organ, even not so important to life, would point out the greatest danger. It is obvious, therefore, that we are not to depend upon one symptom,—one circumstance, in a case; but must always take into view as many particulars as we can ascertain, in considering the question of inflammation.

Disturbance of Function.—Besides these local and these general symptoms, the functions of the part inflamed are disturbed. If the brain is inflamed, there is delirium; if the lungs are affected, dyspnœa is present; if the stomach be inflamed, vomiting is an urgent sign; if it be the intestines,

[a] From ἴδιος, *peculiar*; and πάθος, *an affection*.

[b] See Page 85.

constipation or diarrhœa usually attends it; if it be the bladder, there is a frequent and painful desire to make water.

Changes in the Blood.—It is not, however, merely these disturbances,—these changes, that take place. The blood itself becomes changed in inflammation. The red particles separate so fully from the fibrin, that this fibrin generally remains colourless and transparent at the top; and when this occurs, it is said to have a "buffy coat." There must some change take place in the blood, for this phenomenon to occur; and as soon as a portion of blood is removed from the body, we find that some alteration has taken place; for such are the effects. Occasionally the fibrin—white above and clear from the red particles which are below—is drawn into such an excavated form,—its centre so depressed, that it resembles a cup; and such blood is called "cupped." Blood may be buffy *without* being cupped. The red particles may separate entirely from the fibrin, and leave a buffy coat; but sometimes, in addition to this, the fibrin is drawn into an excavated form; so that it is buffed *as well as* cupped.

Coagulation of the Blood.—[Before the rationale of that process by which the blood undergoes coagulation, can be understood, it is necessary to notice the physiological analysis of this fluid, as made out by Müller on the continent, and Babington in this country.

All physiologists express a common feeling of surprise at the circumstance that, since the first introduction, by Boyle, of the experimental method of investigating the constitution of the blood, and the subsequent discoveries of Malpighi and Hewson, the composition of the *liquor sanguinis* had not been conclusively made out. The experiments of Müller and Babington, however, have shown that the fluid which was, by antecedent writers, vaguely called "serum", is a compound of *fibrin*, and an albuminous liquid, the proper *serum*. It were to encroach too far on the province of chemistry, to inquire into the properties of fibrin; the most correct account of which is contained in the works of Vauquelin, Berthollet, Fourcroy, and more recently in the analytical researches of Berzelius. It is regarded as probable by this great chemist, that fibrin and albumen are modifications of one principle;—the former being the more permanent basis. Müller afterwards extended this view; and supposed that the *albumen* in the serum was nothing more than a salino-alkaline solution of fibrin;—that in fact it was only an albuminate of soda, forming a compound with the other salts of the serum; and that these chemical conditions were necessary to the maintenance of its liquidity. M. Denis, and even Müller himself, subsequently found, however, that the addition of acetic acid, which, by uniting with the soda, destroyed its solvent power, was not followed by the spontaneous coagulation of the serum. It is, therefore, undeniable, that the albumen of the serum is very different in physical habitudes, if not in intimate constitution, from fibrin. The latter when moist is a viscid, *elastic*, and tenacious liquid; while, after coagulation, it is a white, compact, insipid, and elastic solid. The two properties of tenacity and elasticity, and its peculiar power of spontaneously solidifying, are important circumstances; and ought to be remembered in studying the phenomena of coagulation.—*T. Williams.*]

Blood coagulates, when it has escaped from the body, whether it be warm or cold, in the air or in vacuo, diluted within certain limits, or undiluted, at rest or in motion. While within the vessels, rest, which causes a cessation of intercourse between the motionless portion and the general mass, always disposes it to coagulate. Coagulation is supposed to depend upon the escape of carbonic acid; it is said to be proportioned to the quan-

tity of gas evolved;—the latter being given off during the coagulation, and ceasing to escape when the coagulation is complete. Galvanism and oxygen-gas raise the temperature of blood; but do not affect its coagulation,—any more than mechanical agitation. The coagulation of the blood is ascribed, by John Hunter, to its life; by Mr. Thackrah, on the contrary, to its death;—because the separation of a portion of the blood from the whole mass, by its escaping from a vessel, is likely to kill it if alive; because every change likely to impair life, such as debility and fainting, promotes coagulation; and because blood frozen (which process is likely to kill it if alive), and again thawed, instantly coagulates. According to the experiments of Dr. Scudamore,—though others have not found the same results,—coagulation appears, in most cases, to be attributable merely to the escape of carbonic acid. This hypothesis, however, is known to be erroneous; since the quantity which escapes, exercises no influence upon the phenomenon of coagulation; and as coagulated blood, or fibrin, becomes vascular, we can hardly, if the fluid be alive, regard a coagulum as necessarily dead. Large quantities of blood are found fluid in every dead body;—showing that the simple loss of vitality is not sufficient to cause coagulation. Indeed, the blood of the heart and vessels is found, most frequently, in opposite states;—fluid in one part, and coagulated in another; yet it is all equally dead. From all these contradictory circumstances, I regard the coagulation of the blood as quite unconnected with its vitality or its lifelessness, and as entirely a chemical result. That it is influenced, however, by the vital properties of the containing vessels, is possible; but these properties may operate upon the blood, in this respect, as a mere chemical compound; and even if it be alive, and they influence its life, still the influence, as far as respects coagulation, may in effect be chemical.

The blood generally coagulates in the living body, on escaping from its vessels, and even in its vessels, if its motion be prevented by ligatures. When it does not, its subsequent escape from the body almost always produces instant coagulation. John Hunter mentions the coagulation of blood let out from the tunica vaginalis; in which it had lain fluid for sixty-five days after a wound. It almost always coagulates, likewise, in the vessels which run through healthy parts to others in a state of mortification; and in large vessels adjoining a pulmonary abscess;—in which cases, the *final* cause is prevention of hæmorrhage. The *efficient* cause, however, in all these examples, is unknown. In all of them, the blood is still in contact with living parts; and in the two last, it is not at rest till it coagulates. John Hunter mentions that, after mortification of the foot and leg, he found the crural and iliac arteries completely filled with strongly coagulated blood; and adds, that this could not have arisen from rest; because, if that were the case, the same thing ought to happen in amputation, or in any case where the larger vessels are tied up. Besides, coagulation after extravasation, or when a portion of blood in a vessel is included between two ligatures, is not an invariable occurrence. These facts, in addition to those before stated, show that fluidity or coagulation is not dependent on the simple presence or absence of vitality.

When blood is drawn, the serum easily separates on the coagulation of the fibrin; but the latter coagulates before the colouring particles have time to fall to the bottom; and, from entangling them, acquires a red colour;—thus forming the crassamentum. If, however, the fibrin coagulates slowly, as in the case of a phlogistic diathesis, and pregnancy, the greater specific gravity of the cruor detaches it very considerably from the fibrin, which remains colourless above;—constituting what is called "the

inflammatory coat, crust, or buff." In the phlogistic diathesis, both the fibrin and the serum are more abundant, and the blood lighter. The receiving of it into a shallow vessel, and the rapidity of the stream, greatly affect the rate of coagulation; so that one portion of the same blood *coagulates slowly* when *drawn quickly*, and another *quickly* when drawn *slowly*.

The appearance of the buffy coat does not *arise* from slow coagulation, though *increased* by it; for, of two portions of the same blood, one has afforded no buffy coat, although it remained fluid at least ten minutes after the buffy coat began to be formed on the other. If, as appears from Mr. Hewson's experiments, the buffy coat arise from the thinness of the fibrin, while the red particles continue of their usual weight,—the above circumstance proves, that slow coagulation is not altogether dependent on mere thinness of the blood, though generally connected with it, and proportional to it. Yet, when the blood is thin, rapid coagulation, by means of a slow stream, may prevent the formation of a buffy coat;—by not allowing time for the difference between the weight of the fibrin, and that of the red particles, to effect a separation;—the slower the coagulation of thin blood, (occasioned, for instance, by rapid bleeding,) the greater will be the buffy coat.

The different cups of blood drawn in an inflammatory disease, may vary as to the buffy coat, according to accidental variations in the stream; but generally it is the *first* cup that abounds in buff, and frequently the *last* has none. This occurs when there is no difference in the stream. Sir Charles Scudamore finds much more fibrin in buffy blood; and consequently concludes that, not merely the *thinness* of the blood, (as Hewson found,) but likewise its *quantity* may vary during the flow of blood. Dr. Scudamore did not find a buffy coat in blood drawn immediately after violent exercise.

The blood of different brutes coagulates in different periods of time. Mr. Thackrah imagines the rapidity of coagulation to be inversely as the strength and size of the animal. Thus, while healthy human blood coagulates in from three to four minutes, the blood of the horse and ox coagulates in from two to fifteen; that of dogs, sheep, rabbits, and fowls, in from half a minute to three minutes; and in mice and fish in a moment.

[The general inference deducible from the opinions of Dr. Elliotson,—as put forth in this book, and his physiological writings,—is, that coagulation is in part due to the vital properties of the blood, and in part to the chemical action between the particles of the fibrin itself. Physiologists, however, since the period at which these views of Dr. Elliotson were propounded, have been led to the adoption of a different theory. Dr. John Davy it was who showed that, although a large quantity of carbonic acid may be extracted from blood, by the transmission of any other gas through it having a different density, its evolution was by no means essential to the occurrence of coagulation. This fact he demonstrated by adjusting pressure in such manner to the surface of the blood as to prevent the escape of carbonic acid, without interfering with the process of coagulation. He found that the latter still went on. All experimental facts at present known, point to the fibrin as the agent in virtue of whose properties coagulation occurs.

Fibrin not derived from the Red Particles.—Dumas, Prevost, Thenard, and certain other modern chemists, have contended that fibrin is derived from the nuclei of the red particles. That this view, however, is untenable, is proved by a variety of simple experiments:—1. After the process of

defibrinating the blood, the red corpuscles remain, and preserve the original characters. 2. The nuclei are not soluble in acetic acid, after the removal of their red envelopes; while this acid offers a ready solvent to pure fibrin. 3. The lymph and chyle which are interspersed with only very few red corpuscles, are spontaneously coagulable. But the most conclusive proof is derived from the experiments of Müller, on the blood of the frog. From the large size and the elliptical figure of the red particles in this animal, he was enabled readily to *separate* them by filtration through fine gauze, and obtain the *liquor sanguinis* in a separate form. We must then believe, with Lassaigne and Müller, that the fibrin is derived from the *liquor sanguinis*. But the spontaneous solidification of this filtered fluid cannot be intelligible, unless the *mode* and state in which the fibrin is contained in it, be previously understood. Is it chemically dissolved in the serum proper,—or in a state of mechanical suspension only? When acquiring an individual form in the act of coagulation, is it an educt,—or a product,—the result of some vital or chemical action, induced by particular circumstances?

It is an opinion entertained by Wagner, Burdach, Gruithuisen, Denis, Berzelius, and other continental physiologists, that fibrin is in a state of chemical solution in the liquor sanguinis. On the contrary, the distinguished Schultz —by whom the liquor sanguinis of Müller and Babington is called *plasma* —and Majendie state that it is chemically formed after death. Whatever be the intimate *status* in which it exists in this fluid, it is now, by the general concurrence of physiologists, admitted, that the separation of the fibrin by coagulation, occurs only before the death of the liquor sanguinis. These are the experimental data which direct us to this vital fluid, and the contained fibrin, as the elements of the blood, in which its coagulation can be properly and successfully studied. There appears now to prevail but one opinion, in regard to this process; according to which it is believed that coagulation, and the *contraction* of the clot, are *organic changes*; and this is further proved by the organized texture which the resulting fibrin presents. Every attempt to account for this phenomenon on chemical and mechanical principles, has signally failed. The numerous experiments recorded by physiologists, prove such theories to be untenable; and although there is something vague in the employment of the term "vital",—by its use, notwithstanding, we cease to compare this remarkable process to mere inorganic agencies and effects, and are taught to study it in connexion with *vital* phenomena.

We have thus, then, brought ourselves to the inference, that the principle of *contractility*, the natural property of the fibrin, is most active in the coagulation of the blood. Some late English writers have extended this view. The low degree of vital power enjoyed by fibrin, has induced Dugès, Prater, and Lane to compare it to muscular contraction. That analogy drawn by Mr. Prater between the fibrin and the muscular fibre of the bladder of an animal recently dead, appears remarkable. He observes, "that on laying open the abdomen, the bladder will contract upon itself.— This contraction is hastened and increased by exposure to air, and in the case of the blood, by more powerful stimuli; if the organ be removed from the body, after its contraction is once complete, there is no tendency to relaxation, as in *other muscles*; and in this respect it strikingly resembles the *contraction* of a coagulum of blood." Thus the irritability of the blood seems to admit of a better comparison with some of the muscles of the body than others. Mr. Prater conducted a variety of experiments to prove the existence of a vital power in the blood. He remarks, "that

various agents produce widely different effects *before* and *after* coagulation. Thus, the proper effect of the bichloride of mercury is to coagulate the albumen of dead blood; but if a small portion of it in solution be projected into recently abstracted blood, *before* coagulation, this process is prevented altogether." A temperature likewise of 150°, if applied to new blood, maintains permanently its fluidity; while the same temperature would consolidate a mixture of clot and serum, mechanically mixed;—thus destroying its vitality.

There are at present no evidences known of any other vital properties in the fibrin than those of contractility and irritability. Majendie observes, "that it is neither by a chemical action, nor one resembling crystallization, that the blood is coagulated; there is something more than this in the formation of the organic net-work of the clot; there is something which imparts to it a tendency to live." Many things in the history of the blood, connected alike with diseased conditions of itself, external circumstances, and local affections, are readily explained upon this undoubtedly correct view of its coagulation. This process will not take place at all times and under all circumstances;—coagulation, it may be reiterated, can only occur *before* the destruction of those peculiar properties which have been called "contractility" and "irritability."

Summary of the Present State of our Knowledge of Coagulation.—Müller thus described the formation of a coagulum in the blood of the frog, placed in a watch-glass, under the microscope:—"I observed that before the whole mass coagulated, some colourless, transparent flakes formed, which I could draw to the edge of the glass with a needle." A drop of the same was afterwards diluted with serum;—red globules then appeared widely separated; but in the *spaces between* them, I could discern the formation of thin flakes; and by inserting a needle between any two globules, the whole mass was moved. Müller, and all those who have verified these experiments, consider them as convincingly proving that the *red particles* play no part in the coagulation. It is now established that the *time* of coagulation, and the character of the resulting coagulum, may be influenced by a diversity of circumstances,—which formerly were regarded as so many *causes*. Rest, cold, air, escape or not of halitus and gas, loss of vitality, evaporation of aqueous particles,—have respectively their control over the process. The form and material of the recipient vessel, quantity or mass, agitation and temperature, presence or absence of air, *condition* of the blood,—are circumstances which induce considerable modification in the period and *character* of the coagulum; the most important of which is the relative *quantity* of fibrin contained in the blood under different conditions of disease.

It is now well known that increased *coagulability* is a circumstance which always distinguishes blood under states of syncope; while the tendency to coagulation is *diminished* under inflammatory conditions of the body. When an animal is bled to death, the last drawn blood coagulates almost immediately upon its escape from the living vessel. This is a fact which excites attention to its immense importance in practice, while it kindles our admiration at the perfection of organic mechanism. In regard to that condition of the blood in inflammatory affections, in which a *buff* is formed upon its surface, it is now generally acknowledged, that the *slowness* of coagulation, although conducive to it, is not an essential condition. During inflammation, the absolute quantity of the fibrin and albumen is increased;—this being remembered, the augmented contractility of the fibrin, added to the diminished tendency to coagulation, will enable us to account for the

formation of the *buffy* coat. Müller explains the *cupped* appearance in this way :—as the red corpuscles, which, by their presence, mechanically increase the volume of the lower stratum of the clot, the latter being removed from the upper stratum, the contractile force of the fibrin brings its surface within narrower limits, and thus causes the *cupped* form.—*T. Williams.*]

The Blood in Pregnancy.—Occasionally, this buffy appearance of the blood takes place (it is said) without inflammation. It is usual in pregnancy; but a pregnant woman may be considered to be in an inflammatory state;—not a state of actual inflammation; but the condition of the womb is really inflammatory. In pregnancy the whole body frequently wastes. The eyes become hollow; and the whole health, for the most part, suffers a little. The pulse becomes very quick,—quicker than in health; and all the blood-vessels of the womb become greatly enlarged. The womb itself, if it be not in a state which justifies us in calling it *inflammatory*, is, nevertheless, in a state of activity so great, that it comes as near to inflammation as possible. When, to look at other periods of generation, animals are "in heat", and copulation takes place, the genital organs become violently red,—violently hot,—perhaps blackened with blood,—as if they would burst; and all the blood-vessels around throb. If that state ought not to be called "inflammation", still it is very clear that it nearly approaches to that state; and whatever word be employed, we must look at it as physiologists and pathologists. We cannot wonder, therefore, that in pregnancy the blood should frequently be buffy.

Absence of the Buffy Coat.—But this state of the blood is sometimes absent in inflammation. We may find a patient undoubtedly labouring under a most violent inflammation; and, on using the remedies for that affection, the most decided effects, and even cure, may result; and yet no buff may be present in the blood. This is by no means uncommon in bronchitis; where a patient has a rapid pulse, and great heat of body; cannot turn in bed without coughing; suffers under a difficulty of breathing,—so that he is obliged to breathe in a shallow manner; cannot expand the lungs without extreme soreness, tightness, and violent cough. The tongue is white, and violent pyrexia is present; and if bleeding be resorted to, instant relief is afforded; so that both the symptoms and the treatment prove the existence of inflammation. In many cases of bronchitis, the blood will not show the slightest morbid appearance; whereas if, instead of the lining membrane of the air-tubes, it were another membrane that was inflamed, (as, for instance, the pleura,) the smallest quantity of blood that could be taken away, would most likely show an intensity of buff, and be cupped in addition. The absence of this buffiness of the blood, is by no means a proof that there is not inflammation; but, if it be present, it is generally in proportion to the violence of the inflammation. If doubt existed as to whether the patient was labouring under inflammation or not, the appearance of this buffiness might justify the conclusion, that the symptoms which were suspected to be inflammatory really were so. The absence of it is no proof that inflammation does not exist; but the presence of it will, in doubtful cases, very much confirm your conclusions, that the symptoms treated were inflammatory. The buffiness, however, is not necessarily in proportion to the *danger* of the inflammation; for, in acute rheumatism, where there is no immediate danger, unless complicated with internal inflammation, the blood will generally be intensely buffed, and not unfrequently intensely cupped at the same time. We are usually, therefore, to consider this as a mark of inflammation, or of an inflammatory state; but its absence will not warrant us in saying that there is no inflammation;

and the intensity of the buffy or cupped state, is not to be considered as a proof that the inflammation is of an exceedingly dangerous character.

Many particular circumstances are necessary to be observed with regard to this phenomenon. The first cup will often be buffy; while the second, taken within a minute or two, is much less so, or perhaps not at all. When this circumstance occurs, I believe the difference generally arises from the amendment of the patient; for the beneficial effect of bleeding is sometimes very striking;—it sometimes checks the inflammation immediately. One may conceive that a certain portion of benefit, in such cases, takes place before half the blood we intend to withdraw is removed; and when the second cup exhibits less buffiness than the first, we may ascribe it to the actual amendment of the patient.

Relation between the Time of Coagulation, and the Buffy Coat.—The buffiness of the blood is certainly affected by the slowness of the coagulation; so that if the blood do not flow freely at first, but does afterwards, the quick coagulation of the first cup may not give the red particles time to subside; and this may prevent its being buffy. Hence we see that the quick or slow coagulation of blood must effect its buffiness. As blood coagulates the sooner the more it is exposed, and therefore the more slowly it trickles down the arm, increased quickness of coagulation may prevent buffiness in blood which would otherwise present it; and when it comes out more freely into the second cup, it may coagulate more slowly; and then, if there be a disposition to buff, the buff will form; so that it is not at all uncommon to have no buffiness in the first cup, but to find it in the second. Therefore, although a patient may have improved from bleeding, and have a disposition to form less buff in the second cup than in the first, yet the accidental circumstance of its trickling down the arm into the first cup, may give rise to an opposite occurrence, and may counterbalance the operation of the benefit. Buffiness may be shewn in the first cup, and none in the second, from the improvement of the patient; or we may have no buffiness in the first, and find it in the second,—notwithstanding that the patient has improved,—from the accidental circumstance of the second cup coagulating less speedily than the first.

Dr. Stoker's Experiments.—But although the quickness and slowness of coagulation may affect the formation of buff, yet they are not the cause of it; for it has been known that, of two portions of the same blood, one has continued fluid ten minutes after the other had begun to form buff, and yet has shewn no buff. When the stream of blood is exactly the same, causing the blood to flow into cups with equal rapidity, we sometimes find the difference of buff to be exceedingly great; and sometimes the buffiness is the same when one cup has coagulated very slowly, and the other very quickly. Dr. Stoker has given us some experiments upon this point, in his "Pathological Observations."[a] He has furnished twenty-seven experiments; in fifteen of which buff was formed, while in the other twelve it was not. Among the twelve in which no buff was formed, no coagulation took place in three of them in less than from twenty to forty minutes; and in four there was no coagulation for eight minutes. There was abundance of time, through the slowness of coagulation, for the red particles to separate from the fibrin, and yet the result was as I have stated; whereas, in the fifteen in which buff was produced, not one specimen delayed to coagulate longer than fourteen minutes, and in all but three coagulation took place in five minutes, and yet buff was produced. The real cause,

[a] Published in the year 1829.

therefore, of the buffiness of inflammatory blood, certainly is not the slowness of the coagulation; but from what it proceeds I do not know. It may be owing to the thinness of the fibrin; for it appears to be a fact, that the fibrin of buffy blood is both thinner and more abundant than that of other blood. If it be thinner, one may conceive that the red particles will more easily separate from it, and subside to the bottom. That *may* be the reason; but I do not say it *is*. As the quantity of fibrin is known to vary during the flow of blood, so probably may the thinness; and this may be the reason why blood which shewed buffiness in the first cup, exhibits none in the second;—the blood being thicker, the red particles do not so easily separate. At any rate, the buffiness of the blood is not proportionate to the slowness of the coagulation. Dr. Stoker's experiments confirmed the opinion I had previously formed from observation and reading; yet I believe it is true, that buffy blood generally coagulates more slowly than other blood, although I do not ascribe the buffiness to this circumstance. The slowness of coagulation may be in a great measure owing to the thinness of the fibrin; for if the fibrin be thin, it will probably be less disposed to solidify. It is said, that the mere celerity of the circulation does not effect any changes in the quality of the blood;—that it is not because the pulse is quick in inflammation, that the quality of the blood changes.

But although inflammatory blood, shewing buff, generally coagulates more slowly than other blood, yet the buff coagulates if there be strength of body very firmly,—more firmly than the crassamentum in health. The firmness and the cup-like form, are usually proportionate to the strength of the patient; but it is to be remembered, that the firmness of the coagulum is sometimes very great, without there being any cupped appearance. The firmness and cupped form are said to be greater in inflammation of fibrous membranes,—such as aponeuroses, ligaments, and tendons,—and in inflammation of serous membranes, than of other parts.

If it so happen that the buff of the blood be not firm, then the blood is said to be "sizy"; and when the coagulum of blood is soft, whether it be buffy or not, the serum will be found too abundant.

The cupped appearance of the blood, as well as the buffiness, is very much affected by the size of the vessel into which we draw it. If we extract the blood of a patient into a tea-cup, we have an infinitely greater chance of finding it buffy, than if we draw it into a hand-basin. The larger the vessel the less is the disposition to form the buff, and likewise to form the cupped appearance. For accurate observation, blood should certainly be drawn into small vessels.

Blackness of the Blood.—It is a general observation, that the blood is very black in the inflamed parts; although it is more *arterial* in the *surrounding* vessels; since it passes through the capillaries into the veins *without* acquiring the venous character. Leeches, at their first application to an inflamed part, abstract black blood; but after several applications it becomes bright.[a] I have observed this frequently, and I presume it arises from this circumstance;—that the blood, from moving slowly in the inflamed spot, acquires more of a venous character. I have known the blood, times innumerable, to be black, on the first application of leeches; and I once knew the blood, in a case of chronic inflammation of

[a] It is a curious fact, that blood drawn by leeches never exhibits the buffy coat. It seldom appears on blood that has been removed by means of cupping-glasses; but I have seen it take place.—*Dr. Watson's Lectures on Inflammation*; "*London Medical Gazette*"; *Volume* 27; *Page* 339.

the liver, highly offensive; so that almost as soon as it was removed, it passed into a state of putrefaction; but as leeches were applied day after day, it became brighter and brighter, and at last regained its natural odour and nature. It would be wrong to consider inflammation as merely affecting the solids; it affects likewise the blood itself.

Duration of Inflammation.—Having spoken of the *effects* of inflammation, I now proceed to consider its *duration*; and this is very various,—depending much on its intensity. If an inflammation be exceedingly violent, it cannot last long; but if that be not the case, it may last a great length of time. Inflammation may exist for only a very few hours, and may certainly destroy life in the course of a day. It is sometimes so rapid, that a person shall be well in the afternoon, and die from it before the next morning is much advanced. Pericarditis may occur suddenly in the evening, from exposure to cold, and end in death by the next morning. Inflammation may be so acute as to destroy life in a few hours, without any mortification, but simply from its own intensity. A child is sometimes seized with a violent rush of blood to the head;—its eyes will become red; its face flushed; and its head distracted with violent pain. It screams; and death ensues in the space of one or two minutes. The same thing will happen in adults. After death, a great quantity of blood will be found within the cranium, and externally to it. If this state be inflammatory, which is questionable, it certainly proves that inflammation may be almost momentary; and that it will destroy life in this sudden manner.

But inflammation, if it be not violent, may last for many months, and even years; for if it remit, it may often be tolerably violent, and yet continue for a very long time;—its severity not remaining the same during the whole of the period. If it once degenerate into the chronic form, it may last indefinitely; and when it does so, it generally induces various changes of structure, which I will hereafter mention. When a part has been once inflamed, the redness will occasionally remain some years, without any pain or any heat. We frequently see this after burns, and after cutaneous diseases. A portion of a scar will remain exceedingly red;—the vessels would appear to be in a state of passive dilatation. There is no pain, no heat, no tenderness, but extreme redness; and this—after it has existed a year or two, or perhaps longer—will sometimes decline; and the vessels will at last gradually recover their natural tone. After ulceration, the skin will frequently remain of a red colour, perhaps of a very dingy red, and almost of a brown colour. In the case of a person who has had a sore leg, the portions corresponding with the spots of ulceration are frequently very red, brown, variously discoloured, or perhaps nearly black.

SECTION V.—RESULTS OF INFLAMMATION.

Inflammation may terminate in complete health of the part. The part may, in a direct manner, regain its former state; and when this is the case, it is said to terminate in "resolution." Generally, however, when there is this resolution[a], there is some increased secretion, either at a distant part, or (if the part affected be of a secreting character) in that part itself. If it be a serous membrane, there is more or less effusion; if it be a cellu-

[a] From "resolvo," *to loosen.*

lar membrane, there is a more or less œdematous condition, which can be observed externally. But if these effects be very slight,—only temporary,—perhaps no inconvenience is produced; and the termination of inflammation is then said to be in "resolution." If, however, it be a serous membrane that is attacked, and there be a copious secretion, it is said to terminate in "effusion." If it be a cellular membrane that has been inflamed, and it does not terminate in resolution, a new fluid is formed, called "pus"; and the formation of this new fluid is denominated "suppuration." If it be a mucous membrane which has been affected, a great discharge either of mucus or pus supervenes; so that suppuration either from a cellular or mucous membrane may occur. It is actually pus that is formed, in inflammation of a mucous membrane; pus likewise may even be produced by the interior of a vessel. But it is right to say, that although authors call these phenomena "terminations", yet these copious secretions are not necessarily terminations; and that when they begin, it is not a matter of course that inflammation shall end. Although the part may suppurate, or fall into a state of effusion, these processes may, nevertheless, be inflammatory. It may still be desirable to go on with anti-inflammatory measures;—since heat, pain, tenderness, and all the marks of inflammation may continue. We ought, I think, rather to say that inflammation, sooner or later, induces these changes; or that these occurrences take place in inflamed parts;—whether the inflammation subsides or not. Inflammation may terminate, however, not in health, either directly or after these processes, but in *death*, either general or local. It may destroy life, without the occurrence of any farther change. It is very common to see persons die of enteritis, without mortification, or any other change. It sometimes happens, however, that inflammation does not destroy general life, but the life of the individual part; and then it is said to terminate in "mortification." But the inflammation may still continue,—not in the dead part, but in the parts around; and may extend farther, till more parts die.

[Before proceeding to the individual effects of inflammation, it is necessary to understand that, according to the accepted theory, in *every* degree of inflammation, contradistinguished from congestion and irritation, effusion must necessarily occur; the quantity of which obviously varies directly with the intensity of the action. This may be regarded as a law established by the numerous observations of Kaltenbrunner. The stages of irritation and congestion may pass away without the occurrence of any extravasation; but he has uniformly observed, that so soon as the *stasis* of the blood in the capillaries, which constitutes true inflammation, takes place, so soon does the *liquor sanguinis* permeate the coats of the vessels, to gain and occupy the surrounding cells. It is therefore certain that, although inflammation may end in recovery by *resolution*, an exudation of the more fluid part of the blood has taken place. This, of course, will vary with the character of the structure in which inflammation occurs;—being adhesive albumino-fibrin in serous membranes, glutinous mucus in mucous membranes, and consisting, in the parenchymatous structure of organs, for the most part of inspissated *liquor sanguinis*.—*T. Williams.*]

Resolution.—I will now speak particularly of these various "terminations", as they are called; the first of which (resolution), is really a termination. When an inflammation is resolved, all the symptoms decline, and no fresh symptoms arise; and this is essential to the character of resolution. While the inflammation is going on, the urine is generally high-coloured, and clear; but when it subsides, there is usually a copious red sediment. The reason assigned for this by chemists, is the following.

Urine in a healthy state contains, besides other matters, lithate of ammonia, and a yellow colouring matter; which, according to Liebig and others, is believed to be isomeric with lithate of ammonia; both of which remain in solution under ordinary circumstances. If, however, the urine undergoes any change in its constitution, from the existence of diseased actions in the system, these constituents become, to a certain extent, insoluble;—forming a precipitate, the colour of which pretty accurately indicates the nature of the changes that are taking place. If the colour of the precipitate be *pink*, it is owing to the action of nitric acid (which, in certain diseased states, is found in excess), or a portion of lithate of ammonia, converting it into purpurate of ammonia, and giving to the rest of the precipitate a pinkish hue. If the precipitate be *yellow*, then it consists of lithate of ammonia alone, slightly tinged by the yellow colouring matter of the urine. If the precipitate be *red* (lateritious), it is owing to the presence both of purpurates and colouring matter; which form a red colour, when they are mixed together. During inflammation, the lithates of soda and ammonia are in excess in the urine, and nitric acid is formed; which, acting on the lithic acid, produces the purpurates. These give a pink tinge to the lithates, whether they are in solution or precipitated; and this pink colour, by admixture with the yellow colouring matter of the urine, is changed to red. The reason why the urine is red without sediment, during the progress of inflammation, is this;—the same substances are in the urine, but held in solution during the activity of the complaint; but when it declines, an excess of lithic acid is formed,—producing super-lithates, which are known to be insoluble; and therefore a great portion of them falls down in the form of a precipitate. Hence the appearance of the red sediment. This is the explanation given by one who, perhaps, understands these things better than any other man in Europe;—I mean Dr. Prout. The deep-red colour, with transparency, during the activity and copious red deposit on the termination of the disease, are respectively characteristic of inflammation.

Effusion.—If, however, the inflammation do not terminate in resolution, but produce such an effusion as from its quantity may do harm, the symptoms of the inflammation may subside, and a fresh set of symptoms may come on, from the compression of the parts. If the pleura, for example, has been inflamed, and the inflammation induces at last copious effusion, after the pleuritis has subsided, a fresh *series* of symptoms supervene, dependent upon compression of the lung. When there is this excessive effusion, however, in a serous membrane, there is generally something more. Liquor sanguinis is usually thrown out;—sometimes forming layers,—sometimes diffused in the serum, and forming flocculi; so that the serum becomes turbid. When albumino-fibrin is thus poured out by a serous membrane, it is at last often entirely absorbed, while the fibrin remains; and frequently we find fibrin where there is no appearance of serum;—the serum having been absorbed. Professor Thomson, of Edinburgh, says that he has seen lymph lying on a serous membrane, within four hours after he had induced inflammation. Sir Everard Home says, that he has known an effusion of albumino-fibrin form vascular adhesions in the course of twenty-four-hours. Sometimes the effusion which occurs, is purulent. Thus the pleura, the pericardium, or the tunica vaginalis, may be filled with pus; and sometimes with a mixture of pus and serum.

Suppuration.—The third effect of inflammation is "suppuration." When this occurs, the pain generally ceases, but the swelling increases; and is marked, for the most part, by the sense of fluctuation which it imparts to the finger. This fluctuation is not always discoverable at first; but becomes

more and more decided, as the fluid increases. The pain, however, does not always cease. It may decline at first; but, as the fluid increases, considerable pain may come on from tension;—the part becoming exceedingly tense, from the quantity of fluid; which is afterwards absorbed, or escapes either by art or nature. Besides this, where there is suppuration of a cellular membrane, or of any organ, fresh symptoms from pressure may occur;—just as in effusion from a serous membrane. If the suppuration be extensive, shivering may come on, and what are called "rigors" take place; followed by, when matter is being formed, great heat and sweating,—constituting "hectic fever."

Hectic Fever.—This hectic fever is marked by a quick, but weak pulse; by heat of the whole surface; but particularly heat, with a red flush, upon the cheeks, the palms of the hands, and the soles of the feet. Sometimes the whole of these are red; but more frequently the redness is partial, forming patches; so that a portion of the cheek, the size of half-a-crown, may be intensely red, while all around is of the usual pale character. In addition to these symptoms, the patient has profuse sweating; so that as soon as he falls asleep, he is almost sure to fall into a sweat. Free perspiration likewise happens often during the waking state. These symptoms are generally aggravated at night, and frequently also at noon; and, indeed, at any time when food is taken. The effect of sleep upon the sweats is remarkable. If a patient fall asleep but for two minutes, although he may not know it, it is very common to find these sweats break out. They are frequently very partial;—being particularly observed about the head and chest.

In hectic fever, when suppuration is going on, the urinary deposits are of a pink colour. The chemical changes are precisely the same;—the purpurates acting upon the lithates, and producing this pink colour. This pink colour is not changed to red; because the yellow colouring matter of the urine is absent, and therefore the pink of the purpurates and lithates remains unchanged. The intestines often pour forth a fluid as abundantly as the skin, and then there is purging; not unfrequently the purging alternates with the sweating; so that if there be an increase of the sweating, there is a decrease of purging; and *vice versâ*. This sweating and purging are called "colliquative",—"melting the patient down"; and hence the name.[a] The alimentary canal often becomes inflamed; and when a patient who has laboured under this state is examined after death, the mucous membrane appears red and ulcerated. The tongue at length becomes red. We may see it yellowish, or of a deep brown colour; but for the most part it is red, either on the surface, or at the tip, or at the sides and tip. The mind generally becomes very quick; the patient is excessively alive to every thing; and, at the very last, a degree of delirium takes place. When that occurs, it is usually the precursor of a fatal end. I need not say there is usually extreme debility and wasting of the body. It is to be remembered, however, that these symptoms (called "hectic fever") may occur without any suppuration. They will occur, I know, from mere depression of mind; they will frequently occur in women from excessive suckling;—from suckling too much, or suckling too long. All these symptoms, without suppuration, will sometimes remain for a great length of time; and the patient, at last, by proper management, do very well.

Abscess.—Sometimes the matter is collected together in a cavity;—forming what is called an "abscess." [In explaining the formation of an *abscess*,

[a] From "colliqueo", *to melt*.

it is necessary to remember that the *invariable* result of inflammation is—the effusion of *liquor sanguinis*, differing in its quality, according to the varying condition of the system. When inflammation occurs, therefore, in any given part, circumscribed by defined limits, the cells of the tissue become infiltrated, at the spot in which the action is most intense;—softening of the original structure succeeds; and a more or less perfect *solution* of the proper tissue takes place, in the inflammatory effusion. This change constitutes that condition, which, in scientific medicine, is regarded as an *essential* preliminary to the process of absorption under every combination of circumstances. The doctrine, first propounded by Hunter, which supposed the previous *solution* of the *substance* of a part as unnecessary to its absorption, was subverted by the researches of Mr. Key, published in the Transactions of the Medico-Chirurgical Society. The views of Mr. Key have been likewise advocated by Dr. Prout; who puts it forth as a principle of universal application, that the *solution* of a part is an essential pre-requisite to its absorption. Physiology presents us with numerous instances of interest, which might be advanced in confirmation of this view. The *yelk*, in immediate contact with the beautiful web of the area vasculosa, undergoes liquefaction before it passes into the vessels, to fulfil the purpose of nutrition. The lymph is taken up by the absorbents in a perfect state of liquidity. Thus, then, the first steps in the formation of abscesses are rendered intelligible. The disintegration, induced by the softening, soon becomes limited by more active inflammation—a separation is worked out between the *disorganized* and the surrounding living parts, by the production of a saccular membrane—which in surgery is called pyogenic.[a] It consists, at the beginning, of the cells of the encircling structure infiltrated with a fibrinous deposit—which subsequently acquires the characters of membrane.—It is supposed to exercise the function of absorption and secretion;—thus renewing the contents of the abscess.—*T. Williams.*]

This pyogenic membrane, together with the adjacent soft parts, become gradually absorbed at one particular point of the abscess, nearest to the surface, or some principal outlet of the body; wherever, in fact, the easiest exit for its contents is to be found:—abscess of the liver, for example, may either point outwards towards the surface, or upwards towards the lungs; and, after producing absorption of the intervening diaphragm, discharge its contents. Such, at least, was the opinion of Hunter; it is however certain, that there are other circumstances to be considered;—such as the structure of the affected part, and the greater or less facility with which it takes on inflammation and ulceration. When there is danger of pus escaping into a cavity, or part of the body where serious consequences would result (as, for instance, into the peritoneum), then a great deal of additional lymph is frequently thrown out for the purpose of glueing the various parts together;—in order to prevent, as much as possible, the escape of the pus in an improper direction. Thus nature usually thins the walls of an abscess at that point which is most eligible for the escape of the pus; and thickens them where it would be dangerous for the pus to escape. This extraordinary provision of nature, may truly be considered as one of the most wonderful phenomena which claim the attention of the pathologist.

The absorption at the former point, wherever it may be, goes on. If it be near the surface, we see the chief swelling at one particular part; and the collection is said to "point." At length a minute opening is formed,

[a] Pus—γιγνομαι.

and the matter escapes. When the latter occurrence takes place, and the cavity is thus opened, minute red granules, highly vascular, soft, and covered with pus, are seen within. In fact, they secrete the pus. Sometimes the opening at which the matter escapes, although small at first, enlarges; absorption takes place to a great extent; ulceration runs on to a considerable distance, and perhaps lays bare the cavity very much.

These red granules grow larger and larger, till the cavity is filled up. This process is called "granulation." When the cavity is entirely filled up, portions of skin form upon its surface, and portions of the surrounding skin are prolonged into them; so that there is a double source of new skin. Fresh skin appears in insulated points; and the healthy skin around shoots prolongations into it. In this way the surface of the granulations becomes covered with skin, and is healed. The smaller the granulations are, the better; for if they be large, they are generally spongy; in which state they are popularly called "proud-flesh."

From the loss of cellular substance which takes place in the formation of the abscess, (for the cellular membrane is more or less destroyed,) and from the contraction of the new parts (for these granules, which were very vascular at first, become less and less so), after the healing takes place a depression is seen. If it be a very minute abscess,—such as is only called a "pock", as in small-pox,—there is merely a little depression,—a pit; but if it be a more extensive formation of matter that has taken place, "scars" result. They are exactly the same thing, only on a different scale. The contraction of the new parts, and the loss of the cellular membrane, are sometimes so great, that the joints cannot be extended; and the arm becomes bent to the body, or the fingers bent down to the hand.

Pus is sometimes collected in an abscess, in this way, without any lining of lymph; but when the latter is absent, the pus is almost always diffused. Pus is often formed in the cellular membrane in a diffused manner,—so as to run to a great extent, and do very serious mischief;—producing, wherever it spreads, new inflammation, and the most frightful devastation. This is observed in that form of erysipelas styled "erysipelas phlegmonoides." Where suppuration takes place in the cellular membrane, uncontrolled by a cup of lymph, it often runs on extensively; and sometimes a whole arm, or a whole thigh, is in this way covered by a sheet of matter.

Suppuration without an Abscess.—Sometimes, however, there is a formation of pus, and an absorption of the skin and cellular membrane, without any collection of matter. This is seen every day in the case of the throat, and sometimes upon the skin itself; but more frequently upon a mucous membrane. If the latter be attacked by a slight inflammation, the epithelium may be absorbed, together with a small portion of the mucous membrane;—in fact, there may be an ulcer; and that ulcer will secrete pus, without there being a collection of matter underneath. In an abscess, the matter is formed in the cellular membrane, or in a solid structure, and tends outwards; but frequently, in a mucous membrane, the process goes on inwards. Nothing is more common than to see this in the throat. The surface, which is a little inflamed, becomes abraded; matter is formed upon it; and in that way an ulcer is formed, without the previous existence of an abscess. If the part heal, it is afterwards filled up;—in the same way as if the matter had been collected in a cup, in the cellular membrane.

Characters of Pus and Mucus.—Pus, if healthy, is an opaque fluid, yellow or white, homogeneous, short, and creamy; so that if we take a drop between our fingers and separate them, it breaks. The drop divides into two,—does not hang in strings. If it be perfectly healthy, it is bland to

the taste, and without smell. Some say it is rather mawkish; but one never thinks of tasting it, except in the case of a gum-boil, or other suppuration in one's own mouth. It is said to be neither acid nor alkaline; although, by exposure to the atmosphere, it turns sour. It is also insoluble in water. It contains globules; and hence it is distinguished from pure mucus, by being placed between two bits of glass, and then looked through at the sun. From the existence of the globules, we have an iridescent appearance;—resembling the colours of the rainbow. This is not the case with mucus; for mucus contains no globules. It is said, however, that when pus is first secreted, it is not globular; and that these globules do not appear in it, till it has been poured forth from the vessels for fifteen minutes. Mucus, again, is not short, like pus. If we take a portion of mucus between the finger and thumb, and separate them, it drags out into threads.

Persons have endeavoured to discover the difference between pus and mucus by chemical tests. John Hunter says, that he found pus easily coagulate by a solution of muriate of ammonia; but that mucus would not. Dr. Darwin (Junior) says, that a solution of caustic potass does not dissolve pus; but makes it a viscid semi-fluid substance; stringy, like mucus;—not dissolvable in water; but resembling the diseased mucus of the bladder. When the bladder is in a state of chronic inflammation,—when the mucous membrane is in a state of cystorrhœa, and there is a great discharge of mucus from the surface, its mucus is very ropy, and may be dragged out to a great length; and this is the appearance which pus exhibits, if it be mixed with a solution of caustic potass. Dr. Darwin also says, that the same effect is produced, by adding to the pus sulphuric acid; whereas, if we add these acids to healthy mucus, small flakes are produced, and not a stringy semi-pellucid substance. On the other hand, two modern French writers (Andral and Baumes) deny this distinction. Then, again, another chemist (Grasmyer) says, that if pus be triturated with an equal quantity of water, and this combined fluid be then mixed with an equal quantity of carbonate of potass, a jelly is produced in a few hours; but that is not the case with mucus. Pus in general sinks in water, but mucus generally does not; and if pus be diffused in water, the water becomes uniformly white.

Microscopic Characters of Pus and Mucus.—[The microscopic difference between pus and mucus, is thus given by Mr. Lane.—" *Pus-globules* are transparent, and colourless, spherical or nearly so—averaging in size 1-2000th of an inch in diameter: they are spotted with numerous circular bodies, which should be called vesicles rather than granules. These little bodies are also found dispersed in the fluid in which pus globules float. Pus-globules, when allowed to dry on a piece of glass, expand; and measure more in diameter. *Mucus*-globules, from a healthy membrane, are also transparent and colourless, more *perfectly spherical*, and less variable in size than the pus-globules; and measure rather less in diameter than 1-2000th of an inch." Raspail it was who first pointed out the origin of mucus from the desquamation of the epithelium—a view which has derived important confirmation from the subsequent researches of Heule. The latter writer observes, that " when mucus is secreted very abundantly, it is with difficulty distinguishable from pus; both consist of molecular bodies with their envelopes floating in a more or less inspissated fluid. He states that these molecules are found in the serum of blisters, in the *bullæ* of the epidermis, in common pustules, and so on. The *pus* molecules occur in layers on the surface of the inflamed skin, in the same manner that mucous molecules are placed on their

appropriate membrane." Every physiological fact with which we are acquainted, favouring the opinion that pus is secreted from the blood in the form of a clear fluid, and that its globules are *afterwards* formed; it occurred to Drs. Babington and Bird, to institute experiments with a view to extend the analogy between them; and the results to which they were conducted, constitute most important additions to the science of organic chemistry. They have demonstrated, and their conclusions are supported by the more elaborate researches of Mandl, that *pus* differs from *mucus*, only in having in solution a large quantity of albumen, coagulable by heat, acids, and the ordinary agents; in containing iron; and in the incinerated ashes of pus affording a much smaller quantity of saline matter than those of mucus. And they have rendered it extremely probable that the animal matter of mucus is albumen, in a diminished quantity and modified form.—*T. Williams.*]

As to all these distinctions, however, the fact that pus and mucus are convertible into each other, is established by modern organic analysis. Mucus may be diseased, so as to be something like pus,—puriform; and they will run into each other by insensible degrees. In disease of the lungs, the distinction between pus and mucus has been thought most important, as tending to shew whether ulceration exists; but here the two secretions are continually mixed together. When there is an abscess of the lungs, or a number of abscesses, and matter is discharged from them, a quantity of mucus is at the same time secreted from the bronchial tubes; so that the pus and the mucus are expectorated together; and in proportion as the former surpasses the latter in quantity, or the latter exceeds the quantity of the former, the characters of the one or the other are presented. If the quantity of mucus be very considerable, the pus may be borne up by it in water,—not allowed to sink. Besides this, there may be an abscess in the lungs; and there may also be an excavation secreting, not pus, but mucus. The lining membrane of the cavity in the lungs—at least, if fresh ulceration have not taken place—may secrete mere mucus. Again: every mucous membrane which is inflamed, may produce absolute pus; so that pus may be discharged from the lungs, when there is no ulceration at all; while, on the other hand, there may be ulceration of the lungs; but the lining membrane of the abscess may have become of such a mucous character, as to secrete real mucus.

Analysis of Pus.—With regard to the constitution of pus, Schwilgué (who is one of the last that has analyzed it) says that it consists of albumen, extractive matter, fatty matter, soda, muriate of soda, phosphate of lime, and some other salts. When pus is scrofulous, it is said to have more soda and muriate of soda, than healthy pus. Pus was once imagined to consist of the dissolved solids. Seeing that a cavity existed, it was imagined that the solids were melted down, and turned into pus. But frequently pus may appear when there is no ulceration at all; nor is the formation of pus in proportion to the loss of the solids. From a small abscess, there may be an immense secretion of pus, if by chance the abscess do not heal; and yet it does not extend. The pus is a new *excretion*. Whether globules are formed in it,—whether it be perfect immediately or not,—is of no consideration. The fluid from which pus is produced is a secretion. It appears to possess solvent properties; for John Hunter found dead flesh dissolve very readily in pus. He put an equal quantity of dead flesh into pus, into jelly, and into water; and he found the portion put into pus dissolve very readily, while the portions put into jelly and water did

not. Hence it would appear, that pus is useful in dissolving the solids when they die.

Formation of Pus.—[Since the discovery of the capillary vessels as constituting a *distinct segment* of the vascular circle of the body, the formation of pus has been a fertile question of controversy. To the reasoning acumen of Müller, however, is due the merit of having rendered it probable that *pus*, as such, cannot escape from the interior of the capillary; but that the formation of the globules which it contains, must occur subsequently to the exudation of the fluid in which they are seen. This inference was made out from the fact, that the diameter of the pus-globule is nearly twice that of the capillary.

Hunter maintained that inflammation was a necessary antecedent to the generation of pus. Dupuytren believed that pus was the compound *detritus* of the softened and altered tissue. To these views were confronted the microscopic discoveries of *Gendrin*, who laboured to shew that pus was only the red particles of the blood, divested of the colouring envelope—and that, in this reduced form, they transude the parieties of the capillaries. The fact discovered by Andral, that in cardiac concretions, pus is sometimes found, was adduced in support of his hypothesis. With slight modifications Kaltenbrunner advocated this view. Gulliver argues, from certain microscopic observations, that pus pre-exists in the capillaries before its effusion. However certain he may be of the accuracy of his observations, the variance of his inference with physiological principles, obliges me to withhold my belief from its truth. Pus-globules, and the nuclei of the red particles, are both composed of albumen—the latter, however, manifest the presence of a small proportion of fibrin under the action of chemical reagents. In extension of the original arguments of Müller, I believe that, as pus (from the magnitude of its globule) cannot pass out of the capillary—when seen by Gulliver in the interior of the vessel, the lining membrane must have been in a state of suppurating inflammation. The following explanation, as offered by Ancell, appears to me the most reconcileable with all the facts involved in this question. He remarks, "blood recently and severely inflamed pours out *liquor sanguinis*. When it has been for some time inflamed, earlier or later, under particular circumstances, it pours out *liquor puris*. The *diminished* quantity of salt in the liquor sanguinis, under inflammation, renders it a solvent of the colouring matter of the red corpuscles; hence the corpuscles have been observed *to lose their colour and form*, and to be *broken down* in the blood stagnant in the part. The *liquor puris* now exudes, which contains iron and a diminished proportion of salt. This is nature's provision to get rid of the impacted corpuscles, and restore the circulation of the inflamed part. When fomentations and poultices are applied, this natural process is aided; for the aqueous particles being imbibed, the solution of the red particles, and the consequent formation of pus, are hastened."—*T. Williams.*]

Healthy pus is called by the old writers "laudable." I recollect, when a student, hearing good pus, instead of being termed "*healthy* pus", commonly called "*laudable* pus",—"*praiseworthy* pus."[a] Healthy pus should abound with globules.

[a] This has been considered an absurd epithet; but it serves as well as any other to express what was meant; namely, that kind of pus which accompanies benign forms of inflammation, and which indicates that all is going on regularly, and promises a fortunate ending;—pus, in short, the appearance of which was *to be commended.* It is certainly not more absurd than the term "*healthy* pus."—*Dr. Watson, in the "Medical Gazette" for November* 27, 1840; *No.* 678; *Volume* 27; *Page* 343.

[It is, however, to be understood, that these pus-globules have no analogy, either in size or constitution, to the nuclei of the red corpuscles. The nuclei of the red corpuscles are formed of a peculiar compound, which consists of fibrin and albumen; while pus contains only the latter. The opacity of a purulent fluid depends upon the presence of the spherical corpuscules; and its degree will consequently vary with their number.—*T. Williams.*]

If the globules be deficient, and the pus be watery, then we have what is called "*ichorous*[a] pus." But there may be other differences in pus, besides a deficiency of globules. If it be thin and bloody, it is called "sanious"; and it is called "scrofulous" if there be in it little curds; which curds, very possibly, are shreds of lymph. Pus sometimes very much resembles mucus. It does not abound sufficiently in globules, is glairy or muciform, and will hang out in little strings. When mucus, however, becomes something like pus, we call it "puriform." Pus frequently becomes fetid. This particularly occurs if a bone be diseased; but in suppuration of the tonsils, likewise, it is not uncommon for the pus which escapes, or is let out by a lancet, to be most horridly fetid. Generally, however, it is when pus comes from the bone, or the immediate neighbourhood of a bone, that it assumes this fetid character.

We have already mentioned in how short a time albumino-fibrin has been seen effused on a serous membrane[b]; and pus also has been seen to form in a few hours. It has been seen produced by a mucous membrane, in a few hours after inflammation has been set up; and when an abscess has been produced, matter has been formed in so short a time as from twelve to eighteen hours from the commencement of the inflammation.

Mortification.—The next termination of which I shall speak, is "mortification."[c] This is shewn by the part becoming of a darker red than before. When a part is about to mortify, it grows of a dingy red; from red it becomes purple, and then black; and when it is once dead, it changes from the decomposition of the matter to a green colour, and various other hues. The pain ceases,—the part becomes cold,—and, if it be the surface, we often see vesicles; which, although they are frequently filled with a pale fluid, yet are more frequently filled with a bloody serum. If it be the skin which is mortified, it becomes variegated; and perhaps the part crackles under the finger. From the extravasation of air, the swelling increases; and the part has often a doughy feel. These are the *local* symptoms; but *general* symptoms take place. There is extreme prostration of strength, with extreme restlessness. The face becomes ghastly; the pulse becomes rapid and exceedingly weak,—perhaps intermitting and irregular. There is a general fall of the temperature of the body; and a cold clammy sweat takes place. The tongue becomes brown or black;—the patient's manner becomes exceedingly quick; and, frequently, a little delirium takes place. The cessation of the local, and of all the violent general symptoms, will take place just before death from inflammation, when that inflammation does not cause mortification, or any other local change;—although, when mortification occurs to any extent, the very same thing is observed. That is to say, the cessation of pain, the ghastly countenance, the rapid, feeble pulse, the extreme sense of debility, restlessness, and at last death, without any mortification, may happen,—without any other local change whatever. Frequently, from the

[a] From ἰχώρ, *a thin, acrid fluid.*

[b] See Page 97.

[c] From "mors", *death*; and "fio", *to become.*

symptoms of enteritis, we should imagine that mortification of the intestines had taken place; but, on opening the body, we may find no mortification,—nothing but intense inflammation.

When the parts inflamed become of a purple colour, and cold, and fall into incipient mortification, restoration is not impossible. Parts will recover that have become purple, and lost a portion of their temperature. Even parts which have been congealed, will recover by good management; but this, I believe, takes place in man and the other warm-blooded, more than in cold-blooded animals; and Professor Thomson, of Edinburgh, says that if a *whole* limb be frozen, it is never restored.

Gangrene and Sphacelus.—A still higher degree of mortification is called "gangrene"[a]; and the complete death of a part,—when it is gone irrecoverably,—is termed "sphacelus."[b] In the latter case, the part is cold, senseless, black; and putrefaction follows. There are three degrees, therefore, of mortification;—the one where the parts are merely purple and cold; a second where things are more advanced, but the part is not absolutely dead; and the third, in which the part is really dead;—"mortification" being the generic term for all the three stages. When a part is dead, and putrefaction is begun, the progress of the latter depends very much upon external circumstances. The warmer the weather, of course the more readily will putrefaction take place.

Separation of Dead Parts.—If the part which is in a state of sphacelus be not important to life, it may be separated by nature from the body. The process of nature, here, is exceedingly wonderful. The large vessels, which go to the part, become plugged up;—a coagulum of blood forms in them, or adhesive fibrin is poured out from the inner surface; so that in one way or other the progress of the blood is arrested; the consequence of which is, that it coagulates to some extent above the plug, and the plug thereby becomes increased. Dr. Thomson (of Edinburgh) says, that a coagulum never extends higher than the first communicating branch; and that is what we should suppose. The blood coagulates behind the plug, nearest the heart; and therefore we should not expect a plug to extend beyond the first communicating branch. Dr. Thomson has seen a vessel completely obstructed, without the formation of any plug at all;—the whole obstruction being produced by an effusion of lymph,—lymph which has become organized, and formed an internal adhesion. He has even seen an artery completely obstructed without any lymph,—without any plug; but simply from its becoming closely contracted;—so contracted that it would not admit a bristle. The contraction has formed as complete an obstruction to the blood as a coagulum, or a quantity of fibrin, would have done. He says that he has noticed the same circumstance in an amputation, where no ligature had been employed. The vessels have become so contracted, as not to admit of the introduction of a bristle; and have thus prevented all hæmorrhage. In whatever way it is done,—whether by a coagulum of blood, or by a plug of lymph forming an adhesion, or by the mere contraction of the vessels, or by any two of these,—such is the fact, that nature generally succeeds in preventing hæmorrhage from a mortified part, by obstructing the course of the blood in the larger vessels leading to it.

The process of separation is accomplished in this manner:—A red line appears at the boundary of the healthy part, which is nearest to that which is dead. This red line is a line of inflammation; and in it ulceration takes

[a] From γραω, *to feed upon.* [b] From σφαλω, *to destroy.*

place, and gradually penetrates the healthy part, till a complete separation takes place; and in this way a whole limb is sometimes separated from the body.

Necrosis.—Of course I have been speaking of soft parts; but if a long bone die, without any death, or any especial disease, of the surrounding parts, a new bone is formed around it. The process of nature, therefore, is quite different here, from that which is employed to separate a dead soft part. In this case, a new bone is formed under the periosteum, around the dead portion; and in this way the parts exterior to the new bone—the periosteum, the ligaments, and the cartilages—all become attached to it. When the old bone within the new one is completely loosened, an opening is formed in the new bone; ulceration takes place in it at one spot; granulations occur on the inner surface; and these granulations push the old bone through the ulcerated opening in the new one;—at least they tend to do so. The aid of a surgeon is frequently of use in assisting to draw out the old bone, and enlarge the openings in the new; but this is the process adopted by nature when a bone dies. It is called "necrosis"[a]; and the old bone within will frequently rattle,—like the kernel of a dry nut. The old bone is called a "sequestrum."

Exfoliation.—If it be not a long bone which is dead, but merely a plate, or a flat bone, this is separated by ulceration. Granulations form under the old bone, and push it off. This process is designated "exfoliation"; because the bone comes off like a leaf (*folium*).

These are the "terminations", as they are called, of inflammation; but I should rather say they are the *effects* of inflammation, than *terminations*; because inflammation does not necessarily terminate when they occur. Inflammation frequently goes on after these effects take place; and therefore we ought to say, strictly speaking, that these are the *effects* of inflammation, or circumstances that occur from inflammation.

Induration and Softening.—Some authors mention "scirrhus" among the terminations of inflammation; but if they mean the scirrhus which afterwards becomes cancer, they are certainly wrong; because scirrhus will occur without marks of inflammation. A part, without these marks, will gradually become cancerous. It seems to be a specific disease. If, however, by "*scirrhus*", these writers mean *true* scirrhus,—mere induration, then they may be right; because one of the effects of inflammation is to harden. When a part has been inflamed for a length of time, it frequently becomes indurated; so that scirrhus, in that sense, may be said to be the *effect* of inflammation, but not a *termination* of it; because the inflammation will go on, and the part become more and more indurated. Induration, however, is only one of such effects of inflammation as they ought to enumerate; for it has as great a tendency to cause parts to become softened, as hardened. Induration is rather the effect of chronic inflammation; while acute inflammation rather produces softening.

Hypertrophy and Atrophy.—Inflammation, when it continues, will sometimes cause an enlargement of parts. It will cause them to increase,—to be over-nourished; and then the occurrence is termed "hypertrophy",—excessive nourishment. On the other hand, it will sometimes cause them to waste,—to be *under*-nourished, if I may so speak; and then it is called "atrophy." It will occasion them to be indurated, or to be softened; and it will give rise to various transformations; so that a part shall become pretty firm cartilage,

[a] From νικάω, *to destroy.*

or even actual bone. These results of inflammation are sometimes combined in the same part; so that a part may be both hypertrophied and atrophied. If a part be compounded of different structures, one structure may increase, —become harder, and thicker than before; while another constituent of the same organ wastes away; and one part may become indurated, while another shall become softened. Hypertrophy and atrophy, or induration and softening, in different structures of the same compound organ, may therefore co-exist. A thickening of the *investing membrane* of an organ, for example, and a wasting of the *substance* of the organ itself, are met with. The retina is sometimes found in a state of atrophy, while other portions of the eye are excessively thick, or indurated to the consistence of cartilage. Acute inflammation more frequently, as I have already said, causes softening than hardening; and wasting rather follows acute inflammation than chronic; except when the chronic form induces such over-nourishment of one constituent part of an organ, that another structure wastes. Generally, however, acute inflammation is disposed to produce softening; and if any other change occur, it is rather that of atrophy. Chronic inflammation, on the other hand, chiefly causes parts to become hard, and hypertrophied,—over-nourished,—thickened; and it is this which causes transformations,—causes parts to become cartilage or bone. I do not mean to say that these changes will not arise without inflammation; but when they are produced by inflammation, it is usually the chronic, and not the acute form, which gives rise to them.

Changes without Inflammation.—It is to be remembered, that these various changes of size (hypertrophy and atrophy), and of consistency (induration and softening); as also these transformations; the occurrence of hæmorrhage; the occurrence of dropsical effusion; the occurrence of a discharge from a mucous membrane (a gleet); and perhaps adhesion, ulceration, and mortification; —may all take place without any inflammation. They are continually the effect of inflammation; but certainly most of them do sometimes occur, without our being able to discover that any inflammation existed. In the case of hæmorrhage, though it is frequently the result of an active inflammation, and generally, too, in a mucous membrane, yet it is often passive; and is poured forth without either pain, heat, swelling, or general irritation;—nay, it is frequently poured forth without any fulness discoverable in the vessels of the part. I have opened persons who have died from hæmorrhage, in whom there was no collection of blood to be found in the parts which afforded the hæmorrhage. While every part of the body, from head to foot, was perfectly pale, there was hæmorrhage from time to time, until death ensued; and it must have come from small vessels, because no large vessels could be discovered to be ruptured. Chronic hydro-thorax and ascites certainly do sometimes occur without any inflammation of the serous membranes;—no pleuritis,—no peritonitis. With respect to mucous membranes, a gleet frequently exists, without the occurrence of any one symptom of inflammation. It is even thought by some, that suppuration of the lungs will take place without inflammation;—that where a single vomica of mere tubercular matter has been generated, and suppuration has taken place, there has often been no previous inflammation. It is certain that large adhesions continually occur in the pleura, in persons who have no recollection of having been the subjects of inflammation within the chest. Occasionally portions of fibrin are spit up from the bronchial tubes, without a person having, beforehand, suspected the slightest inflammatory state of those parts. Ulceration is thought, by some surgeons, occasionally to occur, without inflammation, in the cartilages of joints, and ulceration will

certainly now and then take place in the skin and throat, with little or no inflammation. Such ulceration is continually seen in scurvy. Ulcerated, like softened, mucous membranes, are sometimes quite pale. Mortification frequently occurs without inflammation. Instances of this are seen in the lungs; and more rarely in other viscera.

Ligature.—When the chief vessel of a part is obstructed by a ligature, this will frequently produce mortification of those parts below, to which the ramifications of the obstructed blood-vessel are distributed.

Diseased Grain.—Spurred rye, or "ergot of rye", causes mortification, I believe, in all animals; though the quantity requisite for that purpose varies in different species. If an animal live upon it, there is sometimes a reddish fluid observed to ooze from the nostrils; sometimes there is violent pain of the extremities; and sometimes there is also heat and redness,—actual inflammation; and then gangrene takes place. Frequently, however, it does not cause heat and redness, but a withering of the part; which will dry, and look like the extremities of a mummy. The extremities become cold, dry, and shrivelled; and, at the same time, diarrhœa, vertigo, convulsions, and delirium, very frequently take place. Internal inflammation is frequently induced in the alimentary canal; but the extremities generally mortify, and present the appearance which I have described. It is common in France, and formerly prevailed in England; the cause of which appeared to be the consumption of diseased wheat. Sometimes the legs will mortify from bad food; and the most common kind which produces this effect, is diseased grain.

I believe that other grain, diseased in a similar manner, has a similar effect. The ergot of maize in Colombia, is said to act in the same way. At least, it will cause the hair to fall off,—sometimes the teeth to drop out; and it frequently induces sudden death. It so happens that brutes are exceedingly fond of it. They will therefore frequently gorge themselves with it, and then die suddenly. It was observed that the hens which ate of it, in Colombia, discharged their eggs prematurely,—before the shell was formed; and it is *thought* that the fact of its occasioning the abortion of eggs in hens, led persons to employ it in the case of the human subject, for the purpose of emptying the uterus speedily. Its peculiar properties appear to be destroyed by cold; for it is found, that if this diseased maize be carried over cold mountains,—over the Paramos, it may afterwards be eaten with impunity.

Gangrene from Ossification of the Blood-Vessels.—Mortification will sometimes occur, not from inflammation, but more probably from ossification of the minute arteries. Some say that mortification will arise from the ossification of the larger and more distant arteries; but certainly it is generally believed to be sometimes occasioned by the ossification of the minute arteries. Cruveilhier, by artificially inducing a similarly obstructed state, produced the same effect. He injected mercury into the arteries, so as to fill the capillary vessels with it; and when an obstruction was thus produced, mortification was the consequence.

Dry Gangrene.—The mortification which arises from obstruction in the vessels, induced by ossification of the minute arteries, most frequently takes place in males; and especially in the old and voluptuous. Generally the gangrene is dry,—the part shrivels up; and this state is preceded by very great pain. There are two varieties of dry gangrene;—the *pale* and the *black*. Mortification may occur without inflammation. Many things, however, are asserted, in medicine, without sufficient proof; and occasion a great deal of trouble to those who follow the asserters, by making it

necessary for them to prove that the assertions are not true. This circumstance, in medical writings, is too common an occurrence. I do not know that it is proved, that mortification is always preceded or accompanied by inflammation; but if it be, the mortification is often not proportionate to the inflammation. The severest mortification may be seen with the slightest inflammation, or with its entire absence; and, on the contrary, the most intense inflammation, without inducing mortification. Some inflammations have a peculiar tendency to end in mortification. The inflammation of glanders, in the human subject, though not more intense than many other inflammations of the face, has nevertheless a great tendency to induce mortification.

Changes from Inflammation.—With respect, then, to all the effects of inflammation, and those changes which, though they frequently are its effects, yet sometimes appear not to be exactly so,—I may mention that induration is generally the result of slow inflammation; but that softening is continually seen without any signs of inflammation at all. Hypertrophy (over-nourishment), like induration, is, I believe, generally the result of slow inflammation; but atrophy, the wasting of a part, is frequently seen without inflammation. In phthisis, the heart is usually small, flabby, and perhaps shrivelled; though not previously inflamed. The transformations of one structure into another structure, natural to the body, though not to the individual part, and therefore called "analogous" formations, are certainly more frequently the result of inflammation than otherwise; but the new formations—those which are not analogous to any thing already existing in the body—are far more frequently not the result of inflammation. It continually happens that there is not a vestige of inflammation to be found during their production. They appear to be alterations of action, rather than the result of an actual inflammation. The part is entirely altered, and a new product is formed. When inflammation does accompany those new formations which are called "*non-analogous*", such as encephaloid disease, or cancer, it is often only an accompaniment, and not their cause. Sometimes it is only the *predisposing* cause. Inflammation throws a part into a predisposition to disease; and then a fresh disease is set up. That these things are not the result, at any rate, of mere inflammation, is shown by the fact, that more inflammation continually occurs, without such effects being induced. In these affections, although we may employ the most vigorous antiphlogistic measures, in the most persevering manner, the disease may resist; we scarcely control it, or not at all. The tendency to the morbid process is continued; and the disposition to it would often appear to excite the inflammation:—that is, the inflammation appears to be the consequence of the disposition to the disease; and not the disposition to be the result of the inflammation. Indeed, inflammation, in many cases, is only the ultimate effect. The new formations irritate the part so much, that inflammation is excited, and an attempt is made by nature to discharge the formation. In this way scirrhus has sometimes been completely separated, by nature, from the body.

Tubercles.—The existence, in the lungs, of tubercles, (which are new formations, not analogous to any thing in the body,) cannot be the result of mere inflammation; because inflammation occurs every day without them; and they, too, are often produced without signs of inflammation.[a] Occasionally, people who are disposed to this disease will, by having the lungs thrown into an unhealthy state by inflammation, become the subjects of

[a] This view is confirmed by the recent important pathological researches of M. Louis.

tubercles from that time; because any thing which throws the body out of health, gives a predisposition to disease of some kind or other; or if there be a predisposition, it is increased, and the new disease is excited. If a rabbit be badly fed, and kept in a damp place, and in the dark,—so that it has a deficient quantity of light and heat, together with unwholesome food, —it may become the subject of tubercles. A new, depraved secretion takes place; which, however, is not the result of inflammation. If we gave stimulants to an animal, we might produce an inflammatory state of the whole body, or of any organ; but should not induce tubercles. The attempt to explain every thing by inflammation, appears to me an absurdity; and I am happy to find that my opinions on this subject coincide with those of Andral and Louis; who argue successfully, that inflammation is not always the cause of tubercles; that they occur continually without inflammation; and that when they do occur as the consequence of inflammation, it is not so much the result of the inflammation itself, as of the part being thrown out of health, and thus easily becoming the victim of the predisposition to tubercles. These are all the observations that I have thought it necessary to make, respecting the symptoms and effects of inflammation. I shall hereafter speak of changes of structure in general.

Such are the usual phenomena of inflammation. Such are the chief symptoms; such are the general effects or terminations; and such is its course. The next point which I shall consider, is the variety in all these respects, occasioned by the nature of the structure which it attacks. The varieties induced in inflammation by the structure affected, were first considered by Dr. Carmichael Smith; who published (in the second volume of the "Medical Communications", printed in 1788) a very admirable and classical paper on this subject. His attention, however, was confined to inflammation. Nearly ten years after this, Pinel, a celebrated French physician, adopted this same arrangement; and he, I believe, generally has the credit upon the continent; while our countryman is overlooked. Bichat, in his "General Anatomy", afterwards pointed out that *all* diseases might be considered according to the structure which they affect.

SECTION VI.—VARIETIES OF INFLAMMATION.

There are five chief structures, which Dr. Carmichael Smith considered as giving rise to the most decided varieties in the symptoms of inflammation. These are the skin, the mucous membranes, the serous membranes, the cellular membrane (including the substance of the organs), and (according to him) the muscles; but we ought rather, perhaps, to say the fibrous membranes; such as ligaments and aponeuroses, tendons, and the periosteum.

Inflammation of the Skin.—When the part inflamed is the skin, it exhibits an intense shining redness, which is instantly removed by the pressure of the finger; and as instantly returns, or nearly so, when the finger is removed;—so that the skin is made white by pressure; but almost as soon as the finger is removed, a blush pervades the part, which becomes as red as before. If this inflammation of the skin be of a simple character, and in a patch,—if there be nothing more than the inflammation of the part, the term given to it is "erythema." It is not every inflammation which is erythema[a]; but the simplest patch of inflammation on the skin is so designated.

[a] From ἐρυθρός, *red*.

The character of the pain, when the skin is inflamed, is burning and smarting; and when the inflammation subsides, it is frequently followed by the separation of the cuticle in branny particles, or scales, or even large shreds. This process is called "desquamation." [a]

Very frequently, when the skin is inflamed, vesicles of various sizes appear; and, not unfrequently, there is a very great effusion of serum into the subjacent cellular membrane; so that where the skin is inflamed, the whole part becomes swollen, puffy, and œdematous. As the skin is a continuous surface, every inflammation of it which is entirely superficial, has a great tendency to spread; and sometimes, when that takes place, the part first affected recovers itself; so that the disease appears to wander along the body, like a cloud;—forsaking one part, and going to another. But, on the other hand, we sometimes have the part originally inflamed still affected;—the disease having merely extended itself still farther. Sometimes the inflammation does not spread in this way, but dips down; so that the cellular membrane below is not merely filled with serum, but becomes the subject of actual inflammation. If this occur in mere points, matter may be formed; and what are called "pustules",—which consist of a number of little minute collections of pus. Sometimes they may be formed, indeed, without the cellular membrane being affected; the surface of the skin alone being attacked; but frequently the pustules extend through the skin, deeply into the cellular membrane. Sometimes, moreover, a frightfully extensive inflammation of the cellular membrane takes place;—suppuration being very likely to occur; and then the disease is designated "erysipelas phlegmonoides", by some called "diffused inflammation of the cellular membrane." The skin, therefore, may be inflamed superficially, and remain so; or the inflammation may dip down into the cellular membrane below; and then all the characters of inflammation of the cellular membrane, in addition to those of inflammation of the skin, appear. This may be considered a complicated disease;—an inflammation of two parts.

Inflammation of Mucous Membrane.—The second structure which gives variety to inflammation, is mucous membrane. Mucous membranes are very nearly allied in structure, as well as in all other qualities, to the skin. In Bichat's beautiful "Treatise on Membranes", the analogy is pointed out between mucous membranes and the skin. It is a work well deserving of study. Heule, however, has recently published some important researches on the intimate organization of membranes. He has shewn that the epithelium, which is the proper cuticle of mucous membranes, consists of vesicles flattened and disposed in a tesselated manner. When a mucous membrane is inflamed, it becomes thicker than usual; its temperature increases; and it becomes tender to the touch. The pain which is experienced is dull and diffuse, though sometimes it is of a pricking character; but if not pricking, it is obtuse and diffused. When the inflammation first begins, the secretion of the part is increased. It is, however, watery, or thin; and perhaps acrid. This any one may observe in a common catarrh. When a cold begins in the Schneiderian membrane of a nostril, the nose "runs", as it is called. The secretion is increased, but is not at first very excessive; nor is it thick, but thin; frequently, however, it is more or less acrid. As the disease advances, the discharge becomes, perhaps, entirely suppressed; but, as the disease declines, the secretion increases again,—becomes excessively copious and viscid,—perhaps offensive; and then, again, it gradually lessens. If the inflammation be not intense, the secretion remains

[a] From "desquamo", *to scale off.*

mucous; although it may be altered in its quality,—may be diseased, still it is mucous. If, however, the inflammation be more intense, the secretion becomes puriform; and a still higher degree of intensity will give rise to absolute pus,—purulent discharge. All this is observed in inflammation of the urethra; where inflammation is far more violent than that which occurs in the nose. The inflammation of catarrh generally produces nothing more than mucus; but the inflammation of severe gonorrhœa is so violent, as to cause the formation of pus. If, however, the inflammation be still more violent than that which occurs in purulent gonorrhœa, you may not simply have pus produced, but albumino-fibrin will be poured out. One of the most violent inflammations of a mucous membrane, is the croup of children; in which disease, the mucous membrane pours forth a plastic fluid; by which the parts become obstructed, and a tube of new secretion is produced. I have seen the same occur in the urethra; where an individual, in consequence of a violent gonorrhœa, has used strong injections; the result of which was the excitement of a dreadful inflammation. Pus had been secreted before, but now adhesive matter; a portion of which, exactly resembling an earth-worm in appearance, except in colour, was discharged from the urethra.

Occasionally, when mucous membranes are inflamed, hæmorrhage takes place from them. They become so overloaded with blood, that the vessels allow its escape, and hæmorrhage ensues. This is more particularly the case with inflammation of the mucous membrane of the intestines, and of the urethra. Now and then ulceration and mortification occur; this circumstance generally happens, however, in the throat and intestines. It often takes place from the very beginning; and is not at all in proportion to the degree of inflammation. There often appears to be a strong disposition to ulceration. Inflammation of a mucous membrane frequently degenerates into a state of chronic discharge; so that when the inflammation is over, the part continues to pour forth a quantity of fluid, without pain and without heat. This particularly occurs when a mucous membrane has been inflamed several times; and we especially notice this gleet, as it is termed, from the bronchia and the urethra. The latter is every day seen in young men; and the former in those who are old. Hence we have "catarrhus senilis",—a gleet,—a constant discharge from the mucous membrane of the air-passages, without any inflammation.

If we examine these membranes after death, when they have been inflamed, we find them thicker and softer than natural. If the inflammation should have continued very long, they will frequently become very soft and thin; but, on the other hand, just the reverse is frequently observed. If inflammation have induced softening, they may be rubbed off by the finger, from the cellular membrane beneath. Sometimes, however, these mucous membranes become indurated. If we find a mucous membrane soft,—as we frequently do in the case of the stomach,—it is no proof that it has been inflamed. I believe that a part will occasionally become softened, without any inflammation;—at any rate, I know that the softening is frequently out of proportion to any inflammation that has existed. Generally, when a mucous membrane has suffered acute inflammation, it is found to be thicker and softer than natural. It is much more rare to find it hardened. The usual effect of acute inflammation, is to soften parts; but if it should occasion a considerable deposition of albumino-fibrin, and that be retained in the cells long enough to coagulate, it will cause an appearance of induration. Baron Dupuytren, the eminent French surgeon, and Dr. Thomson, of Edinburgh, found inflamed arteries softened; and the stomach, bronchia,

and heart, when inflamed, are continually found soft. This is the more general effect, therefore, of acute inflammation of mucous membranes.

[The softening which follows inflammation, may be appropriately considered of two kinds—that which immediately succeeds an attack of acute inflammation, and depends upon the effusion of liquor sanguinis in the cells of the structure in which the action occurs—and that intimate change in the organization of a part, which supervenes at a more remote period after the accession of disease. This latter state, unlike the former (which is mechanical), is caused by perverted nutrition, and is vital; for the softening is an organic process, and does not depend upon the solvent power of the fluid effused into the cells. If the more serous portions of the contents of the tissue were taken up by absorption, and the remaining fibrinous parts to undergo coagulation, it is evident that the opposite state of *induration* would result. It is necessary, however, to distinguish this from another species of *hardening*, which is due to hypertrophy, or excessive nutrition.—*T. Williams.*]

Sometimes, when a mucous membrane has been severely inflamed, it is almost black. Through the mere congestion of blood, it will look dark, as if it were mortified; but, on handling it, it is not found lacerable, like a mortified part; but still rather firm and solid, and devoid of fœtor. Great mistakes have been continually made in the inspection of bodies. After inflammation of the intestines, we often find portions of them nearly black, without any particle of mortification; and frequently such cases have been pronounced, at once, to be mortification of the intestines. Mere congestion of blood will make a mucous membrane almost black; as is seen in the case of the genital organs of rabbits during heat. The error to which I have alluded, is pointed out by Dr. Baillie, in his "Morbid Anatomy."[a]

It is a general remark that the feverishness,—the *pyrexia* attending the inflammation of a mucous membrane, is comparatively mild, and the tolerance of the loss of blood is low. The pulse is generally soft, although quickened; and the more frequent the attacks of inflammation, in any individual mucous membrane, the more mild they are, and the more early and profuse is the discharge.

Serous Membranes.—If the part inflamed be a *serous* membrane,—such as the arachnoid, the pleura, the pericardium, the peritoneum, or the tunica vaginalis,—the pain is for the most part acute,—darting,—lancinating. The pulse is not soft, as in the case of inflammation of a mucous membrane; but is generally hard, though by no means always. It is a general, but not a *universal* remark, that the pulse is hard. The inflammation causes here a copious effusion of serum, with fibrin in solution. This fluid is sometimes limpid, clear, and of a lemon-colour; but is generally turbid; except, perhaps, in inflammation of the head. The serous collection is generally of a yellowish colour, like whey; and sometimes it is puriform;—the fluid, in many portions, resembling pus; although other portions of it may be more like serum. Sometimes, however, absolute pus is produced; so that the pericardium has been filled with this fluid. Sometimes it forms a jelly-like yellowish mass; sometimes minute shreds or flakes are seen swimming about the fluid; and sometimes it forms regular layers, resembling skin. These deposits of fibrin will at length grow vas-

[a] There is no difficulty, however, in distinguishing between this congested condition of a part, and the state of positive mortification. When congestion only exists, the proper organization of the part continues, and its strength is such as to resist the pressure of the finger; but in mortification the natural structure is lost, and the slightest force breaks down the part.—*T. Williams.*

cular; and, when vascular, they will adhere to the surrounding serous membrane; and at last become thin again, and in all respects resemble cellular membrane. Hence they have been frequently called "false membranes." A false membrane is, originally, nothing more than an effusion of liquor sanguinis; which has become organized, and adherent to the surrounding serous membrane from which it has been poured forth; and has then become, in all respects, like cellular membrane.

This deposit is distinguishable into two portions;—one solid, and the other fluid. The solid is fibrin itself; but within the various portions of the solid mass, between the layers and cells, is found a fluid which is albuminous. When these depositions have become adherent, they may be injected from the surrounding parts; but,—as a coagulum of blood has been seen to have vessels of its own, although such vessels are formed from the influence of, and connected with, those which surround them,—so will these depositions of fibrin, before they are visibly adherent to the surrounding serous membrane, become vascular. Within these products, there has even been found a puriform fluid, while they were still unconnected with the surrounding parts. Andral says, that he has distinctly found a fibrinous concretion, unconnected with the surrounding parts, swimming in liquid in a serous cavity; and frequently, even in this concretion, he has found pus. It is said that the circulation within these parts is of three kinds. When they are first formed, currents take place in the interstices, through irregular areolæ; in the next place, insulated vessels are found; and thirdly, these vessels at last become continuous with those of the neighbouring parts. Andral says, that each of these stages may exist in different parts of the same fibrin. The opinion entertained by recent pathologists is, that although these concretions may form before death, they cannot become organized unless attached to the sides of the heart or vessel.

When a serous membrane which has been inflamed is opened, some points, stars, or patches of vascular redness are found. In the first degree of inflammation there are merely points; if there be still more inflammation, there are stars; but if there be a still higher degree, and very numerous vessels contain blood, then a diffused redness appears.

Parenchymatous Structures.—When the part inflamed is either the cellular membrane, or the substance of organs, as the liver, the pain is fixed; —not diffused, as in the case of a mucous membrane; but fixed and rather acute, though not so acute as in an inflamed serous membrane. It is rather dull, but rather acute, notwithstanding; and even pulsating, or throbbing. There is an effusion of serum into the surrounding parts, and at length suppuration takes place in that spot where the inflammation is most intense; and in the midst of the effusion an abscess is formed. If any tumour be produced, it is hard; and it becomes soft when suppuration commences,—the pain remitting at the same time; though, generally, the tension, from the collection of matter, keeps up the pain and the other symptoms. When the matter escapes, the part heals by granulation and cicatrization;—as I mentioned when speaking of abscesses.[a]

Inflammation of the substance of the viscera, or of any part of the cellular membrane, forming an abscess, rarely ends in gangrene; except that particular form which is called "carbuncle." The inflammation of the cellular membrane, or substance of the viscera, is called "phlegmon."

[a] See Pages 99 and 100.

When, however, it is near the surface, and has a tendency to produce gangrene, it loses that name, and we call it "carbuncle." In the latter, the cellular membrane will die to such an extent, that surgical aid is necessary, to make large openings for its escape;—in order that its spread may be arrested.

Inflammation of the cellular membrane, and of the viscera, is sometimes not insulated, but diffused; and (as was remarked, when speaking of the skin[a]) this is frequently called "erysipelas phlegmonoides",—provided the skin be also inflamed; or "diffused inflammation of the cellular membrane", if the skin be not inflamed. This inflammation is occasionally chronic. Nothing is more common than for inflammation of a *mucous* membrane to be chronic; but inflammation of a *cellular* membrane is not so frequently chronic, though sometimes it is; and we observe this especially in the lungs and liver; so that people labour under chronic pneumonia, and more frequently under chronic hepatitis.

Fibrous Membranes.—Fibrous membranes include fascia, aponeurosis, tendons and their sheaths, ligaments, the sclerotic tunics, and periosteum. If these be inflamed, the disease which commonly exists is rheumatism. There may, however, be inflammation of any of these parts without rheumatism; but if there be a general tendency to inflammation of these throughout the body, it is called "rheumatism." Frequently, however, the inflammation of a single one of these parts is the same disease. In rheumatism, although the pain is obtuse, yet there is a feeling of tension; and gelatinous exudations, analogous to synovia, take place. This form of inflammation rarely runs on to suppuration; still more rarely, if ever, to mortification. The pyrexia may be out of all proportion to the violence of the local inflammation; and, indeed, one character of the disease is the occurrence of profuse sweating. In acute rheumatism, profuse sweating is seldom absent, at some period of the disease. It generally occurs at the commencement of the affection. At any rate, if the patient be kept at all warm, the tendency to it is sure to shew itself; and the sweats are frequently of so marked a character, that we can be at no loss instantly to discover their nature. They are usually very sour. This variety of inflammation generally terminates in resolution, or degenerates into the chronic form;—perhaps with a chronic collection of gelatinous matter about the joints, and in the thecæ of tendons.

The peculiarity of this inflammation, is its great tendency to wander,—to *migrate*; so that it is now in one joint, and in a few hours in another. Occasionally it is metastatic;—it will cease in these particular parts, and inflammation of an internal part will begin;—generally an inflammation of some membrane; either the arachnoid, I believe, or the dura mater;—we cannot say exactly which; but, certainly, more frequently than not it is the pleura or the pericardium;—the latter, however, more frequently than any other. But it is not by metastasis only, that this internal inflammation takes place; for inflammation of the pericardium or of the pleura, occurring in rheumatism, is continually brought under our notice, while the affection is going on in the joints, just as violently as before; and frequently this internal inflammation does not take place, till after the rheumatism has ceased for some time. When the pericardium, for example, has been inflamed, if the person do not die, the pericarditis has a great tendency to become chronic. Disease of the heart is then set up; the substance of the heart itself frequently becomes thickened, or hardened, or

[a] See Page 111.

softened; the internal membrane, chiefly about the valves, becomes affected; and organic disease of the heart is soon established. This is by far the most common origin of diseased heart in young persons. It commonly begins in pericarditis, which is generally connected with rheumatism.

Varieties from Sympathy.—Such are the chief varieties of inflammation occasioned by *structure*. The *sympathies* of the particular part affected, likewise occasion varieties in the general symptoms. Some of the symptoms arise from the sympathies of the *general* structure affected. For example: if the structure affected be a *serous* membrane, its sympathies give rise to a peculiar pulse;—in general a hard pulse. From another sympathy, when *fibrous* membranes are affected, a particular sweating is excited. But, besides these general sympathetic effects,—which are due to a peculiarity of structure,—other sympathetic effects, depending upon the particular office of the organ, arise. If the stomach or intestines be inflamed, we generally have a sensation of great weakness, and a wiry pulse; but this does not occur as the consequence of an inflammation of the peritoneal coat of the intestines, or any other of their coats;—for then it would take place when a similar structure was inflamed in other parts; but it occurs because the organ affected is the *intestines* or *stomach*. When the kidney is inflamed, vomiting, a retraction of the testis of the same side, and various other symptoms occur; simply because the *kidney* is inflamed. Hence a certain set of symptoms is induced in inflammation, from the peculiar sympathy of other organs with the part affected.

There are other varieties also observed. Erysipelas of the head has a great tendency to run to the brain. This can hardly be called "metastasis"; because the inflammation frequently still continues violent in the face itself, even after the symptoms of phrenitis come on. Inflammation of the parotid glands, of that peculiar kind said to be contagious (called "mumps"), has a great disposition to occasion sympathetic inflammation of the brain or of the testes. Indeed, when any organ is inflamed, and the inflammation continues any length of time, it is not uncommon for another and a distant organ to become inflamed likewise. This organ is generally either the brain, the lungs, or the alimentary canal;—sometimes, however, (though less frequently,) the skin, and sometimes the throat. When a part has been once inflamed, it has a great tendency to fall into inflammation again, from slight causes. We certainly have inflammation of an organ, from sympathy with the particular organ affected; and very frequently when this second inflammation occurs, although it may be very slight, it is attended with very considerable ill effects. The constitution is so much impaired by the first inflammation, that the addition of disease, though slight, in another organ, produces very great danger, and frequently death.

Intermittent Inflammation.—Inflammation is sometimes intermittent, and sometimes absolutely periodical. Inflammation of the eye has been observed to recur at particular periods. It has frequently been observed to be intermittent,—to come on violently every evening, or every other evening, at a certain hour. I have also seen periodical catarrh.

General Health.—There are variations of inflammation, according as the constitution is healthy or unhealthy. If the constitution be healthy, the inflammation is more active,—is more rapid; and the terminations, when they occur, are more perfect. When the constitution is in an unhealthy state, the parts inflamed are feeble. There is less activity in the inflammation,—less brightness of colour. The terminations which take place are less perfect; and the secretions of the part are more unhealthy.

Specific Inflammation.—There are other varieties in the symptoms of inflammation, depending on the cause which has produced it; and the inflammation on this account is frequently termed "specific." For example: inflammation of the skin, as in small-pox, is induced by a specific cause; and therefore it is called "a specific inflammation." Independently of the cause, some inflammations run a peculiar course, and are therefore specific. Such is erysipelas.

Passive Inflammation.—I have hitherto been considering *active* inflammation; but inflammation is sometimes also said to be *passive*. If, in inflammation, there be but little pain; if the redness be dull; if the heat be but slightly increased, perhaps not at all; if there be more than the usual swelling, and a very abundant secretion;—in this case, the inflammation is said to be "passive." I have already mentioned,[a] that some persons object to this term; and say that such a set of symptoms as these are not inflammation; and Andral, to avoid the difficulty, calls all inflammations and congestions "hyperemy",—the excessive presence of blood in the part. "Active *hyperemy*" is synonymous with "active *inflammation*"; whereas, if the symptoms be those I have just described,—a dingy colour, flaccidity of the parts, and little or no pain,—then, instead of calling it "passive *inflammation*", which he says is absurd, he calls it "passive *hyperemy*."

Acute and Chronic.—These terms apply merely to the *duration* of inflammation; and not to the difference as to whether it is active or passive. An *acute* inflammation may be *passive* from the first. When a person is already weak before the attack of inflammation, or the part has been frequently inflamed before, then at the very outset the inflammation may be of a passive character, although acute. After inflammation has continued for a length of time, it may be still active;—the part may still be hot and painful, and this state may yield only to the remedies of active inflammation. Hence "*active*" and "*passive*", with respect to inflammation, as well as all other diseases, are not synonymous terms with "*acute*" and "*chronic*."[b]

Tonic and Atonic.—Inflammation is sometimes distinguished into *tonic* and *atonic*; and these terms refer, not to the active or passive condition of the part, but to the powers of the system. If the constitution be strong, the inflammation is called "tonic"; whereas, if the system be in a weak state, the inflammation is called "atonic";—because inflammation is sometimes very violent in the part, and yet there is no power in the system. The activity is all of short duration; the powers are exhausted; and perhaps mortification takes place. The activity,—the violence of inflammation in a part, is more than commensurate with the powers of the system. If the *part* be in a state of activity, the inflammation is called "active"; but if not, it is called "passive"; whereas, the words "*tonic*" and "*atonic*" refer rather to the powers of the system at large.

SECTION VII.—CAUSES OF INFLAMMATION.

Predisposing Causes.—I shall now consider the *causes* of inflammation; commencing with the *remote*; and of the remote causes, the *predisposing*, of course, come first to be considered. The circumstance which primarily predisposes to inflammation, is the sanguineous temperament; and the

[a] See Page 71.

[b] See Page 24.

next may be considered high health. In the sanguineous temperament, there is generally a great quantity of blood;—at any rate, there is a large quantity in the minute vessels; so that the blood—the pure blood itself—circulates to a great extent throughout. The body is readily flushed; vessels, which should not, readily receive blood; and the circulation is full and rapid. I need not say, that high health must have the same effect. A person in a high state of health, has a florid colour. There is an increased quantity of blood circulating throughout the body, and to a greater extent than in other temperaments. Besides these two general circumstances of the body, the same occurrence may take place locally. There may be a local sanguineous fulness,—a local fulness of blood; and that may predispose a part to inflammation. The face is certainly more supplied with blood, than any other portion of the surface of the body; and consequently when exanthematic affections (such as measles and small-pox) take place, most of them affect the face, sooner than any other part of the surface; and the inflammation which occurs there is severer. The same thing will occur from a particular period of life. In children, the circulation appears most vigorous in the head. What is called "determination of blood to the head" takes place;—all that is meant by which term being, that more blood (proportionately) is circulating there than in other parts. In youth, the greatest determination is towards the chest; and in the middle period of life and afterwards, it is in the abdomen. Hence children are particularly disposed to hydrocephalus,—to inflammation of the arachnoid membrane of the brain,—to other cerebral affections; and are continually having fits,—continually having affections of the head; and, consequently, a large number of children die of acute diseases of the head. Hence, too, children are particularly subject to epistaxis. Persons in youth—those who have passed the period of childhood—are certainly more subject to all affections of the chest,—to all thoracic inflammations, and to inflammatory spitting of blood. It is adults, particularly, who have inflammation of the stomach and intestines, both acute and chronic;—especially chronic inflammation of the stomach and of the liver;—indeed, inflammation, and congestion, and structural changes of all the abdominal organs.

Seasons and climates will operate in the same way, by exciting either general or local fulness. Pulmonary inflammation is more common in cold climates, and likewise in the winter and spring; whereas in hot climates, and in the autumnal season of temperate climates, hepatic inflammation is most common.

Occasionally a part will acquire an increased excitability from a previous injury; and this is remarkably shown in the head. If a person have once had a severe injury of the head, he may afterwards suffer from a slight cause;—a cause which scarcely would have disturbed him before. I saw a person who had had a fracture of the skull; and, for many years afterwards, he would become completely delirious, on taking a glass of spirits. This is an occurrence, indeed, that I have frequently seen. I very well recollect the case of a man, who laboured under rheumatism of different parts of the body, and among others of the scalp; but he had suffered severe fracture of the skull some years before; and the mere excitement of the external part of the head, was sufficient to excite it internally; so that he had violent delirium from mere trifling rheumatism of the scalp.

Previous inflammation from any cause, disposes a part to be inflamed again. Various causes, of an opposite tendency, will also have the same effect. Bad air, copious evacuations, bad food, depression of mind, fatigue of body, fatigue of mind, the frequent exhibition of mercury, an exhaust-

ing climate, and previous disease of any kind, will also dispose to inflammation. While all these predisposing causes, however, induce inflammation, its character differs totally according to the nature of the cause. The inflammation induced by the first kind of causes I mentioned, is active and tonic; whereas the inflammation predisposed to by bad food, bad air, depression of mind, and so on, is either passive or atonic;—the inflammation itself is of a passive character; or there is not sufficient power in the system to carry it on,—to get the patient well through it, or to produce a healthy secretion of pus, if pus be produced. Hence the character of the inflammation varies, according as the predisposing cause is one which gives strength, high health, and excitement; or one which destroys health and strength, and gives a tendency only to an unhealthy excitement.

Some of these latter causes, such as the defect of heat and of food, act as predisposing causes to inflammation, without producing any debility, or any atonic character of the inflammation. If a part be exposed to cold, it becomes more affected afterwards by a given degree of heat. If a person be deprived of food, and then a small quantity of food, though of the weakest character, be given him, it will produce an excitement which only strong food and a large quantity would have produced before; and therefore some of these predisposing causes may act, also, by rendering the part more liable to be affected by stimulants; for stimulants act according to circumstances that went before them. According to the first, so is the second; and all that is requisite is, that there should be a great disproportion between the two. It is no matter whether the first is very defective, or the second is very great; for the effect is in proportion to their *relative* intensity; and therefore parts which have been exposed to cold, become violently inflamed if exposed to a moderate heat; and a person who has been nearly starved previously, has been known to become delirious, on taking merely a little veal-broth. Many of these causes, however, produce a cachectic[a] state of the constitution; and then inflammation, if it occur, is of a corresponding character.

Exciting Causes.—With respect to the *exciting* causes, we may mention, in the first place, a local stimulus;—be that stimulus mechanical, or chemical, or what is *properly* called "a stimulus";—a stimulus independent of mechanical or chemical qualities; such as alcohol. The effect of all stimuli (as I have just now said) is not dependent upon their positive degree of force; but upon the difference between these stimuli, and the strength of those which preceded them. Every body knows the danger of going from cold to intense heat.

Cold.—Besides local stimuli, whether mechanical, chemical, or true stimulants, the depression of stimulation in one part, will cause an inflammation in another. From having the excitement in the feet exceedingly depressed,—by getting wet through, and sitting with wet shoes,—there will be such increased activity at a distant part, that inflammation may occur; so that many persons always have a sore-throat, or inflammation of the chest or eyes, if they get wet through, or have wet feet. This application of cold—depressing the action of one part, and thus producing an excitement in another—depends very much for its effect upon the previous excitement. If the feet, for example, have been already hot;—if they have been heated, and are in a state of perspiration,—then the application of cold produces so great a depression, that the inflammation of the throat (for example) or the lungs, will be so much the greater. The more partially cold is applied, the more injurious (within certain limits) is it found

[a] From κακος, *bad*; and ἑξις, *a habit*.

to be in producing distant inflammation; but cold will itself, I believe, directly induce inflammation;—exactly as great heat will do. When we are exposed to cold air,—when exceedingly cold air is passing through the nostrils, the nose will "run"; and it has been found, by microscopic observation, that cold, like a positive stimulus (such as heat), will induce that condition of the capillaries which was formerly defined as essentially constituting inflammation[a]; namely, stagnation of the blood, and effusion of the liquor sanguinis. Nothing is more common than for rheumatism to be felt in the shoulders, or for an inflammatory pain to be felt in the ear, when cold air is blowing upon these parts; although unquestionably, for the most part, these affections are of a nervous, and not an inflammatory character.

Thus it appears, that cold may induce inflammation in three ways:—1. By rendering the body liable to be very much excited by the stimuli that come afterwards;—by depressing the action so much, that when the stimulus of increased temperature is applied, the effect of this is tenfold increased. 2. By depressing the action in one part, and thus exciting a correspondent excess of action in another. 3. By exciting inflammation immediately and directly. There are many instances to illustrate these three modes of operation. First, when a person passes from the cold into a warm room, his face will become very red and hot; and frequently he will cough violently, and a catarrh will be set up. In the next place, we see persons have inflammation of the eyes, nose, mouth, throat, or chest, from wet and cold feet. And, thirdly, we continually observe pain in the ear, rheumatism of the shoulders, and the nose "running", when cold air is applied to these parts.

I believe that sudden refrigeration, and the sudden application of cold after excitement, are more frequent causes of inflammation, than the application of heat after cold. Most of the cases of inflammation met with, are those in which persons have become suddenly cool, when they were overheated and fatigued. Perhaps, likewise, wet may have been added to this; or they may have been exposed to the influence merely of cold air. A rigor is frequently induced; and a state arises which is soon followed by inflammation. The effect of sudden refrigeration, therefore, is greater in proportion to the previous excitement; it is also greater if it be partial than if it be general; and it is always greatest if there be much sweating and exhaustion. Sometimes, indeed, fatal results have instantly occurred. Many persons, from taking ice when they have been not only hot, but sweating and exhausted, have at once fallen dead. The account of Alexander the Great bathing in the Cydnus, when exceedingly hot and exhausted, after great fatigue, is well known;—an occasion on which he nearly lost his life. How hot soever the body may be, there is comparatively little danger, if it be not fatigued. The Russians go from the vapour-bath to the snow, and roll in it.

[It has long been a popular, as well as a professional axiom, that *sudden vicissitudes* of temperature are dangerous;—that *a previous hot state of the body* augments the hurtful effect of the application of cold, either externally or internally. But the proposition, thus broadly stated, is not universally true. Sir Charles Blagden, describing some of the experiments in which he was engaged, says,—"During the whole day, we passed out of the heated room, (of which the temperature ranged from 240° to 260°,) after every experiment, immediately into the cold air without any precaution. After exposing our naked bodies to the heat, and sweating most violently, we

[a] See Page 81.

instantly went into a cold room, and stayed there even some minutes, before we began to dress; yet no one received the least injury." And Captain Scoresby (speaking of the Arctic regions) tells us, that he has often gone from the breakfast-room of the vessel, (where the temperature was 50° or 60°,) to the mast-head, (where it was only 10°,) without any additional clothing, except a cap;—"yet," says he, "I never received any injury, and seldom much inconvenience from the uncommon transition." It is plain, therefore, that the proposition which assigns danger to sudden vicissitudes of temperature, requires limitation. The effects of a sudden descent from one point to another, in the scale of atmospheric temperature, varies according to the state of the body at the time. Without going into any physiological discussion respecting the science of animal heat, I may just remind you of the faculty of evolving heat possessed by man, and the warm-blooded animals; by which faculty very nearly the same degree of inward temperature is steadily maintained under very different degrees of outward temperature. If the external temperature be lower than that of the body, the caloric thereby carried off is speedily replaced, in a healthy adult, by this evolution of heat from within, aided by clothing, or exercise. When the external temperature approaches the standard heat of the body, sweat soon breaks forth, and the superfluous heat is removed by evaporation; for so constant is the internal evolution of caloric, that an atmosphere which does not as constantly abstract any of it, is excessively incommoding. An external temperature of 98°, which is about the average heat of the blood in man, is (as you know) extremely oppressive. The terms "hot", "warm", "cool", and "cold", as applied to the surrounding air, are regulated by the sensations that it produces upon the average of persons. If the heat be carried off as fast as it is generated, and no faster, no particular sensation is felt; and the bodily powers are neither stimulated nor exhausted. This equilibrium is maintained, (supposing that no extraordinary exertions are made,) when the thermometer stands at 62°, or thereabouts. We call that point in the scale "temperate." All degrees above that point, up to 70°, are reckoned "warm", all above 70°, "hot." Descending in the scale, we speak of the temperature denoted by any degree between the 60th and 50th, as being "cool"; and every lower degree of temperature is "cold." I am speaking of the average of healthy men; for remarkable diversities occur among individuals, with respect to the names which they assign, under the guidance of their sensations, to particular degrees of the thermometric scale;—their sensations differing according to the power which their constitutions respectively possess of evolving heat. Now, if this power of evolving heat (thus inherent in the system) be entire, and active, and persistent;—if it have not been weakened by any of those circumstances which are known to have the effect of weakening it,—no peril need attend even violent alternations of external temperature. Universal heat of the body, at the time when the cold is applied, so far from implying danger, is really the condition of safety;—provided the heat is steady and permanent. You may read, in Dr. Currie's book, numerous instances of cold-affusion being employed in the hot stage of fever, and particularly in cases of scarlet fever, not only with impunity, but with great benefit to the patient. The same holds true of the application of cold, when the body has been heated by exercise; and, indeed, whatever may have been the cause of the increased heat;—provided always that that cause remains steadily in action, that there is no local disease, and that the body is not fatigued and rapidly losing its heat. But if a person be already exhausted and weakened by exercise,—if he be sweating and rapidly parting with his heat,—and especially if the

exercise is remitted, and he remains at rest immediately after the application of the cold,—then it becomes highly perilous, and likely to produce internal mischief. The more correct statement, therefore, respecting the application of cold is, that it is dangerous, not when the body is *hot*, but when the body is *cooling after having been heated.* [a]

Damp.—The effect of cold applied to the body, is much increased by damp. Very often, persons do not suffer from the application of cold, till dampness is conjoined with it. It may act simply by increasing the cold,—by lowering the temperature still more; but I cannot help thinking, that it injures to a greater extent than this circumstance will explain;—that its injurious effect is out of proportion to the greater diminution of temperature which the dampness occasions. Many persons are not so strong, by any means, in damp weather. It is possible that it may act by conveying away the electricity in too great a quantity. In dry weather, we are all active and vigorous; but in damp weather, there certainly is a degree of languor,—an inaptitude for action, both of body and of mind, which most persons notice.

Sleep.—The effect of cold upon the body, is much increased by sleep. In sleep, the powers of the body are less; the pulse is slower; the heat is not so high; and all noxious agents are less withstood. It is a common remark, that if a person go to sleep in a draught, he is sure to take cold; but if he contrive to keep awake, he will most probably escape.

Cold, too, appears to be more dangerous when applied to the back part of the body, than to the front;—in consequence of the less endowed power there, than in the anterior parts. Persons will escape if a little draught fall upon the face; whereas, if it come to the back of the head or neck, they for the most part experience ill effects.

Sympathy.—Inflammation is sometimes excited as a *sympathetic* occurrence. But when I say that inflammation is excited by sympathy [b], I do not *explain* [c] the fact; I merely *express* the fact. When one eye is inflamed, the other, without any external cause, may also become inflamed; and this is called a sympathetic result;—it is said to occur by sympathy. If a child's head be inflamed, it is common for the abdomen to become likewise inflamed,—either the intestines, stomach, or liver; and *vice versâ*. It is of the highest importance, in practice, to look out for this circumstance; or treatment may be addressed to only one inflammation, when two exist.

Metastasis.—Metastasis is also another mode in which inflammation occurs. When inflammation of the parotid glands in "mumps" ceases, the brain may become inflamed; or what is more common, the testicles, or one testi-

[a] Dr. Watson's "Lectures on the Principles and Practice of Physic"; Lecture 7; "Medical Gazette", Volume 27, Pages 226 and 227. (No. 675; November 6, 1840.)

[b] From *συμπασχω*, *to suffer with.*

[c] The reader is referred to Müller's "Physiology", translated by Baly, and Bichât's "General Anatomy", for an exposition of the physiological laws upon which these sympathetic phenomena are explained.

By the former eminent physiologist they are considered under the separate heads of—

1. Sympathies of the different parts of one tissue with each other.
2. Sympathies of different tissues with each other.
3. Sympathies of individual tissues with entire organs.
4. Sympathies of entire organs with each other.
5. Sympathies of the nerves themselves.

It is most probable, as suggested by Bichât, that the apparent *translation* or *metastasis* of disease from one organ to another remotely situated, is due either to the *reflex influence* of the nervous system, or to the circulation throughout the system of some morbific agent;—inducing the same specific action in a distant organ, the structure of which is similar to that first affected.—*T. Williams.*

cle; and this inflammation often affords an illustration of atrophy, as the result of inflammation. It is very common, indeed, for a testicle, when it has been inflamed after mumps, to waste away; so that nothing will be left but the membranes. In gout, metastatic inflammation continually occurs. When the gout suddenly ceases in an extremity, it is very common for inflammation, of an apoplectic nature, to take place in the head; or for inflammation to occur in the stomach or intestines.

Absorption of Morbid Secretions.—Occasionally inflammation is induced by the introduction into the blood of unhealthy or acrid matter. If pus, or any other diseased secretion, be absorbed, it is very common to find a deposition of it, at a distance from the part in which it was originally formed. We have a deposition of pus, or of lymph, at a distance;—in the various viscera, in the cellular membrane, or even in the secreting cavities; or we have inflammation and disorganization without deposition. Probably inflammation of the veins takes place; since the pus formed in them does not cause inflammation in distant parts; here it is deposited; but pus, lymph, and other things, are there produced by extravasation only. If distant inflammation take place, there is of course a deposition of pus or lymph; marked by debility, great irritation, and a sallow hue of the countenance.

It has been said, that the *predisposing* causes to disease will sometimes become *exciting*,—merely by their continuance and increase; so that no "exciting" cause, properly so called, is necessary. This may be the case with regard to fulness of blood. A part may become more and more filled with blood,—congestion or determination of blood (whichever it is called) may increase, till at last inflammation occurs; or if it be the head that is affected, a state of apoplexy may be produced, without any actual exciting cause. In *specific* inflammation this cannot be the case; for no predisposition would have the effect of producing small-pox, unless the exciting cause were applied.

Proximate Causes.—Such are the observations which I have thought it necessary to make, respecting the *remote* causes of inflammation. The *exciting* causes,—those which are essential to the existence of the disease,—in fact, the actual state of the parts in inflammation, have been already considered in a former section.[a]

SECTION VIII.—DIAGNOSIS AND PROGNOSIS OF INFLAMMATION.

The *diagnosis* of inflammation, when the inflamed part is visible during life, or when we make an examination after death, has been already spoken of sufficiently[b]; but if it happen that we have to make a diagnosis, during life, respecting a part which we cannot see, then of course it must be founded upon something else than if the inflammation were visible.

Deep-Seated Inflammation.—When an invisible part is inflamed, there is almost always pain increased upon *sudden* pressure,—frequently upon the most *gradual* pressure; and there is generally more or less pyrexia and "symptomatic fever." The pain is often throbbing; and frequently there is a sense of weight and tension. It is to be remembered, however, that although a part be inflamed, *gradual* pressure may sometimes be borne; and that, on the other hand, very *slight* pressure,—a mere brush of

[a] Section III, at Page 78. [b] In Sections I and II, at Pages 67 and 75.

the surface, may cause pain, when there is *no* inflammation. In neuralgia[a],—when a person is labouring under *tic douloureux*, for instance,—we may sometimes produce the most agonizing pain, by brushing the surface in the slightest possible manner. But that is not the case where there is inflammation. Such a slight touch does not produce such an intense effect; and (more than that) if a slight touch do produce so great an effect, it is only in inflammation of the skin; and that we can see.

If we are in doubt,—notwithstanding that the pain is increased by pressure, and that there is pyrexia,—the best way, if the patient's powers will allow it, is always to treat it as an inflammation; and we frequently find, that the blood which is drawn away fully justifies our presumption. The blood is frequently buffed, or cupped, or both; but even if it be not, and there be strong reason to treat the case as inflammation, we must not suppose there is less reason to imagine ourselves right, *simply* because the blood is not buffed. Generally, however, it will be found buffy, if there really be inflammation.

Prognosis.—With regard to the *prognosis* of inflammation, we must consider, on the one hand, the age of the patient, and the evident powers of his constitution; and, on the other, the violence of the disease, the degree of disposition to it, and its seat. The danger of the affection depends on the power which the patient has, from the beginning, to sustain the attack. Much must depend upon his age, and upon the general state of his constitution; and much depends, likewise, not only on the intensity of the disease, and its liability to increase, but on its seat. An exceedingly violent inflammation, in an extremity, might not be half so dangerous as one less violent in certain viscera. It is necessary, also, to calculate upon any idiosyncracy, whether natural or acquired, in the individual. I have already mentioned [b] a patient, who had merely a rheumatic affection of the external part of the head; but he had previously had his skull fractured; and the irritation on the outside of the head, produced sufficient irritation within, for violent delirium to ensue; so that he was in a most violent state of phrensy. There was no danger in this;—it gave way to the ordinary treatment of rheumatism of the external part of the head; but had there not been this idiosyncracy, it might have been feared that an inflammation of the brain, of a highly dangerous character, was set up. When the man took a glass of spirits, the same effect, I understand, was always produced. We have therefore to consider, whether there is any idiosyncracy or not; for, whether the disease be inflammation or any other complaint, if the patient be nervous, there may be great depression of the system; and the quickness of pulse, and the general disturbance, may unnecessarily alarm those not aware of the peculiarities of the constitution.

SECTION IX.—TREATMENT OF INFLAMMATION.

a. Active Inflammation.

Stimuli.—In the treatment of *active* inflammation, the first point is to lessen the ordinary stimuli to which the body is subjected, both externally and internally. Excessive action is going on, or there is excessive activity and excitement; and our business is to lessen all the stimuli which maintain that activity. The *external* stimuli may be diminished by exclusion. In the first place, we exclude a high temperature;—so that its stimulus may

[a] From *νευρον, a nerve*; and *αλγος, pain.*

[b] See Page 118.

act as little as possible. In attending to this point, however, great care must be taken not to allow the temperature to fall too low; for if we chill a patient labouring under inflammation, we not only cause great discomfort, but most likely increase the affection. By diminishing the circulation in healthy parts too much, it is possible we may increase the activity of those which are inflamed; so that in lessening the temperature around a patient, it is necessary to diminish it only so far as is comfortable to him.

Cold Applications.—With respect to the part itself, the temperature there is too high; and to that part cold may be applied. Cold may be applied by means of plain water; which generally answers as well as any lotion that can be employed, if it be continually renewed; but, of course, we can procure a lower degree of cold, by the use of evaporating fluids,—those which evaporate more quickly than water. It is often of great use to employ real ice; and for this purpose a bladder may be half filled with it, and laid on the head after it has been shaved, or on the front of the chest, or on any other part of the surface that requires it. If we *fill* the bladder, it will not accommodate itself well to the part; but if it be only *half*-filled, it presses down in close apposition with it. If it be the surface itself which is inflamed, and not the interior of the head or chest, it is not well to apply ice in this way; because the pressure would do harm. Indeed, in inflammation of the chest, cold is not applied externally; it is only in cases of hæmorrhage that we have recourse to it. If the surface, then, be inflamed, it is best to apply plain water, or iced water, or evaporating lotions; but in the case of internal inflammation of the head, or hæmorrhage from the lungs, ice is one of the best things that can be resorted to.[a] In hæmoptysis of a decidedly inflammatory character, I have never seen the application of ice attended with harm. Some have said that the application of cold, in the case of inflammation within the abdomen, has been of use; but I am not aware that such is the case. Certain inflammatory pains of the head have given way to a stream of cold water applied to it, when nothing else would succeed. By means of a tube, a stream of water has been applied to the head, for many hours in the course of a day; and the complaint has been thus cured, when evaporating lotions did not answer the purpose.

When the surface is abraded, or when it is a mucous membrane that is inflamed,—such as the interior of the mouth, or the conjunctiva of the eyes (which is very similar to a mucous membrane),—it is generally found of great service to combine, with the cold water, a small portion of the diacetate of lead; but not sufficient to irritate the part. When the surface, however, is not abraded, I doubt whether the employment of lead is more efficacious, than that of plain cold water, or an evaporating lotion.

Warm Applications.—The very opposite treatment, however, is often equally beneficial. If we apply warmth and moisture together, we often produce as good an effect as by the application of cold. It is only a speculation; but I imagine that the reason why two such opposite agents produce the same effect, is this:—If we apply cold, we lessen the stimulus;—we lessen the heat of the part;—we lessen the quantity of blood in all the vessels; and, therefore, we lessen the tension; whereas, if we apply warmth and moisture, we cause a relaxation of the inflamed part;—we soften the solids, and in that way the tension is taken off. I presume the cold lessens

[a] The reason why ice is a more powerful refrigerant than water, is that a great quantity of heat is absorbed (becoming "latent" or "combined") in converting it from a solid to a liquid form. While any of the ice is unmelted, the water remains at the same temperature as the ice itself.—*N. Rogers.*

the stretching cause; whereas the moisture allows the part to be easily stretched,—to give way to the distending fluids. Perhaps the warmth and the moisture applied to the surface, may relax the ends of the vessels, cause a free perspiration, and in that way ease the parts. Such, however, is the fact;—that one patient will be as much relieved by warm applications, as another will by cold. I have myself frequently suffered violent external inflammations; and one part of the day I have found the greatest relief from iced water, or from a stream of cold water constantly applied; and when that ceased to produce ease, or caused pain, then I have experienced the greatest comfort from the application of warm water and flannels. The feelings of the patient are the best guide, in the application of these means. I never apply cold when it is uncomfortable. If once the patient be allowed to become uncomfortable, it may not only produce general chilliness, but make him ill, and perhaps increase the inflammation.

The temperature of the part, however, is not the only thing to be attended to. If we know that the part affected is one greatly influenced by other surrounding stimuli, (as the head, for example,) we should likewise exclude *light* and *noise*; and should, in all such cases, prevent conversation,—both of the patient and of others; so that he may be kept as free from stimuli as possible. The exclusion of light is an important point to be attended to, in all affections of the head, and particularly of the brain.

Diet.—Still pursuing the plan of exclusion, we should give the patient but little food; and even that should be of the most inert kind. In fact, we should starve him without letting him know it;—pursue starvation in disguise. Plain water would be the best thing, in many inflammatory complaints; but we must allow toast-and-water, or barley-water;—for the purpose of satisfying the patient. In consequence of the thirst, a great deal of drink must be taken. This should be cold, unless the patient wish to have it warm; and if the drinks be made acid, they are of course so much the pleasanter. A saline draught is a good thing; but a few ounces only will be productive of little benefit. The patient should have a pint, in the course of twenty-four hours, if it be designed to exert a beneficial influence.

Blood-Letting.—But although these things are highly important, the great remedy in this disease, is the loss of blood. That is,—we have not only to *exclude* the *external*, but to *remove* the *internal* stimuli; and the great internal stimulus of the body, is the blood. Blood-letting may be performed anywhere. The object is to withdraw blood; and not merely so, but to make as great an impression upon the system, by a given loss of blood, as possible. Hence it is generally good practice to make a large orifice in the vein (if we open a vein); and to make the patient sit up;—so that he may faint quickly. If the blood be drawn with great rapidity, a far greater effect is produced, than if it be drawn slowly. A large orifice tends to accomplish that object; and if a patient be sitting up, he is far more likely to faint, than if he be lying down. When we are sitting up or standing, the blood finds more difficulty in returning to the heart, and escapes more easily from it; and therefore, if there be causes tending to produce fainting, they are far more likely to occasion it in that posture, than if we are recumbent. If it be an object to spare blood very much, and yet make as great an impression as possible, it is well to have two veins opened at once,—one in each arm; and to make the patient stand up. The loss of a very few ounces will then produce fainting.

The rule for taking away blood, in general, is not to consider the quantity, but to consider the effect;—to do every thing calculated to occa-

sion a great effect from a given quantity; but, while doing so, to go on till the pulse sinks, till the patient experiences relief, or till an evident improvement takes place. In any of these circumstances, it is well to stop the bleeding, especially if the patient grow faint; lest the depression become too violent. If, however, the faintness cease, and yet the pulse continue the same; or if the patient feel no relief; or if, when he has not fainted, but there has been an improvement of the pulse, the pulse should fall back into its former state; or if, again, there have been no syncope, no improvement of the pulse, but a great improvement in the patient's feelings,—a great diminution of the disease, and yet the pain all returns;—then, in any of these circumstances, we should let the blood flow again. In general, one never orders a particular quantity of blood to be taken away, in an acute disease; but is rather guided by the effects produced.[a]

We sometimes find, on bleeding, that the pulse, so far from diminishing, will increase in volume; and so far from becoming slower, will become quicker; and will still retain its firmness. This circumstance may be a very great improvement. There are some diseases in which the pulse is oppressed;—in which the pulse may be large and firm enough, but seems to have scarcely any activity in it. It is not a fluttering pulse; but it moves heavily,—if I may so speak. In what is commonly called "an *oppressed* pulse", there is plenty of volume,—plenty of firmness; but very little impetus. This is often the case in affections of the head. The pulse is frequently, at the same time, very slow; but is not necessarily so. A pulse may be oppressed, and yet not slow; or there may be a morbid slowness, and yet the pulse may not be oppressed. The one or the other may be the case; and yet, on bleeding, the pulse will rise. It will be sharper, or quicker, or both; and this is as much to be considered an improvement, as diminished force and frequency in other instances; and I would arrest the flow of blood in both cases. I would then wait and see whether things relapsed; and even if the pulse became slower, or heavier, but still having sufficient volume,—it would be advisable to let the blood flow again.

The repetition of bleeding, after an interval of some hours, or of a day, must depend upon the same circumstances. When the pulse becomes

[a] Dr. Alison, in his admirable Essay on Inflammation, in the "Library of Medicine", observes that "the efficacy of blood-letting in lessening the extent and intensity of inflammation, would appear to depend upon two principles";—to which, indeed, the powers of all other antiphlogistic remedies are referrible;—first, "it weakens the heart's action", and, secondly, "it causes a derivation of blood from the affected parts." In both ways it diminishes the quantity of living matter in which the peculiar changes comprised under the term "*inflammation*" are going on; and whatever be the precise nature of the changes, as it is certain that the blood is an agent essentially concerned in them, it is easy to understand that the greater the quantity of blood sent to the affected parts in a given time, the greater the amount of these changes, and particularly the greater quantity of effusion from the vessels (with which we have seen that the danger of inflammatory diseases is most connected) will take place." He treats the first principle by considering it under two heads;—in the first place, he shews that, under certain sthenic forms of inflammation, "the heart's action is *weakened* by the abstraction of the stimulus by which its motion is habitually excited and maintained", and this quite in conformity with all that has been established by the labours of Dr. M. Hall on "the effects of the loss of blood";—a man than whom medical science has known no greater benefactor in modern times. Dr. Alison then proceeds to shew "that the difference, observed, of the effect of blood-letting in the erect and horizontal posture, proves that the loss of blood may powerfully affect the heart through the intervention of the central portions of the nervous system." The second leading division includes the principle of *derivation*;—abstracting a portion of the diseased blood from the inflamed parts, and thus lessening the diseased action. On the important question of blood-letting, as a remedy in inflammatory disease, we earnestly recommend to the reader the perusal of Dr. Marshall Hall's works on loss of blood.—*T. Williams.*

quicker or fuller again, or the symptoms become worse, then we should follow the same rules in repeating blood-letting, as we originally did. In violent inflammation there is, in general, more difficulty in making a patient faint, than when the inflammation is less violent, or when there is very little the matter with the patient. I believe it is true that very frequently, in inflammation, a degree of bleeding will not occasion fainting, which in health, or in a state not far from it, would produce syncope.[a] This great principle was established by Dr. Marshall Hall.

But although these are the general rules to be observed, it may be necessary to act in the very opposite manner. If a patient be very plethoric, so that it appears necessary to take a large quantity of blood; if it appear that, without copious depletion, the disease can only be temporarily subdued; and that all the symptoms may return, on account of the great fulness of the system; or if it so happen that the patient is nervous, and thus easily disposed to faint;—in either of these cases, it may be a great point to prevent syncope, before the desired quantity of blood has been withdrawn; and therefore it may be right to bleed from a moderate orifice, instead of a large one; and to make the patient lie down for some time, and then proceed to take away blood. If nervous fainting be expected, instead of syncope from the absolute loss of blood;—if it be likely to arise more from emotion of mind, than from the abstraction of blood, a small orifice should be made; and the patient should also be made to lie down;—in order that the depletion may be carried far enough to make an impression on the system. If fainting occur when one or two ounces only have been taken away, cupping or leeches should be employed. When a patient does faint in ordinary bleeding, the latter should be stopped, and the patient laid down;—lest the fainting become excessive.

Pulse.—Though a quick, full, firm, wiry, or jerking pulse, with the symptoms of inflammation, may justify bleeding; yet the absence of any of these states of the pulse, will not forbid bleeding, if the symptoms themselves demand it. If there be no extraordinary debility of the pulse,—no feebleness of the constitution; if there be neither tender years, nor extreme old age;—if none of these circumstances forbid free bleeding, we may have recourse to it, notwithstanding that the pulse gives us no such indication. The pulse may not *indicate* bleeding; but still it may *justify* bleeding. The pulse (as we have already noticed[b]) has been called by Celsus "res fallacissima",—"the most fallacious of all symptoms"[c]; and, if we depend on the pulse alone, we shall be led into error. The pulse will give us highly important information; but if there be a sufficiency of other symptoms to point out the nature of the case,—to show that the person is labouring under an inflammatory affection, though the pulse would not lead to such a conclusion, we must treat the case in *spite* of the pulse;—provided, however, that the pulse does not indicate such debility, as would evidently make bleeding improper; or that the constitution and age of the patient do not forbid it. In the most dangerous cases of peritonitis,—when the patient was obliged to lie upon his back, with his body and even his thighs raised, so as to relax the peritonæum as much as possible; and where the abdomen could scarcely bear the pressure of the bed-clothes,—I have known the pulse scarcely different in volume, or force, from what it was in a state of health. Notwithstanding that the peritonæum is a serous membrane, I have witnessed the pulse without any great firmness,—any wiryness,—any jerking state;—without any thing that would lead to the supposition

[a] From συν, *with*; and κοπτω, *to strike down*.

[b] See Page 52.

[c] Book 3, Chapter 6.

that there was disease of this investing membrane. We continually see females, in a state of pregnancy, with a small pulse;—such as would prevent the thought of bleeding, unless there were other modifying symptoms; but from pressing the part affected, we find bleeding indicated; and from attending to the countenance, and looking at the patient, we see that bleeding will be borne. In the cases of peritonitis to which I have just referred, I have seen the blood, after it has been taken away, both buffed and cupped; and the patient has speedily recovered after a loss, perhaps, of forty, fifty, or even sixty ounces. But it is the same with every other symptom. The symptoms should be taken together, and reliance should seldom be placed on any one alone. Every one is important in itself; but every one has also its *relative* value.

[In the article already quoted [a], Dr. Alison generalizes thus upon the pulse:—"In inflammatory diseases, the pulse (for the most part) is observed not only to be more *frequent*, but also to be *fuller*; that is, to cover a larger surface of the finger, and give the sensation of a *greater expansion* on each systole of the heart;—to be firmer or stronger; that is, to be less compressible;—and to be *sharper*; that is, each of its pulsations to take place more suddenly than in health";—"and when blood-letting produces a favourable impression in these diseases, or when they are spontaneously subsiding, it may be observed to become not only less frequent, but also smaller, more compressible, and softer." It is an observation which is frequently used by Mr. Tyrrell, in his Clinical Lectures, that the only *variations*, or differences in the condition of the pulse, under inflammatory affections, upon which the surgeon with any confidence can calculate on the propriety of blood-letting, are those which relate to its *compressibility*. The importance and value of this remark will be the better appreciated, when it is seen that the various qualities of the pulse, known as the "hard"—"wiry"—"firm"—"sharp"—and so on, are really reducible to the one generic head of *incompressibility*. In his walks round the wards, the question generally put by Dr. Bright is—"Is the pulse compressible or incompressible?"—*T. Williams.*]

General bleeding is superior to *local* bleeding. It is speedy, and it is powerful. However local the inflammation,—however remote from the heart (even in inflammation of the testicle, or of the finger in paronychia or whitlow),—venesection [b] is more powerful and far more quickly productive of an impression upon the disease, than any local bleeding.

Venesection and Arteriotomy.—In affections of the head, I believe that venesection in the arm is just as good as arteriotomy.[c] The great point, in an acute disease, is simply to get a large quantity of blood from the system in as short a time as possible; and venesection in the arm will generally answer every purpose. At least, I have never seen any thing to make me prefer opening an artery, in a case of inflammation of the head, or inflammation of the eyes.

If a vein cannot be opened, then I would certainly, in any case of dreadfully violent inflammation, open an artery. It is always safe to open the temporal artery. If blood could not be obtained from a vein, in a *very* dangerous complaint, instead of troubling the patient with cupping or leeches, the temporal artery should be opened; I know that some practitioners have opened the radial artery. But opening the temporal artery is safe; and generally affords as much blood as is required.

[a] See Note to Page 125.

[b] From "vena", *a vein*; and "*seco*" *to cut.*

[c] From αρτηρια, *an artery*; and τεμνω, *to cut.*

Quantity of Blood.—I have never had occasion to take away more than thirty ounces of blood at a time; except in one instance, in which forty were required to induce syncope; nor do I recollect having had occasion to take away more than eighty ounces altogether, in an acute complaint. Of course, many hundreds of ounces in *chronic* complaints have been taken away;—pursuing small bleedings for many weeks, or months. It is right to mention, however, that some practitioners have taken away an immense quantity of blood, in acute diseases, in a very short time; and with success. In inflammation of the lungs, one hundred and fifty ounces of blood are said to have been abstracted in a few days. In the tenth volume of the "Medico-Chirurgical Transactions",[a] Dr. Blundell states that Mr. Hensley (a gentleman on whom he could rely) declared that, in two cases of inflammation of the lungs in men, he had taken away a gallon and a half of blood in five days; and they both recovered. Precisely such a case is mentioned in the "Medical Gazette", for January 3, 1829.[b] Dr. Badeley speaks of having taken away five quarts in five days, in a case of peripneumonia; and with perfect success.[c] If a case be very obstinate, and will not yield to proper treatment, we see what there is authority for doing; for the above are undoubted facts. I do not condemn such practice; but I have never had occasion to have recourse to such profuse evacuations.

Red Particles Diminished.—Two Swiss physicians, Drs. Prevost and Dumas (of Geneva), who have made many experiments on the blood, say, that when blood-letting has been employed, the red particles are found, after a certain interval, to be fewer in number. There is not only a change, in the disappearance of the buffiness; but venesection lessens the number of red particles in the blood. We know, indeed, that when blood is taken away from an individual in health, its effect is to impoverish the blood. It is now ascertained, however, in a scientific manner, that the red particles are diminished; so that in blood-letting we not only diminish the mass of the blood, but also lessen its stimulating qualities. We lower its quality, while its quantity is diminished.

General, and Local Bleeding. – Besides *general* depletion, however, it is sometimes necessary to have recourse to *local* bleeding. The latter is usually employed on account of the less violence of the general symptoms; the smaller powers of the patient; and the existence of mere congestion of blood, rather than of inflammation. If the general state of the patient's system be not much disturbed; if there be no great excitement or fulness of the pulse; if the patient be very weak; if there be a great accumulation of blood, rather than inflammation; or if the inflammation be rather of a passive or atonic character;—then, in proportion as this state of things prevails, local bleeding is usually preferred to general. But I believe that, in many cases where *local* bleeding is had recourse to, *general* bleeding would be found to answer the same purpose. At any rate, we are never to allow *local* bleeding, which is performed by cupping or leeches, to stand in the way of *general* bleeding. It is frequently a better practice, even if the patient be weak, to bleed *generally* than *locally*;—to set him upright in bed, or to make him stand upright; and from a large orifice to detract four or five ounces of blood, and thus produce a great effect,—than to apply a number of leeches, and drain away perhaps a larger quantity of the vital fluid. I am satisfied that general bleeding is continually omitted, when it

[a] Page 307.
[b] No. 57; Volume 3; Page 158.
[c] See the "London Medical Gazette", for March 1, 1828. (No. 13; Volume 1; Page 368.)

might be advantageously adopted;—when it would produce a much more decided effect, and give far less trouble.

General followed by Local Depletion.—I believe that local, is often of great use immediately *after* general bleeding. We lessen the load of blood in the part, very materially, by immediately applying a large number of leeches, or by cupping. I consider that this is really good practice. General bleeding frequently answers every purpose; but I think I have seen the symptoms disappear still more speedily if, after making a great impression upon the system, and lessening the force of blood sent to the part, I lessened the quantity contained in the part, by adopting local bleeding.

Local Bleeding.—*Local* bleeding may be employed to produce *general* effects. If it be carried very far, a patient may become debilitated by it, —become bloodless. A child, during the operation of leeches, may become exceedingly faint. We may produce these general effects by local bleeding; but it is usually a slow process, and the effects of local bleeding are often very local. In a case of pain of the head, I have seen leeches applied to only one temple; which has been relieved, while the other has not. Frequently, when a patient has had pain of the head, I have seen the occiput cupped, and relief obtained there, while the front of the head has remained as before; and when leeches have been applied to the front, I have known the occiput continue painful. This certainly is not invariably the case; but we perpetually find the effects of local bleeding to be very local. I am not contending against local bleeding. I employ it extensively; but I am always anxious that it should never supersede general bleeding, if the latter be necessary. It is much better to take a decisive line of conduct,—to make a strong impression upon the patient in an acute disease; and then local bleeding, if employed subsequently, has a far greater effect. It is to be remembered that I have been speaking, hitherto, of *active* inflammation.

Local bleeding will sometimes succeed best at a distance from the affected part. I have known chronic inflammatory diseases of the head, that had resisted general bleeding, and local bleeding at or in the neighbourhood of the head, yield to cupping of the hypochondria, or leeches to the anus. Some think highly of bleeding at the foot.

It is certainly a fact, that the detraction of blood from a distant part, is frequently of great utility; and many think of even greater utility than from the immediate seat of the disease. The ancients, or, at least, the older writers, were very fond of it, and supposed that a revulsion was produced;—that the blood immediately rushed from the inflamed part, to that from which the depletion was made. In this country, the circumstance has been too much overlooked. I have had cases of inflammation of the head, (as I shall mention hereafter,) where repeated local bleedings, even till the patient became pale, proved of no avail; but on taking away blood from the sides of the trunk,—far enough from the head,—the relief was perfect, and the patients recovered. I have had several cases of this description. There can be no doubt that the application of leeches to the anus, will frequently produce the most decided relief, in affections of the head, and indeed even of the heart. Whether it be more efficacious than local bleeding from these parts themselves, I can scarcely say. On the continent, this mode is commonly resorted to; but, from delicacy, it is not usual in this country.

Bleeding from the Anus.—When two or three parts are affected at the same time,—as, for instance, the head and stomach,—it is frequently a good practice to take blood from the anus. One can easily imagine why great

relief should be obtained from blood being taken away from that part. The veins there go to form the "vena portæ"; and therefore a great load is taken from the liver,—a great load is taken from the whole venous system; and less blood goes to the heart. As the hæmorrhoidal veins run to assist in forming the "vena portæ", and the latter branches through the hepatic veins to the "vena cava inferior", far greater relief is sometimes obtained by this means, than by any other, in diseases of the heart, and affections situated within the chest, as well as in great congestion within the head. Still, however, it is easy to make assertions in medicine and surgery; and one ought to have a large number of cases registered for comparison,—shewing where relief has been obtained, and where not,—before we draw any conclusions. General assertions are frequently not to be depended upon. Extensive and accurate observations are necessary, to enable us to say that one mode of treatment is superior to another. Whether the same quantity taken from other parts would be more or less beneficial, I cannot say; but in affections of the head, I have been frequently surprised on seeing the benefit derived from taking away blood around the abdomen, or from the rectum.

Position.—We may frequently diminish the quantity of blood in a part by position; and this is always to be attended to. Position may increase, or diminish the quantity of blood in a part. If a patient have inflammation of the foot, it would be madness to allow it to hang down; or if a patient have inflammation of the hand, it would be equally absurd not to have it kept in a sling. But these things may often be carried farther. In inflammation of the foot, it is often of use, not merely to have it on a level with the body, but to have it raised; and the same is the case with regard to the hand. In inflammation of the head, it would be absurd to allow the patient to lie with his head low. By attending to these points, though we are not doing any thing which will cure the patient, we are doing that which will enable other things to cure him sooner; and we prevent other things from being counteracted.

Purging.—To bleeding, in the way of evacuation, purging may be considered next in importance. This, although inferior to bleeding, is highly necessary; for, in the first place, it removes from the interior of the body a quantity of irritating fæces, which are almost always diseased, and will most likely become putrid if allowed to remain. We also are sure to find the secretions themselves diseased; in removing, therefore, the remains of food, we also remove such diseased secretion as would be more or less poisonous, or at least irritating. Besides this, we produce an evacuation of liquids from the vessels of the body; and likewise cause a counter-irritation in a part distant from the inflammation. In all inflammatory affections of the head, chest, and various parts of the body, the intestines are disposed to become torpid; the excitement occasioned by the inflammation, causes a depression of excitement in the intestines; and if their excitement be increased, so far as to bring them into full action,—in a proportionate manner we tend to lessen the distant inflammation. It is right, however, not to give very stimulating purgatives; lest we should increase the general excitement. The point is, to give those purgatives which thoroughly empty the intestines of their contents, and subsequently to exhibit such as produce a considerable drain; but, at the same time, we ought to select those which effect the object without great irritation.

Irritation produced by Purgatives.—I must here remark, that because very diseased stools are produced, it does not follow that purging is to be continued for the purpose of bringing the diseased excretions away;

for there can be no doubt whatever that purgatives, especially if acrid, will cause a diseased secretion. If a person in perfect health take an acrid purgative, his fæces will not exhibit the healthy character which they presented, previously to the purgative being taken. There can be no doubt that many purgatives, especially if they possess any acrimonious quality, will disorder the secretions, and produce a fetid discharge from the intestines, which would not otherwise take place. It is not necessary that a patient should have diseased secretions, in inflammation and other diseases, before we administer purgatives. It is often not the case; and it is to be remembered that, after a time, when the fæces would otherwise assume their natural appearance, they may be kept in an unnatural state by the administration of purgatives.

Repeated Evacuations.—The *repetition* of purgatives, as well as of bleeding, must be regulated by the violence of the disease on the one hand, and the strength of the patient on the other.

Diaphoretics.—With respect to other evacuants, I do not think much of them. Venesection and purging are by far the chief diaphoretics. Sudorifics are not always good; for the skin will resume its healthy function, and the patient perspire without them. If we bleed the patient well, starve him, exclude stimuli, and apply such remedies as I shall presently speak of, we may generally neglect the skin as well as the urine. In inflammatory complaints, when the disease is combated, the urine will come round, without any direct means; and so will the skin. At any rate, stimulating sudorifics do great harm. With regard to antimony,—as it is generally exhibited in inflammatory complaints, for the purpose of producing a moderate diaphoresis,—we may just as well treat the patient without it. A few drops of "vinum antimonii potassio-tartratis", in a saline draught, cannot do material good in a severe inflammation. So trifling is the power of small doses of this medicine, that I had patients at St. Thomas's Hospital, who took two or three drachms every three hours to shew how it can be borne, without the production of any sensible effect whatever. The idea of a few drops of antimonial wine producing any serious effect, in inflammation, is absurd. If the disease be combated with local and general bleeding and purging, small doses of it are just as well omitted as not; and I never think of saline draughts, or a few drops of antimonial wine, or any other such pretty things, for the purpose of curing inflammation.

Counter-Irritation.—There is, however, another plan to be followed, in the treatment of this disease;—namely, to exhibit counter-irritants, or (as they are called) "contra-stimulants"; in order to produce a strong impression upon the system. The chief of these are colchicum, digitalis, antimony in very full doses, and mercury. In violent inflammation, and indeed in many violent morbid states of the body, all remedial agents are opposed. In fever, or inflammation, or insanity, or spasm, we may give far larger doses of medicine than could be exhibited in health. In the violent pain of tetanus, for instance, an ounce of laudanum may be given. In inflammation, an ounce of digitalis in twenty-four hours has been given. I never did; nor have I given a scruple, or half a drachm, of the powder, in the same time. As to mercury, we may give a quantity which, in the same individual in a state of health, would induce the most violent ptyalism[a], and cause all the teeth to drop out. In violent inflammation, the effect of bleeding is resisted by the heart. The system is in a new state; and many things will not produce that effect, which they would if it were in its natural condition.

[a] From πτυαλιζω, *to spit.*

Digitalis.—Of the first of the contra-stimulants which I have enumerated, I have had no great experience. I have little or no knowledge of the use of digitalis in inflammatory diseases. I know that some say they can cure inflammatory affections with it, unaided by venesection;—but I have really a horror of digitalis. I have seen so many people die suddenly under its use, that whether they died from it or not, it is a medicine of which I am particularly shy; and—knowing the effect of bleeding, together with some other remedies—I have not had recourse to it, in any quantity sufficient to control the circulation. I have exhibited it in the dose of a scruple, or half a drachm of the tincture, three or four times a-day: no useful *effects*, however, have resulted in inflammatory affections.

Colchicum.—With respect to *colchicum*, there can be no doubt of its extraordinary powers in active rheumatism and gout. So strong an anti-inflammatory remedy as colchicum, must produce sweating, purging, and vomiting; and nausea has a great tendency to lessen inflammation. Nevertheless, I cannot state that I have been so satisfied with it, as to place much confidence in it. With the exception of its employment in gout and rheumatism, its utility has not appeared to me so decisive, as to induce me to exhibit it in preference to mercury.

Antimony.—*Antimony* may be given in far larger doses than could be imagined. It is now nearly twenty years since I found antimonial powder[a] to be, in general, a very inert preparation. I have seen others give two or three grains three or four times a-day, or five grain doses at night, with the view of promoting perspiration;—ordering the patient, at the same time, to take plenty of gruel, to bathe the feet in hot water, and put plenty of clothes on the bed; and if he has sweated profusely, it has been all attributed to the antimony. Seeing these things, I was in doubt as to its powers; and I went on until the dose exceeded a drachm, and even amounted to two drachms, three times a-day. This satisfied me that its want of effect could not arise from the remedy being resisted; and I therefore gave it to patients labouring under itch. It is well, when a patient is rubbing in sulphur, to give something internally, to gratify his wish to have his "blood purified." In the cases to which I am referring, I gave the antimony with no effect. I once prescribed *one hundred and thirty* grains three times a-day, without its even producing nausea. The patient took it to see how far we might go. There was little the matter with the man; and as I found that he took one drachm, and then a drachm and a half, of antimonial powder, three times a-day, with no more effect than would have resulted from "powder of post", I gradually increased the dose, till he took the quantity I have mentioned. This fact shews the uncertainty of the remedy. It contains a great deal of phosphate of lime, and peroxide of antimony; and sometimes it contains nothing else; but if given with calomel, it may sometimes produce nausea. I will not say that antimonial powder, as it ought to be, is an inert remedy; but as it is commonly procured, it may be given in the quantity I have just stated, in a large number of cases, without any effect.

In reference to "antimonii potassio-tartras", it may be given in large quantities. Many patients in St. Thomas's Hospital took half-ounce doses of antimonial wine, in chronic bronchitis, every four hours, without experiencing nausea. They said, when first taking it, that it made them sick; but such a state did not continue. Many persons give twenty grains of tartar-emetic, in the course of twenty-four hours; and in inflammatory complaints, I have given two grains every two hours. This at first induces

[a] "Pulvis Antimonii Compositus."

nausea or vomiting, which soon ceases; though, after going on for perhaps a fortnight, the patients may be sick again. It has not produced the salutary effect I expected. Colchicum and digitalis, like tartar-emetic, cannot be depended upon like mercury. I have given colchicum and antimony repeated trials; and I am not contented without great success in inflammation; because I think it ought, generally, to be cured. It is an established truth, however, respecting tartarized antimony, that in inflammatory diseases it may be given in large quantities; and that, although a patient may be made sick at first, the sickness will go off, and the remedy be borne. I have generally, however, seen the sickness come on at the end of about a fortnight; and then persist as long as the remedy was continued.

In administering antimony, the object is to depress the system, by inducing nausea. The dose required, however, in different cases, to bring about this result, will vary with individual peculiarities of constitution. In some there is a great *tolerance* of its effects. This is exemplified, although not strikingly, in a case which occurred at St. Thomas's Hospital, of bronchial inflammation with a tendency to tuberculous deposit. The employment of mercury being contra-indicated by the latter circumstance, antimony was given; and the patient took it for several days, at the rate of a grain every four hours, without the occurrence of nausea. The frequency of the dose was afterwards lessened. This in addition shows that antimony, like digitalis, may produce *cumulative* effects.

Mercury.—I have instituted comparative experiments with antimony and mercury; and I am quite certain that the success of those who employ antimony, in addition to bleeding, is very inferior to the success of those who employ mercury. In violent inflammation, I really make it a matter of conscience to employ mercury. If there be great danger, as in violent inflammation of the larynx,—where the patient, if neglected, would die in a few hours,—I do not hesitate to give ten grains of calomel, every two hours. In this case, if we do not bring our means to operate very speedily, the patient will be suffocated in a moment;—he will fall back in bed (from œdema in the glottis), and the case will be over. In other instances, however, there is no occasion to be so active. Five grains every four hours will do very well; or, perhaps, rather less. In a case where life appeared to be in danger every moment, I have given as much as a scruple, every two hours. These, however, are extreme cases; in which we are very sure that, if we do not instantly save the patient's life, he will slip through our fingers. If the mercury begin to run off by the bowels, it is better to unite it with opium. It very soon does this; and we see the necessity of resorting to opium; or, if there be an objection to this remedy, we might give an infusion of catechu, which is one of the most powerful astringents. Astringents in *tinctures* must be injurious in inflammation; and it is therefore better to give an *infusion*. Kino, as far as I know, is as good as catechu. If the calomel run off in spite of all we can do, "pilula hydrargyri" may be exhibited; but "hydrargyrum cum cretâ" is still less likely to do so; and with this a person may be salivated very readily. It is stated, in some books, that salivation cannot be produced by it; but I have salivated many with it. A dose of ten grains may be given every two or three hours; but I think it has a greater tendency to produce sickness, than any other of the three forms of mercury we have mentioned. More patients become sick while taking "hydrargyrum cum cretâ", than while taking either calomel or blue pill. It is frequently necessary to unite it with opium.

Salivation.—It may be right, also, to rub in mercury externally,—on the extremities and abdomen,—as quickly as it can be done; for the best plan

is, to get the mouth sore as quickly as possible. It is right, at every visit, to examine the gums; and likewise to press the glands under the lower jaw, and smell the breath. The moment any symptoms of an affection of the mouth appear, the remedy should be suspended;—it certainly should not be continued. In some cases, the affection of the mouth will exceed the point desired; but it is better now and then to have a violent ptyalism, and save nearly all our patients, than to be fastidiously particular.

When the mouth becomes too much affected, the chloride of lime, or of soda, are the best applications. If one ounce of the solution be mixed with six or eight of water, and the patient's mouth washed with this lotion every hour, you will find that the ptyalism will readily subside. If ulceration have taken place, time is required to heal it. If we employ the chloride before ulceration has occurred, no subsequent soreness, from the inflammation of the mouth, takes place. It should be employed of a strength just sufficient to be felt by the patient. It is also to be remembered, that if we maintain a free state of the bowels, there is much less danger of a violent affection of the mouth; and if the mouth become affected, and we open the bowels freely, we generally diminish the affection to a certain extent.[a]

I can state, as a positive fact, that if bleeding be properly had recourse to, and we produce a certain degree of affection of the mouth, it is very rare indeed for a patient with acute inflammation to be lost;—unless there be some organic disease which keeps up the irritation; or unless our efforts be counteracted by something wrong in diet, or by some violent emotion of the mind, which must be more than a match for all the best remedies.

The use of mercury, I beg particularly to state, is not to make us employ less bleeding beforehand, or at the time of exhibiting it. So far as there is occasion for bleeding, it should be put in practice whether mercury or any other remedy be employed; but it will be found that, as the mercury produces its effect upon the mouth, the necessity for bleeding will diminish. Bleeding is the great remedy,—the "sheet anchor"; we therefore should bleed according to the necessity of the case, without considering whether mercury is being administered, or not. But the addition of mercury causes the bleeding, which is put in practice, to be tenfold more efficacious, and so lessen the necessity for its repetition; but it can never become a substitute for bleeding. Dr. Armstrong used to say, that bleeding was the right arm, and mercury the left arm of medicine, in the treatment of inflammation;—a pithy declaration of an important fact.

I would strongly advise the perusal of Dr. Duncan's "Medical Commentaries", published in 1788. All we know now, relative to the use of mercury, was known then; though it has been considered, that the facts known with respect to the use of mercury, in many local inflammations, were first generalized by Dr. Armstrong. The general fact is fully stated by Dr. Hamilton. It is singular how often many of us, who know excellent practical things, do not bring them into use when we come into practice. It is a sort of inertness which is apt to come over us. The paper to which I refer, is by Dr. Hamilton, of Lynn-Regis. He says that he learned the use of mercury from a navy-surgeon;—that having been informed by a navy-surgeon of the great use of mercury in inflammation, he gave it in pleuritis, in hepatitis, and other inflammations; which yielded in the most extraordinary manner under its use,—in a way that he never found before by any practice he adopted.

Opium.—There are some cases, in which it would be very wrong to

[a] In the Meath Hospital, Dublin, great relief was found to ensue (in cases of excessive ptyalism) from the application of leeches below the angle of the lower jaw.

employ opium;—for instance, in phrenitis. But in cases where it is not specially contra-indicated, it is a practice with some to give a full dose of opium, after a copious venesection; and, as far as I know, it is a very good practice. Two or three grains of opium, after venesection to syncope, will frequently prevent the necessity of another bleeding; or, at any rate, will send the patient into a quiet sleep, by which he will be very much refreshed. Unless there be inflammation of the head, this practice is not objectionable. If the bleeding be likely to cause great irritation, or if the patient be weak, it may be a highly proper practice. It may be wrong to omit it; because it may prevent that morbid irritability,—that restlessness which sometimes takes place after bleeding; but it ought not to take the place of mercury. The chief point should be, to endeavour to arrest the inflammation by free bleeding, which, if it be thought advisable, may be followed up by the local detraction of blood; and a dose of opium may then be given. We should also be as anxious to give mercury, as though that were itself the chief remedy. Mere bleeding will cure many cases; and so will mere starvation; but if we give mercury, the exceptions to a cure will be reduced to a very small number indeed. With respect to opium, it is better to give one full dose, than repeated small doses; for it is found that opium has a stimulating effect over the body. Hence the pulse becomes fuller, and there is thirst. Under small and repeated doses of opium, both thirst and heat will continue. Dr. Wilson Philip made experiments illustrative of this subject. He applied, to a denuded brain, a small quantity of opium, and likewise of tobacco; and, on looking at the distant capillary vessels in the extremities, he found them very much excited; but if he applied a large portion of either of these ingredients, he found the action diminished;—just the opposite effect. This demonstration of the effect of large and of small doses, is perfectly in harmony with what we all observe, when we give large and small doses of these remedies. A small quantity of tobacco, for example, will excite feverishness;—will make a person hot and thirsty during the whole of the night; whereas a considerable quantity will depress the pulse, produce a cold, chilly sweat, and lower all the powers of life. So with respect to opium; if its sedative effects be wanted, it should be given in one full dose. This would be dangerous, if we did not bleed; but it is perfectly safe if we have depleted the patient copiously in the first instance.

Excessive Depletion.—Supposing, however, (as is very likely to happen,) that the patient has been bled too much, even then we find opium of the greatest use. If too much blood has been lost, and the patient has headach, throbbing of the temples, frequent syncope, deadly faintness, great rapidity of pulse, vertigo,—and this is a state frequently seen in women who have lost a great deal of blood during or after labour,—then the chief remedy is opium. All these symptoms are much diminished by it. Stimulants, of which ammonia is one of the best, and good nourishment, are highly proper; but the extreme restlessness of the body is very much alleviated by the addition of opium. In such a case as this, if we cannot prevail upon the patient to eat, it is necessary to use the stomach-pump; and strong broth should be injected, both into the stomach and the rectum.

Local Depletion.—But notwithstanding this state of the system, a local congestion of blood occasionally takes place;—so as to render it necessary to apply leeches. When the body has lost so much blood, that we are obliged to give ammonia, and nourishment, and opium, we sometimes find such a tightness of the head,—such a degree of heaviness from local con-

gestion, that the application of leeches, or of ice, is indispensably required. These matters, however, cannot be learned minutely by precept. The requisite knowledge can only be acquired by personal observation. Cases present themselves in which the abstraction of four ounces more blood, would certainly precipitate the patient into the grave.

Local Counter-Irritants.—Mercury, colchicum, and the other remedies mentioned, are *general* counter-irritants; but in the treatment of inflammation, we have also frequently to put in practice *local* counter-irritation; —that is to say, to set up a new action in the neighbourhood, or at a distance. I stated[a] that purgatives chiefly act in this way;—not only in removing a quantity of stimulating fæces, but by exciting the action of the intestines, and so far diminishing action elsewhere. But we also employ certain downright stimulants to the surface; and of these, blisters and sinapisms[b] are perhaps the chief.

Blisters.—It is best, I believe, to apply a blister on the surface over the internal part inflamed;—as over the right hypochondrium, in inflammation of the liver; and over the thorax, in inflammation of the lungs; but with respect to the head, this is a dangerous practice when there is any active inflammation going on. The application of cold to the head is beneficial in inflammation of the brain itself, or of its membranes; but early stimulating the vertex, by a blister, is highly injurious. Nothing can be worse practice, than to apply blisters to the top of the head in phrenitis, in the early stages of the disease; when, however, the patient has been sufficiently evacuated, then such a measure is very proper. But with respect to other parts of the body, it is best to apply blisters immediately over the internal part which is inflamed.

Sinapisms.—If it be desired to produce an effect rapidly, a mustard-poultice is one of the best applications. Some persons excite blisters, by causing the steam of boiling water to play upon the part; and others by putting boiling water in a jug, with a napkin in it, and suddenly inverting it; but I think a strong mustard-poultice, beat up with hot vinegar[c], will produce an effect as speedily as, in general, is to be desired. In young children, ordinary blisters are often very dangerous; and a mustard-poultice,—applied to the abdomen, or the back of the head, or the chest,—will produce as great an irritation as is desirable; and one which can be controlled, by removing the sinapism, when the child expresses great distress. A mustard-poultice, applied for ten minutes or an hour, over the chest or abdomen, oftentimes proves useful.

Solution of Cantharides.—Some persons have introduced a solution of cantharides, as a substitute for blister-plaster. I made some extensive trials with it at St. Thomas's; because it appeared a desirable thing to be able to produce a blister, by merely varnishing a part with a brush. It is a much cleaner application than that of an offensively-smelling plaster, which a patient has to keep in bed with him for twenty-four hours; but it does not well answer the purpose. A blister was produced, but not immediately;—frequently not till the next day; and then, when it was going to heal, a fresh blister would arise. In many instances, a far more violent blister was induced than I desired; and sometimes it did not succeed in causing any vesication. Upon the whole, it appeared very unsatisfactory; I considered it, therefore, preferable to continue the old practice, of applying a common plaster of cantharides.

[a] See Page 132.

[b] From "sinapis", *mustard.*

[c] Some experiments at the Hotel Dieu have tended to show, that the mixture of vinegar rather diminishes, than adds to, the stimulating properties of the mustard.

b. Atonic and Passive Inflammation.

Atonic Inflammation.—In that form of inflammation in which there is little power,—in inflammation which is called "atonic" (where there is not only inflammation, but likewise a state of debility),—we must employ less evacuants, and trust more to mercury and opium. Where patients are debilitated altogether, I should certainly place great reliance upon mercury (combined with opium), for the purpose of lessening the morbid irritability of the system; and should make the evacuant means chiefly local. I should employ local bleeding; or perhaps should frequently trust much more to blisters, or the application of cold, than even to local bleeding. Still, as I mentioned before [a], it sometimes may be a better practice, even when there is debility, to produce a momentary effect upon the system, by causing fainting;—by taking away a few ounces of blood suddenly, in an upright posture. But, as a general rule, when patients are of very weak constitution, one would trust more to *local* than to *general* detraction of blood. In these cases, while we take away blood locally, or while we are producing syncope by the detraction of a few ounces, it may often be necessary to give good nourishment. When there is violent inflammation in a part, and little power in the system at large, it is not at all inconsistent to lessen the inflammation of the part by local evacuants, and by cold; and yet to support the whole powers of the system by beef-tea, milk, and other nourishing articles of diet. The latter, but not stimulants, are admissible.

Passive Inflammation.—The same remarks apply to what is called "*passive* inflammation";—that is, when a part is not actively inflamed, but rather in a state of congestion; and the affection is not so much in the constitution, as in the part itself. In inflammation of the throat, where the throat is very much swollen, and of a dingy colour, without active symptoms; and frequently in inflammation of the eyes, in which there is more congestion than real active inflammation, local means are by far the best. It is not desirable to produce an impression on the system; but to unload the part,—to remove the congestion of blood; and therefore local means are exceedingly proper. In such cases, even stimulating applications to the parts are useful. They are in a state of atony; and by stimulating applications, and by astringents, we may frequently remove the unhealthy condition, even better than by mere local evacuations.

It is of the highest importance to make a correct diagnosis between an active inflammation, and one of an atonic kind, and a state which is hardly, perhaps, to be called "inflammation." After an inflammation has been very active, the symptoms will continue; but they are very much modified;—being attended with great debility, and great morbid irritability. Here the remedies of inflammation will make bad worse. It is necessary to remember that, in almost every case of inflammation, this stage may arrive; and it is also necessary to remember, that this set of symptoms may happen in the first instance;—bearing so great a resemblance to inflammation, that one not practised in it might fall into error. This particularly occurs in inflammation of the brain. Children sometimes display many of the *symptoms* of arachnitis, or acute inflammation of the membranes of the brain ("hydrocephalus acutus"), but without that disease;—we see patients labouring under sudden and violent delirium, without the presence of inflammation; or at least so little, that debility, inducing morbid irritability, is the prominent feature of the attack; and if, in these cases, blood were taken away, life would most likely be destroyed. The mode of distin-

[a] See Page 130.

guishing these cases, is by observing that there is no great pain; or that, if there be any pain, it is slight and transient; and that, in the next place, the pulse, although it may be quick, is feeble;—it is not a pulse which, upon careful observation, would appear to justify us in resorting to depletory measures. Then, again, the surface is frequently by no means hot; or, if it be hot, it is only so in a transient manner; and the expression of the face altogether is one of weakness. I shall have to speak upon this subject at greater length, when, in the consideration of particular diseases, I come to treat of hydrocephalus and delirium tremens; but in every case of inflammation it is possible, that after we have treated it actively, and subdued its active nature, the patient may fall into a state of morbid irritability; and local symptoms, though not of an active kind, may still exist. We can judge of it only by finding that, whatever local symptoms there may be, still the pain is not sharp; that if not gone entirely, it is much reduced; and that the pulse is one which will not justify bleeding. There is a degree of feverishness, so that the pulse may be very rapid; but still it is a pulse of irritability;—one that may be almost extinguished by the finger; and an expression of feverishness is observable.

Administration of Stimulants.—In these cases, we must no longer go on with evacuant means. They are highly dangerous. It is necessary to administer good nourishment, and even stimulants; and sometimes to give opium. Such a case may occur, not only after excessive bleeding, but after inflammation has subsided spontaneously. It is particularly seen in children, in spurious hydrocephalus[a] (if I may so call it); and likewise in delirium tremens (a spurious sort of phrenitis);—not invariably, however; but in many instances. In such cases we have sometimes even to give wine, and also brandy; but the utmost care is required; and we continually meet with cases, in which we cannot satisfy our mind how far active inflammation may still exist; or how far it is a mere case of irritation;—where we may sit anxiously pondering over every circumstance, and be unable after all to determine what course to pursue. In these instances, I should advise a combination of both plans;—that is to say, support the strength, give moderate stimuli with the greatest caution, and anxiously watch their effects; and, at the same time, cautiously employ evacuants locally. After the use of any remedy, we should carefully observe the effects; and draw our conclusion from its action. For example: if leeches were applied while giving nourishment, it may be soon seen, by the effects, which is the more proper; and that must be afterwards steadily pursued.

c. *Chronic Inflammation.*

With regard to *chronic* inflammation, its treatment must depend entirely upon the circumstance of its being active or passive. We have little to do with the duration of the complaint. We are not to consider whether it is *acute* or *chronic*; but whether it is *active* or *passive*; and what are the powers of the patient. We frequently have occasion, for example, to bleed in rheumatism which has existed for a year or two. I have met with cases where, after rheumatism has existed two or three years, the

[a] This state of the system frequently involved the physician in confusion and *malapraxis*, previously to the discovery of its true nature, by Dr. M. Hall and Dr. Gooch. Dr. Hall, by whom these affections of children were first described, called them "hydrocephaloid diseases." He has graphically shewn them to depend upon an exhausted and anœmiated condition of the body;—the very opposite of that which accompanies inflammation; and requiring, therefore, remedies of an opposite character;—support and nourishment, rather than depletion.—*T. Williams.*

parts have been so hot that it would have been vain to attempt to cure them without local bleeding. It is true that, when the disease has continued so long, the powers of the patient will seldom be very great; but we are not to consider what is *likely* to be the case, but to ascertain what the patient's powers *really* are;—what is the degree of activity of the disease; and what proportion it bears to the strength of the patient. In these chronic cases, we should make use of chronic remedies. We can apply, not only leeches and cupping-glasses from time to time, but also means which are not serviceable in active inflammation;—that is to say, issues, setons, and caustics,—so as to produce external ulceration. In *acute* inflammation, whatever is done must be done rapidly; but in the *chronic* form, we can apply setons or moxæ;—we can burn the part, or apply caustic and repeated blisters, or keep blisters open; and we can also produce great irritation by the application of tartar-emetic. Any of these applications may be serviceable in the highest degree.

Nitrate of Silver.—There is one form of caustic which is frequently of great use, even in certain acute inflammations, which is nitrate of silver. In certain inflammations of the skin, the application, wetted and rubbed on the part, or a strong solution applied with a brush, is frequently of great use. There is sufficient testimony in its favour; but I have not employed it extensively myself. In one form of violent inflammation of the skin, however, I have made a circle all round the inflamed part. I have not touched the inflammation itself, but a certain portion all around,—so as to blacken it; and I have seen it put a limit to inflammation, which threatened to spread to a great extent. Inflammation is thus arrested which, in all probability, would have run on to destruction of life.

Organic Diseases.—I have remarked[a] that, in *acute* inflammation, when depletion (both general and local) has been carried as far as is admissible,—the pulse being still quick and compressible, with considerable irritation,—there is reason to suppose that the case is now one of irritation; and we therefore have to support the patient well;—perhaps to give stimulants, and quiet him by opium. So, too, in the treatment of *chronic* inflammation; when we have persevered for a great length of time; and when, notwithstanding all we have done,—constant evacuations,—constant draining,—constant abstinence, we find that the signs of local inflammation still continue, we have reason to suppose there is something more than mere inflammation;—that it is not simply chronic inflammation we are treating; but that there is organic disease, which keeps up this chronic inflammation. In disease of the liver, it is impossible, for the most part, to say whether there is mere chronic inflammation, or organic disease of various descriptions, as tubercles, unless we can feel tubercles forming upon its surface, or can feel a considerable enlargement of the organ. It is only when we find, notwithstanding all the rational means employed, that no progress is made against the disease, we begin to suppose that there is something more to be dealt with than inflammation.

In this case it is wrong to go on with mercury, or with antiphlogistic measures, to any extent. Such measures only increase the mischief. The patient must be well supported. For the most part, he will gradually sink under his complaint; but we must take care not to make him sink sooner than he otherwise would. In tubercular, and most other organic diseases, by supporting the patient well, tranquillizing him with opium, and attending to the general state of the constitution, we may protract life, and mitigate

[a] See Page 140.

suffering; although we cannot cure the disease. If we take it up too hastily, inflammation that might otherwise be subdued, will not be overcome; but if it be taken up too late, and the disease be treated as inflammation that may be subdued, dissolution will certainly be hastened, and the patient will sink so much the sooner.

d. Terminations of Inflammation.

In the treatment of what are called "the terminations of inflammation", it is well to remember what I stated formerly [a];—that it does not necessarily happen that the inflammation ceases, because the (so called) "terminations" take place. They are circumstances which take place; but the inflammation does not cease because these circumstances occur. When any of these circumstances take place,—as effusion, suppuration, or mortification,—we must always inquire whether inflammation is still present or not; and if it be present, to what extent; and likewise of what character,—whether active and tonic, or attended by debility; for the same remedies may be necessary, as were requisite in the treatment of mere inflammation, before these "terminations" took place. We have to treat the inflammation present accordingly as it is *active*, or more or less *passive*; as it is tonic,—attended with strength of constitution; or according to the power of the constitution, whatever may be the activity of the part itself.

Effusion and Suppuration.—We have also to treat effusion and suppuration as *inflammatory* or *not inflammatory*; because there is sometimes no inflammation. If it so happen that fluid is generated,—whether that circumstance has taken place which is called "effusion"; and which is merely an excessive secretion or collection in a serous membrane; or whether suppuration has taken place, so that matter has collected,—in either case, it may be necessary to let out the fluids; because fresh symptoms may arise from their pressure. This is frequently necessary in a collection of pus; and also in the case of mere effusion, or of fluid collection, in a serous membrane. We may liberate the lungs, and avert impending danger, by allowing the escape of fluid effused in great quantity into the thorax; and some say we may do the same with respect to the pericardium; but of that I never knew an instance. It may sometimes be necessary in the case of the peritonæum. With respect to pus, however, the escape of it by art is of the utmost importance; because it not only injures by its mechanical pressure and distension, but frequently causes great mischief to the constitution, by its peculiar properties. If the matter be confined, the system is sometimes in a state of great depression (the tongue brown, and the pulse feeble); but on making a free incision, and letting out this fluid, the constitution will rally,—perhaps in the course of a day. When there is a mere collection of serous fluid, (whether diseased or not,) diuretics are frequently very useful; but for the most part, the remedies of inflammation, moderately continued, are among the best means. By still giving mercury, and by continuing low diet, we cause absorption of the fluid to take place; and, what is much better, we prevent its increase; and if we can but effect that object, nature, in a large majority of cases, will herself accomplish the evacuation. Among the remedies that answer both purposes, colchicum and digitalis will be found useful. They will perhaps lessen the action that is going on, keep down the fluid, and also tend to lessen previous effusion. Colchicum—owing to its exciting the kidneys and alimentary canal—is particularly suitable; and so is mercury.

[a] See Page 94.

Nourishment without Stimulation.—If a discharge has been accomplished by art, or if nature herself have effected a new opening, then we find it necessary to support the constitution well, for the purpose of enabling her to bear this copious discharge; but still it is frequently necessary to adopt more or less of an antiphlogistic regimen;—to give abundant nourishment; though not, indeed, of a stimulating kind.

Ulceration.—We may see good reason for not supposing that the necessity of antiphlogistic treatment is over, even in the instance of ulceration and of mortification; which are also called "terminations of inflammation." An ulcer is frequently due to nothing more than the surrounding inflammation. In the case of a sore nipple, I have oftentimes seen this. When the breasts have been so sore, that the mother dreaded the agony of sucking her child, the ulceration has frequently been cured, by merely applying leeches at some little distance from the spot, but still on the breast;—subduing the inflammation there, and afterwards keeping it down. So in the legs;—it is very common for an ulcer to take place in them, and yet not to heal; simply because there is so much inflammation around. Here blasters and ointment are of no use; but if we bleed the patient well, and purge him, we take off the tension and fulness of all the vessels. We subdue the inflammation, and then nature has power of her own to heal the ulcer. It may be just the same with respect to all the terminations of inflammation.

Mortification.—Even in mortification, we have to consider whether or not inflammation is going on; and whether it is attended by tolerable strength of constitution, or not. Inflammation may attend mortification after it has begun, and when it is decidedly going on. The inflammation may be really active;—there may be great redness of the part, great pain, and great heat; and there may be tolerable strength of the constitution at large. On the other hand, the inflammation may be more of a passive kind;—the part may be dingy, swollen, and not in much pain; and the constitution may be in a deplorable condition as to strength. It is often necessary, particularly in mortification, to employ local antiphlogistic means, while supporting and sustaining the system at large. The system itself is in a bad state; and therefore we have to give the best of nourishment, and perhaps wine, or even brandy; whereas the part itself is disposed to run into a state of excitement; and mischief arises from such treatment, unless we prevent the action of the part itself;—perhaps by the application of leeches, or of cold. Occasionally, in mortification, it is wrong to employ soothing measures. We must adopt means of the most stimulating description; but it is to be remembered that, frequently, the more we stimulate the part, the greater will be the mortification. If there be great irritation, a poultice of carrots or turnips answers a very good purpose. The more we irritate, in many cases, the greater will be the extent of the mortification. If, however, a stimulus be absolutely necessary, I consider the oil of turpentine the best. Sulphuretted oil is often very good. When the constitution was well supported, I have seen the mortification stop, apparently through these applications; but these things are to be employed only when there is no violence of local inflammation.

Fœtor.—It is always an object to prevent the gangrenous parts from injuring those which are not yet in a mortified condition. There can be no doubt that putrid animal substance is, in the highest degree, poisonous; and it is very necessary to prevent it from acting on the living part, and also to prevent the stench which proceeds from it. The latter may be removed, pretty easily, by charcoal-powder put into a fermenting poultice.

Stale beer-grounds and yeast are very serviceable; but, above all, I should recommend the chloride of lime, or of soda, to be continually applied. In using these applications, however, it is necessary to remember, that they must be continually applied;—not two or three times a day; but as one portion of the solution of the chloride dries, so a fresh portion must be employed,—to counteract the putrescent tendency. For the most part, they are inefficiently employed; and, unless you look after nurses and attendants, they will not apply them sufficiently to remove the stench.

Bark, Ammonia, and Musk.—In mortification, bark was formerly much praised; and was even thought to be a specific. But that cannot be the case; for there is sometimes great excitement of constitution,—requiring antiphlogistic means. At other times, however, in an opposite state of the system,—where there is mortification with debility,—bark may be of great use, and especially sulphate of quinine; for, in mortification, it is common for the stomach to reject bark. I have frequently seen mortification apparently arrested by a combination of musk and ammonia. I say "*apparently*"; because, in such a case, it is our duty to support the constitution. Musk and ammonia united, and given every few hours, have been particularly extolled by some practitioners. In nearly all these cases of mortification, opium is useful. There is great general suffering,—great general restlessness; and it is an object to lessen the suffering, and tranquillize the system at large.

Amputation.—It might be supposed, that the removal of the gangrenous part would put a stop to the mortification. On reflection, however, it will appear to be bad practice. The mortification of a part depends, generally, upon the state of the constitution; and the fresh wound caused by amputating the mortified part, will fall into the same condition; because it is not the *part* that is so much in fault, as the *constitution*. If, however, the mortification depends entirely upon local circumstances, the mortified part may be cut off with safety. Supposing an artery has been injured to such an extent as to cause its obstruction, and that the part supplied by it dies from the want of blood, the part may be removed without any danger whatever of the disease spreading; because the mortification depends upon a local cause, and not upon the constitution; and the fresh wound will not fall into the same predicament as the mortified part. In almost every case, however, where the mortification does not depend upon a local cause, it is the best practice to wait till nature herself has pointed out that the mortification will not spread;—till a line of separation has begun; and till we see that the powers of the constitution are sufficient to repair the injury;—that the constitution is not in a condition for the mortification to spread higher up; but that, on the contrary, nature is capable of the healing process. Then we remove the part, and effect the object that nature herself was carrying on. It is of great importance, in the treatment of mortification, to recollect these few particulars.

e. Specific Inflammation.

The observations that I have now made refer to *common* inflammation; but I stated that inflammation may also be *specific*;—and that we term inflammation "specific", when it runs a very peculiar course, or arises from a peculiar cause.[a] Gout is termed "a specific inflammation"; because it runs a very extraordinary, and very peculiar course. Small-pox is also an

[a] See Page 117.

instance of specific inflammation. It not only runs a peculiar course;—beginning on a certain day, and undergoing certain changes on others; but it arises from a special cause, which will produce no other disease. Gonorrhœa, also, is a specific inflammation;—having its origin in a cause that will induce no other disease.

Prophylactic Treatment.—We sometimes adopt prophylactic measures, and can prevent these affections altogether. Small-pox may be prevented, in the majority of instances, by the cow-pock.

Specific Remedies.—For some of these diseases we have a specific remedy. For itch, which is a specific disease, sulphur is the remedy; for syphilis, mercury. For the greater part of these specific inflammations, however, we have no specific remedy; and even if we had, it would still be of the highest use to treat them on the principles of common inflammation. Even where certain remedies are at command,—as in the case of itch or syphilis,—we must, notwithstanding, keep in view the remedies of common inflammation; because it must be recollected that *specific* is *common* inflammation, with something superadded to it; and by adopting common treatment, in addition to specific, the cure is much accelerated.

Mixed Inflammations.—Some inflammations are specific at one time, and not at another. There can be no doubt that, in general, ophthalmia is not a contagious disease; but we have every reason to believe that sometimes it is. Even erysipelas has appeared to be contagious. I think I have seen a person die from erysipelas caught in this way. Some strong reasons (which I shall notice more particularly hereafter) for supposing it to be contagious, will be found in a paper published by Dr. Wells, late of St. Thomas's Hospital. Catarrh is sometimes specific. A common "cold" is an instance of common inflammation; but now and then there is an epidemic catarrh, which depends upon some peculiar cause in the atmosphere, and not on the common causes of inflammation. It is a singular fact, that inflammation may be specific at one part of its course, and not at another. Gonorrhœa is an instance of specific inflammation at first; but no doubt, after a time, it ceases to be contagious. When that time arrives, we do not know; and therefore it would be bad policy to speculate on the presumption of its having occurred; but I think it is pretty certain that inflammation in the urethra, sufficient to keep up a discharge, will continue long after any contagion is to be feared.

CHAPTER II.

HÆMORRHAGE.

Not only do the essential symptoms of inflammation (such as swelling and pain) sometimes arise from other causes; but even other circumstances that usually occur in the course of inflammation, and what are called its "terminations", are sometimes present without it. Among the circumstances which take place in the course of inflammation or its terminations, are discharges and collections. These may sometimes be mere results of inflammation, or closely connected with it, and sometimes they may occur without any inflammation at all. One of these discharges consists of blood; another is a discharge of mucus; another is not a discharge, but a collection of serous fluid. A discharge of blood is called *hæmorrhage*; a discharge of mucus is called a *flux*, or a *catarrh*, or a *gleet*, or a *profluvium*; and an excessive collection of serous fluid, that cannot be discharged, is called a *dropsy*.

[The term "*hæmorrhage*"[a] signifies the bursting forth of blood from the living body;—the escape of the blood from those vessels in which it is always contained in a healthy state of the system.

In the present day a very large class of important diseases is collected together, and described under this title,—"*Hæmorrhage.*" Whether the extravasated blood escapes from the body by some of the natural external openings, or remains pent up in some closed cavity or viscus;—whatever may be the cause of the extravasation of the blood, still the morbid phenomenon would, in the present state of medical science, be classed among the hæmorrhages. It frequently happens that a very considerable loss of blood is sustained, in consequence of some accidental injury of the arteries or veins, or by ulceration of their coats. Whenever the vessels so injured, or the trunks from which they arise, are within the scope of the senses of sight and touch, the surgeon is called upon to arrest the hæmorrhage by the application of the ligature. It is not our intention to consider any of those forms of hæmorrhage which more properly belong to the province of surgery; we simply state, that all those hæmorrhages which are consigned to the care of the surgeon, are the result of appreciable injury of the blood-vessels. Those forms of hæmorrhage which are usually committed to the care of the physician, are much less perfectly understood; they frequently take place without any perceptible alteration in the anatomical condition of the part whence the blood escapes; and are therefore controllable with less facility and certainty. They arise from some pathological condition of the body itself, and may be entitled *spontaneous.*[b]]

Tissues from which Hæmorrhage occurs.—There is scarcely a structure of the body which may not suffer from the spontaneous effusion of blood from its vessels. Hæmorrhage frequently occurs in inflammation of a mucous membrane,—particularly of the mucous membrane of the intestines and of the urethra, and less frequently in inflammation of the bronchia; but it is a

[a] From αἷμα, *blood*; and ῥήγνυμι, *to break forth.*

[b] "Library of Medicine"; Volume 5; Page 1.

common occurrence to see the most violent inflammation of a mucous membrane, without the escape of a single drop of blood. Why it happens that inflammation of a mucous membrane should, in one case, be attended by hæmorrhage, and in another not, I do not think we can explain; but such is the fact. A discharge of blood, whether profuse or not, will frequently take place without any violent inflammation. We see that inflammation exists; but we cannot believe it is the sole cause of the hæmorrhage. That the hæmorrhage is accompanied by inflammation, is all that we feel justified in saying; nor can it be stated that it is the result of an inflammation.

Although it is generally the mucous membranes which pour forth blood, the skin, without any abrasion, has been known to do the same. I never saw an instance of the kind, but I have read of bloody sweats; and they occur in persons who have been bitten by some poisonous animals. Curious cases are to be met with in authors, of blood oozing from various parts of the body. In an American journal there is an account of a person from whose cheek blood suddenly oozed in considerable quantity, without any abrasion.

Vicarious Discharges.—Ulcers will frequently afford a great quantity of blood; but this especially occurs in women whose menstruation is deficient. There have been some curious instances of the vicarious discharge of bloody fluid. If menstruation be suppressed, it is not uncommon for an ulcer to break out on the legs, and to bleed once a month; or, if there have been an ulcer before, it may take on a bleeding character. I have seen hæmorrhage from the chest take place in the same way. Hæmorrhage has taken place once a month; simply because the menses were suppressed.

On some occasions, though rarely, hæmorrhage occurs from the serous coverings of the lungs, heart, brain, and abdominal viscera. It likewise occurs in the cellular tissue of many parts of the body; as in the parenchyma of the brain, lungs, liver, and testicle.

Mode of Escape of the Blood.—[It will be interesting, and productive of a better understanding of the pathology of hæmorrhages, if we first consider the conditions under which the blood escapes from the vessels of the different tissues. It is true that hæmorrhage from some of the beforementioned organs,—as the stomach, the intestines, the lungs, and the brain,—does occasionally result from the rupture of some vessel or vessels of cognisable magnitude; but it is no less certain that, in by far the greater number of these spontaneous hæmorrhages, there is no lesion of structure, either of arteries or veins, so far as the most careful dissection informs us. To "break or burst a blood-vessel", in the most literal meaning of those words, is thought by the public, and by some at least of the profession, to be a misfortune of very common occurrence; yet, relatively to the frequency of hæmorrhage, it is certainly a very rare one. ("*Cyclopædia of Practical Medicine.*") The opportunity here afforded of dissipating a widely entertained error, ought not to be neglected; and we shall therefore not hesitate to reproduce the principal arguments by which the doctrine of hæmorrhage by exhalation is supported. As hæmorrhages from mucous membranes are far more frequent than from other tissues, so will they afford us the readiest means of establishing this principle in pathology. Thus, where hæmorrhage has occurred so profusely from the stomach or bowels, that the death which ensued has been sufficiently accounted for by the mere loss of blood, the whole tract of the alimentary canal has been diligently examined, and has exhibited no breach of surface, nor any perceptible

alteration of texture. Sometimes the mucous membrane appears, here and there, of a red colour, and (as it were surcharged) with blood; sometimes it is pale and transparent, while the vascular network, visible immediately beneath it, is gorged and turgid; sometimes the whole is colourless,—the same network of vessels having been completely emptied by the previous hæmorrhage; and sometimes, again, (and this is illustrative of the mode by which the blood has issued,) vast numbers of small dark-coloured masses, like grains of fine sand, can be made to start from the surface of the membrane by slight pressure. There can be no doubt that these are minute portions of blood, which had remained and coagulated in the vessels or apertures forming the ultimate channels of the hæmorrhage. (Watson; Andral's "Precis de Pathologie"; Volume 2; Page 151.) Numerous and conclusive observations, of a similar kind, might be cited from the records of morbid anatomy, which is so extensively cultivated in the present day; and in this way direct proof is obtained, not only that hæmorrhage may take place from the surfaces of internal mucous membranes by exhalation, but that this is the mode in which it most commonly happens;—that the effusion of blood by any of the natural outlets of the body, can seldom be explained by the detection of any rupture of the coats of a blood-vessel. Bichat also supported this doctrine of hæmorrhage by exhalation by the following considerations; which, although full of physiological interest, are by no means so convincing as the former. He states, that if the uterus of a female who dies during menstruation be carefully examined, we cannot discover either any actual erosion of vessels, or any of those scars which ought to be so numerous, if at each menstrual period the uterus were really the seat of so many successive lacerations of its internal membrane. It may be observed, however, that the process of menstruation cannot be looked upon as a morbid process; as in the unpregnant female, during a certain portion of her life, it is not only consistent with perfect health, but actually essential to it; and as the fluid so poured out is not strictly blood, the analogical argument drawn from the preceding facts in favour of hæmorrhage by exhalation, though it may afford a strong presumption, is not decisive. But any deficiency in the cogency of the two preceding arguments, is supplied by the careful observation of those rare but well-authenticated cases of cutaneous hæmorrhage, where a dew of blood appears upon some part of the surface of the body; and which, being wiped away, again appears, without any perceptible change in the bleeding surface beyond a blush of redness. But it is not only from the observation of mucous membranes and the skin pouring forth blood from their surfaces, that we are assured that hæmorrhage takes place by the process of exhalation. Bichat states, that he had upon many occasions scrupulously examined the internal surface of the peritoneum, of the pleura, and of the pericardium, in cases of hæmorrhage from those membranes; and that their surface appeared to him entirely free from any laceration; so that it was very evident to him, that the exhalants had poured forth the blood, in place of the serum which they previously secreted.[a]]

When hæmorrhage occurs from a mucous membrane, I believe it is, for the most part, from a large number of minute vessels. The profuse hæmorrhage which may take place in a very short time,—so as to prove fatal in a minute or two,—without any vessel whatever being found injured, is surprising. I distinctly recollect having a patient with some pulmonary disease, who was sitting up in bed. Suddenly blood came from his mouth; he fell back,

[a] "Library of Medicine", Volume 5; Pages 2 and 3.

and was dead. On opening him, we found the stomach filled with blood;—there was an immense coagulum, exactly forming a mould of the stomach; but, after examining every part of that organ, with the most minute attention, I could not discover the orifice of any vessel whatever. The same has been observed in the case of the pericardium. I think it is mentioned in Dr. Baillie's work on "Morbid Anatomy", that cases have occurred, both in mucous and serous membranes, in which he was unable to find a vessel which appeared to have poured forth blood. The pericardium, for example, will suddenly allow the escape of an enormous quantity of blood.

["If it be demonstrated", says Chomel, "that there does not exist any rupture of the blood-vessels in these cases of hæmorrhage from the mucous and serous membranes and the skin, there remains open to us, in the present state of medical science, only one mode of explaining the escape of the blood;—it can only take place through the same channels as pour forth the mucus, the serum, and the sweat." (*Dictionnaire de Médecine.*) There seems no more necessity, under the action of disease, for a rupture of vessels to give exit to the blood, than to give exit to these fluids. What the vessels or outlets to which we give the name of "exhalants" are, how they are distributed and arranged, in what manner they are connected with the ordinary capillary circulation of red blood, or under what influences they are placed, are points concerning which we have little or no certain knowledge. We know, indeed, that such channels must exist, though we cannot see or demonstrate them; and that whilst the health is good, they do not allow the blood, as such, to pass through them. Having thus produced facts and arguments which, as we believe, establish the truth of the doctrine of hæmorrhage by exhalation, it would seem that this class of diseases should be regarded as analogous to morbid secretions, and in any nosological arrangement be placed in the same class with dropsies and mucous discharges; and it is in this light that they have been regarded by Andral.

Another mode in which the occurrence of hæmorrhage has been explained (Andral; "Precis de Pathologie"; Volume 1), and which is principally applicable to the passive forms of the disease, is by a supposed alteration in the consistence or composition of the blood itself; which becomes attenuated, and capable of passing through channels or orifices that healthy blood cannot permeate. In defence of this supposition may be adduced the facts, that hæmorrhages are known to occur where the blood is obviously more thin, pale, and serous than natural; and, still more remarkably, where that fluid has undergone further demonstrable changes in its chemical nature, or is even visibly altered in its sensible qualities; as, for example, in purpura hæmorrhagica, scorbutus, typhoid fevers, malignant small-pox, and erysipelas. These hypothetical attempts to explain the processes by which hæmorrhage may take place, deserve (as Dr. Watson has observed) more attention than has sometimes been paid to them. The views which they involve can scarcely be regarded as mere speculative refinements; for they often exercise a real, though perhaps an unacknowledged, influence upon our practice. At any rate, if they do not, prior to experience, justify certain modes of treatment, they accord wonderfully with what experience has taught concerning the means by which hæmorrhage may sometimes be stayed or prevented. In some cases we succeed by measures which tend to abate the general force of the heart and arteries, and to lessen general plethora; or by diverting partial plethora and restoring the disturbed balance of the circulation, or by directly emptying the turgid capillary vessels. In other cases, we rely chiefly upon expedients which we believe to have

the effect of constringing the extreme vessels;—styptics to the bleeding part; cold to the surface of the body,—producing a sympathetic shrinking in other related membranes; or internal medicines, which use has shown to have the property of restraining the natural exhalations when in excess. And, finally, there are cases where we seek, and not in vain, to repair the blood;—to restore it to its natural condition by improvements in diet, or by food of a peculiar kind, such as the juice of lemons; and thus the tendency to hæmorrhage is cured. ("*Cyclopædia of Practical Medicine.*")[a]]

Active Hæmorrhage.—If hæmorrhage occur with signs of inflammation,—with pyrexia,—with a full, hard, or quick pulse; together with pain and heat,—it may then be termed "*active* hæmorrhage";—just as inflammation is called *active*, in similar circumstances. The disease is then to be treated simply as inflammation; and the hæmorrhage will subside. We have, in general, to bleed the patient; and the blood will generally be found buffed and cupped. As in inflammation, purging will be required; and it is often quite safe and proper to give mercury, keep the patient on low diet, and apply cold. The latter is particularly useful in such a case.

Passive Hæmorrhage.—But, like inflammation, hæmorrhage may be *passive*. There may be no pain, or but little; no heat; no pyrexia; no quickness and fulness of pulse; or, if there be quickness, the pulse is at the same time feeble. There may be congestion in a part, or there may not;—that is to say, all the veins may be distended; or the extremities of the vessels only may be pouring forth blood, without any congestion. When hæmorrhage takes place without any symptoms of inflammation,—without pain, without heat, without fulness or quickness of pulse,—the part itself may be in a state of congestion; but the latter condition is sometimes absent. We may, on opening a patient, find great congestion of all the vessels; while, in other cases, we find extreme paleness. Where there is a considerable discharge of blood, without signs of inflammation, but with symptoms of great fulness of blood in the part, I believe in general it is venous. Hæmorrhage of this kind will sometimes be altogether mechanical. There may be an obstruction in some of the leading veins; and the blood may be poured forth mechanically. An obstruction in the spleen, or in the liver, is a common cause of a discharge of blood from the intestines; but this discharge will sometimes take place without any obstruction; in which case there is a peculiar state of the circulating fluids. In typhus fever, in exanthematous fevers, in scurvy, and in that peculiar disease called "purpura", there are peculiar vitiated conditions of the fluids,—inducing corresponding changes in the tissues of the body; which enable us, in great measure, to account for the constant tendency to hæmorrhage. In bleeding from a wound, the discharge is merely passive,—from the want of mechanical resistance. The want of mechanical resistance, however, will not explain all cases of passive hæmorrhage; because we have cases of the most extreme debility of body, where the patient has no hæmorrhage; and frequently there is hæmorrhage of a passive kind, without inflammation, where there is not such an intense degree of debility.

Inflammation and Relaxation.—In these two forms of hæmorrhage, the state of the system is totally different. In *active* hæmorrhage,—that which resembles active *inflammation*,—the blood is, as it were, *forced* out; whereas, in *passive* hæmorrhage, the blood is *let* out. In active inflammation, there is an intense circulation going on in the part; that is, the blood is moving more energetically than natural,—and the *quantity* of blood *moving*

[a] "Library of Medicine"; Volume 5; Pages 4 and 8.

through the part is increased; the action of the heart is strong, and the blood is forced out of the extreme vessels. We have, therefore, only to moderate the force of the blood; and the hæmorrhage, for the most part, ceases. But, in passive inflammation, the force with which the blood is impelled to the part is not increased. There is no great impulse behind; the blood is altered in quality; and the extremities of the vessels are so relaxed, that it escapes. It becomes, therefore, necessary to employ different means;—not to stop the force of the blood, but to improve it, and restore tone to the extremities of the vessels as much as possible, and to diminish their diameter; so that the blood may not be thus *let out*. In active inflammation, all the astringents, stimulants, and compression which can be employed would do little or no good; for there is an active hæmorrhagic tendency. The blood is driven on with great force; and if we merely treat it as inflammation, the hæmorrhage generally ceases; whereas, in *passive* inflammation, if we were to annihilate the force of the blood from behind, by debilitating measures, we should only increase the relaxation of the vessels, and make them more liable to give way than before.

Mixed Cases.—It must always be remembered, that a great number of cases are inflammatory; and that others depend entirely upon relaxation, combined with certain conditions of the blood. In these mixed cases we are under the necessity of resorting to both plans;—of keeping down activity in the part, while we moderately support the system at large. We have to adopt just the same treatment that I mentioned, as necessary in a doubtful, combined case of active and passive, or tonic and atonic inflammation.[a] According as the pulse is not quick,—or as it is not full and strong, or as there is little pain or heat, we may adopt the remedies for passive or atonic inflammation. In proportion as the pulse is strong or quick, and the amount of heat in the part is great, so we must adopt more vigorous antiphlogistic measures. Local means must sometimes be had recourse to, for diminishing excitement; while, at the same time, we support the constitution. But if the hæmorrhage be decidedly of a passive character,—so that to treat it as inflammatory by bleeding and purging is out of the question,—we must trust more to the application of cold to the part itself; and to local, and perhaps even general, astringents.

Application of Ice.—Cold may be applied to the exterior of the chest, in spitting of blood, with the most perfect safety. I have known phthisical patients to sit up in a chair, with scarcely any thing upon them, and to have ice laid on their chest; without the least suffering being produced, or any unpleasant circumstances resulting. In hæmorrhage from the kidneys, also, it is a good practice to apply ice to the loins; and in cases of profuse discharge from the alimentary canal, I should not hesitate to give ice by the mouth and rectum, and to place it on the abdomen.

Astringents.—I very much doubt the efficacy of nearly all internal astringents, except in the case of hæmorrhage from the alimentary canal; in which case catechu or kino may be employed with great advantage; for then we apply the remedies as locally to the part itself, as if they were applied to the surface of the body, in cases where the latter is diseased. But with respect to those astringents, which are intended to be absorbed, and thus to operate on a distant part of the body, I very much doubt their effect;—unless they are of a saline character, or are readily absorbed. The efficacy of acetate of lead is unquestionable. I have oftentimes proved

[a] See Page 140.

it, to my own satisfaction. But with regard to vegetable astringents, I very much doubt whether, in a case of profuse hæmoptysis, for instance, we can do good, even if we fill the stomach and intestines with catechu and kino.

Acetate of Lead.—We may operate, however, on distant parts by means of *metallic* astringents,—provided we give those that may be quickly absorbed; and the acetate of lead is certainly the chief of these. With regard to the dose, it would not be imagined beforehand (knowing the ill effects of lead), that we could give the large quantity that really may be borne. Not only may one or two grains be given every six hours, but two or three grains may be exhibited every two or three hours, for some days, with the most perfect impunity. I know we may give a scruple of it in the twenty-four hours, and even more,—nearly half a drachm, with perfect safety;—provided we carefully attend to the state of the patient's bowels; and I know that such doses are sometimes necessary, because I have found no effect produced till the dose has been brought up to that point. For some time, there is no occasion to push on the doses so quickly; but if the hæmorrhage be obstinate, it is then necessary to do so. I have seen a stop put to the hæmorrhage, when the dose had arrived at a certain point; and when the dose was lessened, the hæmorrhage returned. The only inconvenience I have known to occur, has been violent pain of the limbs. It is especially necessary, however, to attend to the patient's bowels;—to take care that they are freely opened every day; for otherwise it would be madness to give it. With this precaution, however, I consider it perfectly right, in passive hæmorrhage, to give acetate of lead very freely. The pain of the limbs is of no consequence, if life be saved. A patient, on such terms, may well bear pain for some little time after his recovery; but even that pain may generally be removed by employing the warm bath, once or twice a-day, and by the administration of colchicum.

Sulphuric Acid.—Sulphuric acid is another astringent, which exerts an influence over a profuse discharge;—not *hæmorrhage*, but profuse *sweating*. The same effect may result from nitric acid; but sulphuric acid will undoubtedly check the most profuse perspiration.

Oil of Turpentine.—The application of cold, of astringents combined with cold, and the administration of astringents internally, are among our chief measures in passive hæmorrhage; but the oil of turpentine frequently answers a most excellent purpose. We have all seen it stop profuse hæmorrhage from the nostrils, by being introduced with a plug of lint; and I have seen a similar effect produced, in hæmorrhage from mortified parts. I do not know that it will stop hæmorrhage from internal parts, except the alimentary canal and the kidneys; but it will stop hæmatemesis and melæna;—that is, a discharge of blood from the stomach. I have had cases, almost innumerable, illustrating the great utility of this remedy. Oil of turpentine, which has proved a most efficacious medicine, should not be exhibited in large doses;—as by producing vomiting and purging it might prove injurious; which, in such cases, might be fatal to the patient. Twenty drops should be given, every three or four hours. I have known people take it of their own accord, where I should have been afraid to give it. I have known it taken in active hæmorrhage from the kidneys, and put a stop to it; but where the hæmorrhage was active, I would first treat it as inflammatory; and then, after a time, give oil of turpentine. If the hæmorrhage proceed from a part which can be reached, and we cannot succeed in stopping it by other measures, compression (by means of a ligature, compress, &c.) may be necessary; or even the application of the actual cautery.

Predisposing Causes.—With respect to predisposing causes, it is in young persons that we have active hæmorrhage; and it is in middle age and advanced life, that the passive form generally occurs. Of course, there may be exceptions to this general rule. In children, it usually takes place from the nose; in young adults, from the lungs and air-passages; in elderly people, chiefly from the abdomen; but they are likewise subject to hæmorrhage within the head,—producing apoplexy.

Women—old, young, and middle aged—are very subject to hæmorrhage from the stomach; and also, though in a much less degree, to hæmorrhage from the intestines. This hæmorrhage from the alimentary canal in females, is generally of a passive kind; and will generally bear astringents from the first. It does not require any great extent of bleeding. In the menstruating period of a woman's life, however, the uterus is very subject to hæmorrhage; which is often inflammatory. Many cases of menorrhagia[a]—without pregnancy,—without delivery—have yielded to one or more bleedings, combined with low diet; whereas all the astringents that could be given, would be of no use in this *inflammatory* hæmorrhage,—attended with pain of the loins, heat of body, and quickness of pulse.

Hæmorrhagic Diathesis.—Besides this predisposition to hæmorrhage from certain parts, depending upon age, there are others depending upon other circumstances. There is sometimes a constitutional tendency. Certain persons are known to be subject to hæmorrhage from certain parts; and some persons are subject to hæmorrhage in general; so that if they have a tooth extracted, they will always bleed profusely; or if they cut their finger, it will continue to bleed for many hours, in spite of the remedies used. There is certainly, in many people, an hereditary predisposition to hæmorrhage. In some of these, an extreme thinness of the arteries has been found. After a tooth has been extracted, it has been found necessary, from the profuse hæmorrhage,—notwithstanding that the actual cautery was employed,—to tie the carotid artery; and it has been found that the arteries were even thinner than the veins in other people.

[The hæmorrhagic diathesis, is a remarkable state of the blood and sanguiferous system, and by no means uncommon in this country; but it seems to be a more common affection in the West of Germany, where all the boys of a family will frequently die with it. It is hereditary; and has been observed to affect males more frequently than females, although it may be transmitted by the mother. The blood is of the ordinary colour, but *unusually fluid*; and, although it is coagulable, the coagulum has little firmness. The consequence of this state of the blood is, that most of the tissues, including the *capillary parietes*, are extremely attenuated and relaxed; and, accordingly, this lax state of the vessels allows the blood readily to transude, upon the application of the slightest force. In many instances, where this latter circumstance happens, no efforts of nature, or means of art, are capable of restraining it. Mr. Wardrop has collected several cases of this description; and mentions several examples, in which this diathesis was evidently *hereditary*.

In the aggravated form in which this disease is described as occurring in Germany, the symptoms are—the appearance of ecchymoses (spontaneously, or from the slightest pressure), which slowly disappear, leaving a yellow tint behind;—epistaxis;—profuse loss of blood from the slightest puncture;—hæmoptysis from a slight cough;—diarrhœa with clots of blood in the stools. The patients, moreover, are subject to frequent attacks of pain

[a] From μηνια, *the menses*; and ρηγνυμι, *to break out*.

and swelling, with ecchymosis of the wrist, ankle, and knee-joint, attended by fever. On the examination of the bodies of those patients, the vessels were found extremely thin and softened.

Mr. Wardrop remarks, that those substances which dispose the blood to coagulate, seem to have more effect in restraining the bleeding, than those which excite the artery itself to contract. A lad who exhibited this hæmorrhagic tendency, was reduced to the most extreme state of anæmia,—threatening immediate dissolution,—from a trifling surgical operation. Mr. Lane, by whom the case is given [a], performed the operation of *transfusion*;—the boy was soon reanimated, and ultimately recovered.

Vitiated states of the blood—predisposing to, or causing hæmorrhage—are frequently acquired: these are generally passive and symptomatic hæmorrhages; and for the most part they are *not*, properly speaking, hæmorrhages at all;—being merely exudations of serum, holding the colouring matter of blood in suspension, or solution; and the result of various morbid conditions of the blood. This is exemplified in the petechiæ, ecchymoses, and sanguineous effusions occurring in malignant diseases. Andral remarks, "that it is sufficient for hæmorrhages to occur, that its molecules lose their natural *force of cohesion*." [b] With respect to many of these cases, and the curious subject of the *sudor sanguinis*, it is to be regretted, that no microscopic observations of the fluids have been made;—the first question which suggests itself to the mind, being—"Are the red particles of the blood effused as such, or do they previously undergo solution?" From the rapid advances which are now being made in organic chemistry, there are some grounds for the hope that these states, depending upon the vitiation of the fluids, will soon be more definitively understood.—*T. Williams.*]

Exciting Causes.—The *exciting* causes of hæmorrhage, are whatever propels the blood violently, either generally or locally; and whatever mechanically accumulates it; such as posture, the application of a ligature, or obstruction in any part. Another exciting cause of hæmorrhage, is the suppression of a discharge, or the sudden cessation of a natural discharge; such as the entire or occasional suppression of the menses, the suppression of hæmorrhoidal discharge, or the suppression of diarrhœa. Indeed, the sudden cessation of any disease to which a patient has been very subject, is sometimes attended with hæmorrhage from an internal part. A solution of continuity is a common cause of hæmorrhage; and, of course, it is then of a passive kind.

Arterial and Venous Hæmorrhage.—In hæmorrhage which proceeds from the nose or the lungs, the blood is generally florid; while that which comes from the stomach and intestines, is generally of a venous character. But the circumstance of the blood being black, does not necessarily prove that it comes from a vein. It may assume that colour from remaining some time in the stomach or intestines, before it escapes; for blood, if allowed to be perfectly still, and not exposed to the air, will become black. If we tie an artery in two places, the blood between the ligatures becomes venous in its character; and therefore blood discharged from the stomach and intestines, though it may be *venous* in its *characters*, may yet be *arterial* in its *origin*. In apoplexy, the blood effused within the head appears to be venous; but its black colour may arise merely from the reason I have just stated.

The uterus is particularly subject to hæmorrhage during pregnancy, and

[a] "Lancet", 1840-41, Volume 1; Page 825.
[b] "Lancet", 1839-40, Volume 2; Page 843.

arturition; but the reason of this is, for the most part, mechanical. Inammation, if not the cause of menorrhagia in women who are not pregant, and have not lately been delivered, is, at any rate, a very common ttendant circumstance. Menorrhagia that has nothing to do with imregnation, is generally of an inflammatory character. An inflammatory ate very often produces hæmorrhage from the intestines and urethra.

In the head, and from the lungs, the stomach, and the intestines, hæmorage often arises from merely mechanical causes;—from ulceration, or olution of continuity. One cause of hæmorrhage in the head (apoplexy), brittleness of the vessels, or tenuity of them, or ulceration of the bloodessels of the head. Hæmorrhage from the lungs often arises from a mere nflammatory state of the bronchia, or of the air-cells,—constituting pneuonia. In phthisis, nature endeavours to prevent hæmorrhage by forming dhesions, and plugging and contracting arteries; but sometimes an ulcer vill produce hæmorrhage, and even sudden death. With regard to the omach, hæmorrhage will sometimes occur from ulceration; and death may e the consequence. The same thing will take place in the intestines. here may be an ulceration of even a malignant character; and, every now nd then, profuse hæmorrhage is the consequence. It will also come on, n many of these parts, from mechanical violence. It is very common for person to spit blood after a blow on the chest, or a fall. It is also common o void bloody urine after a blow upon the loins; and to discharge blood om the intestines after a fall.

Not only may there be profuse hæmorrhage from the mucous membrane f the bronchia, from the stomach, from the intestines,—from the interior of ne kidneys, and from the urinary bladder; but other parts are sometimes the eat of fatal hæmorrhage. I have known hæmorrhage take place into the ericardium, and prove almost instantly fatal; and cases of sudden and atal hæmorrhage into the spinal sheath, without any evident cause, are ecorded. In fatal cases of hæmorrhage into the pericardium, the heart nd the pericardium have been found soft. It was so in the case which I aw; and, as far as I can ascertain, it was so in other instances.

CHAPTER III.

PROFLUVIA.

Fluxes, catarrhs, or profluvia[a], form the next class of affections which we shall notice. They are precisely similar, in principle, to hæmorrhage; and occur from those parts which are most frequently the source of the latter;—namely, the mucous membranes. Fluxes occur particularly from the nose, the bronchia, the intestines, the bladder, the urethra, and the vagina. Those parts which, during inflammation, frequently pour forth blood, will also, during the same period, pour forth a much increased secretion. In the first instance, their secretion is increased; it afterwards declines, but does not come down to the standard of health; and then, as the inflammation subsides, the secretion becomes excessively abundant. Inflammatory or catarrhal fluxes may therefore occur from the mucous membranes;—like the inflammatory hæmorrhages; and, after all the signs of inflammation have subsided, these discharges frequently continue. There is, however, another form, in which no inflammation is to be discovered;—the mucous membrane pouring forth a considerable quantity of liquid, for some time; and that without the occurrence of any signs of inflammation. There are *passive* fluxes;—exactly as there are passive *hæmorrhages*. The only difference is, that in the one case *blood* is poured out, and in the other a *secretion*.

Inflammatory and Uninflammatory Discharges.—I mentioned, that the skin—which has some relationship to mucous membrane (since it is developed from the latter)—will occasionally, though in very rare cases, pour forth blood.[b] The skin, however, will every day pour forth an immense quantity of its own secretion. The term "*flux*", "*catarrh*", or "*profluvium*", would not be given to a discharge from the skin; but, just as the mucous membranes pour forth their discharges in excess, so frequently does the skin. Profuse sweating is analogous to profuse discharges from the mucous membranes. We have sufficient proof that excessive discharge from the skin is, more frequently than not, quite devoid of an inflammatory character. In fact, in the highest debility, that of syncope,—or of death, the skin will secrete most abundantly. Just so it is, undoubtedly, with respect to the mucous membranes. They will secrete most abundantly, without any signs of inflammation at all. It has been imagined, that whenever a mucous membrane secretes in excess, it must be in a state of inflammation; but I think the instance of the skin, which is alluded to by Andral, is sufficient to show that the mucous membranes likewise may be in a similar state, without any inflammation. He remarks, that the skin will secrete in the greatest abundance,—will sweat profusely, without any marks of inflammation. This instance of the skin would enable us to say, *à priori*, that the same thing is possible with respect to the mucous membranes. But I think, *à posteriori*, we can assert that mucous membranes will secrete most abundantly, without inflammation; for after fluxes these

[a] From "profluo", *to run down.*

[b] See Page 147.

membranes are often quite pale after death;—just as they often are after passive hæmorrhage. It appears to me to be a case analogous to that of inflammation itself; and also to that of hæmorrhage. I think there may be an *active* secretion from the mucous membrane, and from the skin, as in acute rheumatism; or that it may be entirely *passive*,—without any mark of inflammation.

[The division of profluvia into active and passive, adopted by Dr. Elliotson, is that which is ordinarily recognised. The word "*active*", however, does not, with any precision, convey a knowledge of the general conditions of the system under sthenic discharges. In the acceptation of this term, it must not be allowed to respect exclusively the inflammatory action existing in the part from which the morbid secretion proceeds. Since this local state is not essential to the occurrence of active profluvia. It is known that the *blood*, in many contagious and epidemic diseases, attended with inordinate secretions, without any actual inflammation in the surfaces from which they proceed, exhibits in a marked degree the inflammatory crust. In such cases,—which for the most part implicate the mucous tracks of surfaces, in addition to a reflux of blood to the follicular or other glands connected with the membranes,—there is a known alteration in the quality of the blood. Dr. Charles Williams regards the disease which he denominates "bronchorea", or "humid asthma", as an illustration of the pathological conditions above described. In the *passive* kinds of fluxes, the altered constitution of the blood is accompanied with marks of general laxity and debility. In elucidation of this state, profuse sweats, "diabetes insipidus", inordinate secretions of bile and saliva, and mucous and serous discharges, might be enumerated.

With reference to the *anatomical characters* of this latter class of affections, Dr. Charles Williams remarks that, "in bronchorea, the air-tubes discover little or no trace of inflammation of the mucous membrane. It is sometimes a little thickened and softer than natural,—from the infiltration of serum, and sometimes it is perfectly *pale*. The nature of the discharge, and the absence of febrile symptoms in the subjects whom it affects, lead us to consider pituitous catarrh as a *profluvium*, depending upon a laxity, want of tone, or a mechanical obstruction of the pulmonary and bronchial vessels, rather than upon inflammation."[a]—*Thomas Williams.*]

Treatment.—The treatment of these fluxes is precisely the same as the treatment of inflammation or of hæmorrhage. If they be of an active kind,—attended with strength of pulse, pyrexia, heat of body, pain of the mucous membrane itself,—the pain that is characteristic of inflammation of a mucous membrane, and is increased by pressure,—astringents are altogether improper. At any rate, they are altogether useless;—just as they are in active *hæmorrhage*. It would be as absurd to attempt to cure these discharges by astringents,—to stop the discharge of gonorrhœa, for example, during the violence of the inflammation, by an astringent injection,—as it would be to attempt to stop by such means an active hæmorrhage. We have only to lessen the inflammatory state by bleeding, and the discharge will become diminished, or be put into a course of diminution. Perhaps there will be a momentary increase; but it is followed by a diminution, similar to that which occurs in an active hæmorrhagic process. When there is no inflammation present, or the inflammation is subsiding, we may apply local means, as stimulants and astringents, with the greatest advan-

[a] "Library of Medicine", Volume 3; Page 85.

tage. If it so happen that no inflammation occurs from the very beginning, we may at once apply stimulants and astringents. The instance of the urethra is a good illustration of all that occurs in the various mucous membranes of the body. I have remarked [a] that, in inflammation, an increased secretion may happen, both of which are only to be subdued by anti-inflammatory measures; but that at last there may be only a passive discharge; and then anti-inflammatory measures will increase the mischief: stimulants are therefore to be resorted to. Sometimes there will be so little inflammation, that it may be disregarded from the very first. It is quite the same in diarrhœa. In diarrhœa, frequently, the best remedy is to bleed the patient, to starve him, to leech the abdomen, and to blister him; to give no astringents whatever, but sometimes even moderately to purge, —in order to increase the effect of the treatment: the inflammatory state will then subside. In other cases, we have to give astringents and opiates, and support the patient well; and in that way he recovers. It is the same, too, in bronchitis. In active bronchitis, any remedies which stimulate the air-passages, would be highly injurious. It is only necessary to bleed the patient well, to enjoin abstinence, and to treat him as labouring under inflammation; and the discharge of mucus gradually subsides. In an old man, however, a profuse discharge may take place from the bronchia; —forming what is called "catarrhus senilis"; without inflammation, but accompanied with emaciation and paleness. Tonics and good nourishment form essential steps in the treatment. Such stimulants as snake-root (*Polygala Senega*) answer the purpose best.

[a] See Page 156.

CHAPTER IV.

DROPSY.

Definition.—The next class of affections that we have to consider, belong entirely to serous membranes, and the interstices of the serous cellular tissue. In these cases, fluid is secreted in such excess, that the ordinary powers of absorption are inadequate for its removal; and as the serous cavities of the body are shut sacs, the fluid does not escape, as it does from mucous membranes; so that, instead of a discharge or flux, *dropsy* is the result.

[But the term "*dropsy*" has likewise been applied to collections of serous or other liquids in cysts; which are themselves preternatural;—having been formed, or greatly enlarged and altered, by some morbid process. Those effusions which occur in serous cavities, as the direct result of inflammation, ought not to be denominated "dropsy." Nor is every collection of serous fluid found in the shut cavities of the *dead body*, and independent of inflammation, to be considered a dropsy. For this is oftentimes only a physical, post-mortem phenomenon,—arising from the accumulation of blood in the venous system; the tissue of which, becoming lax from commencing decomposition, allows the serous portion of the blood to transude with greater facility.

Ought Dropsy to be considered a Disease?—It has been said, with much truth, that dropsy is rather a symptom of disease than a disease itself; and that it would be more philosophical to treat of the original malady on which the accumulation of fluid depends, and to withdraw dropsy altogether from the class of substantive diseases. But there are considerations which entitle us to regard dropsy as still constituting a genus of disease, and particular dropsies as specific forms of disease. For, allowing that dropsy is often or always a symptom, it is one which, in many instances, we cannot trace home during life, or satisfactorily ascribe to any organic change discoverable after death; so that, practically speaking, the dropsy in such cases is the disease and sole object of our treatment. Moreover, the liquid accumulation is a symptom very obvious and striking in itself, while it results from various physical alterations, differing both in their seat and in their nature; and it will be useful to study dropsies collectively;—if it be only with the view of analyzing them, and of referring them, as often and exactly as possible, to the pre-existent disease.

Dropsy is, in fact, to a medical eye, in all cases something more than an effect or symptom of disease. The fluid collection itself is a cause of various other symptoms;—of symptoms which often constitute the greater part, or the whole, of the patient's distress and danger. The imprisoned liquid, by its weight or pressure, may embarrass important functions, or even extinguish life. The removal of the dropsy will frequently restore the patient at once to comparative comfort; or indeed to what, so far as his sensations and powers and belief are concerned, is for the time to him a state of health; although the original bodily cause, of which the dropsy was a symptom, may remain behind untouched;—to be again productive of similar consequences, under circumstances favourable to its operation. Sometimes it happens that the bodily change which is the immediate cause

of the dropsy, is slight or temporary; while the patient's comfort, and very existence, are compromised by the mere accumulation of the water; and if this accumulation can be remedied by art, its temporary producing cause may cease, or be removed, or admit of compensation; and so the patient may be strictly restored to sound health. In a dropsical person, then, whose dropsy results from organic disease, there are plainly two sets of symptoms to be distinguished; namely, those which depend upon the primary disease, and those which are caused by the collection of water. And these two sets of symptoms differ, perhaps, not only in their gravity and importance, but also in their obedience to treatment. The latter, usually the most grievous, may often be got rid of; the former are frequently but little complained of or felt by the patient, but are generally permanent.

Dropsy would perhaps be thought by many a more attractive subject, if it were not so commonly considered incurable. But the preceding remarks may suffice to show that, as far as itself is concerned, it often *is* curable; and some of its forms will hereafter appear to be curable in a more absolute sense;—the serous collection, and the condition from which it proceeds, both admitting of remedy. Besides: it is our business and aim to cure it when we can; and, whether we can cure or not, to remove or mitigate human suffering; and this we are able to do, to a very considerable extent, in many or in most cases of dropsy.

Different Forms of Dropsy.—Wherever there is a shut sac, or wherever there is loose and permeable cellular tissue, there we may have dropsy. Thus, there may be dropsy of the ventricles of the brain, or of the meshes of the pia mater,—producing death by *coma*; of the cellular tissue of the lungs, or of the submucous tissue of the larynx,—both leading to death by *apnœa*[a]; or of the pericardium,—causing death by *syncope*. Almost every mode of dying, therefore, may result from dropsical accumulations.

When the cerebral ventricles are distended with water, we express the diseased condition by the term "*hydrocephalus.*" When serous fluid occupies the pleura, or the pericardium, we say the patient has *hydrothorax*, or *hydropericardium*. If the cavity of the peritoneum be the seat of the collected water, we call the complaint "*ascites.*" When the cellular tissue of a part becomes infiltrated with serous liquid, the part is said to be *œdematous*; and "*anasarca*" is the name given to the more or less general collection of serum in the cellular tissue throughout the body, and especially to visible subcutaneous œdema of much extent. Under the term "*general dropsy*" we signify the simultaneous existence of anasarca, and of dropsy of one or more of the larger serous cavities.

Certain forms of dropsy—for example, dropsy of the *tunica vaginalis testis* ("hydrocele"[b]) and dropsy of the joints and bursæ ("hydrarthrus"[c])—belong to surgery, and need only to be glanced at for the sake of elucidating the general subject.

SECTION I.—GENERAL PATHOLOGY OF DROPSY.

Under what conditions, and by what mechanism, do the hollows and interstices of the body become thus filled and oppressed with water? In other words, what is the general pathology of dropsy? It is an ultimate fact, that from all the surfaces of the healthy living body there is continu-

[a] From α (privative) *without*; and πνεω, *to breathe.*

[b] From ὑδωρ, *water*; and κηλη, *a tumour.*

[c] From ὑδωρ, *water*; and ἀρθρον, *a joint.*

ally going on a kind of secretion, or oozing forth of fluids. The inner surfaces of the shut cavities, and the partitions of the cells of the cellular tissue, furnish no exceptions to this law. If we examine the interior of an animal just slaughtered, or observe a cavity laid open in the human body, (by accidental injury,) we find that their inner surfaces are *moist;* and, indeed, we may see the fluid escape into the colder atmosphere, in the form of vapour. We perceive, also, that the surface is merely moist. The fluid in these shut cavities, during life and health, being taken back again into the circulating blood as fast as it exudes, the two processes of exhalation and absorption are accurately balanced. The disturbance of this equilibrium would account for dropsy.

Now, considering the matter hypothetically, we perceive that the balance may be deranged, and the dropsy arise, in one or both of the two following ways. Either the quantity of fluid exhaled may be over-abundant; or the amount of absorption may be deficient; or both these deviations from the natural state may occur together. It is obvious, that dropsy will ensue whenever the exhalation takes place faster than the absorption; and this may happen when both are in excess, or both defective. The inquiry may be reduced, however, in the first instance, to these two questions:—"Is there ever a preternatural amount of exhalation? Is there ever defect of the natural absorption?" An affirmative answer to either question, would *explain* the occurrence of dropsy. So, *à fortiori*, would an affirmative answer to both.

These inquiries being satisfied, another point would require to be investigated; namely, whether the product of the exhaling process may not be liable to variation in quality, as well as in amount;—whether the liquid actually accumulated in dropsy, is essentially identical with the liquid naturally exhaled. Are there, then, any known facts which accord with the hypothesis of a preternatural exhalation or pouring out of the serous liquid? There are; and in order to appreciate them, it will be necessary to bear in mind some further physiological truths. Reference has already been made to the perpetual separation of watery fluid from all the surfaces of the body;—the external, and those which communicate with the air, as well as the inner faces of the closed cavities. The fluids that exhale from the former class of surfaces are, for the most part, excretions. They are thrown out of the system; and, with respect to these, something more has been ascertained. It is observable, that when the escape of aqueous fluid from one such external surface is checked, exhalation becomes more copious from some other excreting surface or organ. And there are special sympathies of this kind established between certain secreting parts. It is probable that, so long as other circumstances remain the same, the aggregate amount of water thus expelled from the system cannot vary much, in either direction, without detriment to the individual,—manifested by symptoms. But we are sure that the quantity furnished by each secreting surface, may vary and oscillate within certain limits consistent with health;—provided the defect or excess be compensated by an increase or diminution of the ordinary expenditure of watery liquid through some other channel. Sound health admits and requires this shifting and counterpoise of work between the organs destined to remove aqueous fluid from the body. The sympathy, or compensating relation here spoken of, is more conspicuous with regard to some parts than others. The reciprocal but inverse accommodation of function that subsists between the skin and the kidneys, affords the strongest and the most familiar example. In the warm weather of summer, when the perspiration is abundant, the urine

is proportionally concentrated and scanty. On the other hand, during winter, when the cutaneous transpiration is checked by the operation of external cold, the flow of dilute water from the kidneys is strikingly augmented. All this is well known to be compatible with the maintenance of the most perfect health. But supposing the exhalation from one of these surfaces to cease or to be diminished, without a corresponding increase of function in the related organ, or in any organ communicating with the exterior, then dropsy, in some form or degree, is very apt to arise. The aqueous liquid, thus detained in the blood-vessels, seeks, and at length finds, some unnatural and inward vent; and is poured forth into the cellular tissue, or into the cavities bounded by the serous membranes.

If water be injected, in some quantity, into the blood-vessels of a living animal, the animal soon perishes;—generally dying by coma, or by suffocation: and when the carcase is examined, the lungs are found to be charged with serous liquid; or water is discovered in the cellular tissue of some other part, or in the shut serous membranes. If, however, the animal be first bled, and then a quantity of water, equal to the quantity of blood abstracted, be injected, the injection is followed by no serious consequences.

It has been ascertained, that animals (dogs, cats, and rabbits) survive the extirpation of both kidneys for a space of time varying between ten hours and nine days. Copious and very liquid evacuations from the intestines, vomiting, and fever precede their death. Clear serum is found in the cavities of the brain, the bronchi are full of mucus, the intestines of liquid fæces, and the blood is more than naturally aqueous. So in the disease called "ischuria[a] renalis[b]", the secretion of urine is suppressed; death by coma ensues; and the web of the pia mater, or the cerebral ventricles, are often found full of water. In cholera, there is suppression of urine for as long a space; but the brain is unaffected; for the system is drained of its water by the profuse discharges from the stomach and bowels. Conversely, in diabetes the skin is permanently dry;—the kidneys pour forth their altered secretion with a fatal prodigality.

The several classes of facts which have now been briefly brought into view, throw a strong light upon a confessedly obscure part of pathology. It appears that, in various circumstances, the blood-vessels may receive a considerable and unwonted accession of watery fluid; and that they are very prone to get rid of the redundance. When they empty themselves through some free surface, their preternatural distension is relieved by a flux; if, on the other hand, the surface be that of a shut sac, in discharging their superfluity they cause a dropsy. Why sometimes *one* organ, and sometimes *another*, is selected as the channel by which the superabundant water shall be thrown out of the vessels, is a matter concerning which we can seldom render any satisfactory account. We often find it difficult to determine which of the two facts in question is to be considered the antecedent, and which the consequent. For not only is it true that, when the blood-vessels become overloaded with serous fluid, they readily deposit a part of it; but it is also true, that when they are in the opposite condition of comparative emptiness,—when they contain less blood than is natural, they are equally ready to replenish themselves, by absorbing fluids from any source to which they can find access. In the case of an individual who was cured of his hydrocele upon the occurrence of profuse watery discharges from the stomach and bowels, it seems clear that the expenditure of serous liquid from one part, led to its absorption into the

[a] From ἰσχω, *to restrain*; and οὐρον, *urine*. [b] From "ren", *the kidney*.

blood from another. When anasarca suddenly leaves the extremities, or ascites the abdomen, and fatal coma follows, it appears probable that the absorption is the first of the changes, and the effusion the second; and had this effusion been determined to the mucous membrane of the intestines, to the skin, or to the kidneys, it would have brought relief and safety to the patient, instead of causing his death.

We have obtained, then, a glimpse of one or two most important principles, with respect to the pathology of dropsy:—the blood-vessels, when preternaturally full of aqueous fluid, have a strong tendency to empty themselves; when preternaturally empty, they readily drink up watery fluid wherever they come into contact with it. From the discharge of their superfluity of water, arises a dropsy or a flux. The cause and the cure of many dropsies, lie in these propositions.

Active Dropsy.—The dropsies hitherto considered,—resulting from the rapid as well as preternatural pouring out of fluid by the blood-vessels,—compose an especial class of dropsies; in which the arterial system is more concerned than the venous, and to which the term "*active*" has sometimes been applied. For the sake of convenient distinction, and in conformity with established usage, we shall retain that epithet. But the number of these active dropsical effusions quite independent of inflammation, is small when compared with the whole number of dropsies. The state of the part from which the effusion proceeds, borders closely upon inflammation. The condition of its capillary circulation, has been regarded as intermediate between that in which the ordinary quantity of secretion is maintained, and that in which inflammatory effusion takes place. The increase of secretion is analogous to what we observe in other parts of the body;—to the abundant perspirations, for example, that are occasioned by violent exercise; to the increased flow of tears caused by any irritation of the eye, or by the passion of grief; to the augmented watery discharges from the mucous membrane of the bowels, produced by purgative drugs;—all of which may be independent of inflammation, but all of which are attended by congestion, that may easily be pushed into inflammation; and it is obvious, that if the secretions just referred to were poured forth into closed cavities, instead of proceeding from surfaces that are situated on the exterior of the body, or communicate readily with the exterior, they would constitute dropsies.[a]]

Inflammatory Dropsy.—By far the larger number of those dropsies that are called "active", are of an inflammatory character; and require to be treated, not by diuretics, but simply by the remedies of inflammation. In the arachnoid, the pleura, and the pericardium, for instance, dropsy is frequently attended with the most decided inflammation, both acute and chronic. Sometimes, though not so frequently as in the cases just mentioned, we see dropsy in violent inflammation of the abdomen; but very often ascites itself is a decidedly inflammatory disease. In such cases, the usual signs of inflammation of a serous membrane occur. When the affection is situated in the arachnoid, we have pain of the head, intolerance of light, perhaps squinting, and great quickness of pulse. In inflammatory dropsy of the pleura, pain in the side, dyspnœa, and cough, form conspicuous symptoms. With respect to the pericardium, we have pain in the region of the heart, perhaps a rapid pulse, palpitation, and pain darting from that organ in various directions. In the case of the abdomen, the pain is considerable, and is increased on pressure. All these affections are of an inflammatory character,

[a] "Library of Medicine"; Volume 5; Pages 97 to 101.

and tend to induce more or less effusion in every case; but occasionally the effusion is very considerable; and then the word "*dropsy*" is applied to the collection.

Passive Dropsy.—[A much larger class of dropsies commence in defective absorption. There is no sudden and profuse gush (as in the former class) from the overladen blood-vessels; but the fluid which is healthfully and unceasingly exhaled from the serous surfaces, fails to find its way back again into the blood, and gradually accumulates. The mechanism of the morbid process is commonly as follows:—Some cause retards the current of venous blood: hence the veins, and the capillaries by which they are fed, become distended; and this distension constitutes an impediment to the further admission of liquid. Absorption is sluggish, or at a stand. To dropsies thus originating, we give the name of "*passive.*" The venous system is more concerned in them than the arterial.

But we have still to show more clearly, that dropsies may and do originate in this manner. The agency of the blood-vessels in the production and removal of dropsy, has not been sufficiently recognised till of late; or perhaps it should rather be said, that more importance used to be assigned to the agency of the lymphatic absorbents, than they are really entitled to. Pathologists, even of recent date, speak of a want of tone or energy in the absorbing vessels—of the superfluous fluid of the part not being adequately taken up by the enfeebled absorbents;—meaning, thereby, the absorbents properly so called. And this view of the matter—connecting dropsy always with debility as its cause—has infected the whole pathology of the disease, and led to a corresponding mode of treatment;—the object aimed at being the stimulation of the absorbents to more vigorous action. This obvious difficulty, however, presents itself at once to the theory, that dropsy results from deficient activity of the absorbents: namely, that absorption goes on, and to a very great degree, in dropsical patients. Their adipose matter disappears;—they get miserably thin. There is no complaint in which emaciation goes to a greater extent than in dropsy. It is found, also, that persons afflicted with anasarca become readily enough affected by mercury; which, of course, must be absorbed before it can produce any of its specific effects.

Physiology of Absorption.—It must be confessed, that our knowledge respecting absorption is neither complete, nor absolutely certain; but there appears good reason for supposing, that the process is shared between the lacteals, the lymphatics, and the veins; and, probably, somewhat in this manner:—that the lacteals absorb the chyle from the surface of the intestines, and convey into the blood the materials for its renovation; that the office of the lymphatics is to take up and carry into the blood, that effete portion of the solid constituents of the body which requires to be removed, to make way for a fresh deposit; while the veins imbibe the serous fluid exhaled from the surfaces of serous membranes, and into the meshes of the cellular tissue, as well as poisonous and other substances that are soluble and dissolved in that fluid.

Now, if this be so, one of these last sets of absorbing vessels,—the lymphatic apparatus or the venous,—may continue to perform its office, while the other fails to do so. This theory is sufficiently consistent with the actual phenomena of dropsical disease; and, whether it be altogether true or not, a part of it is certainly true;—that, namely, which assigns to the veins a large share in the whole process of absorption. The experiments of Magendie, Fodéré, and others, are quite conclusive upon that point. It has been proved, that fluids may pass into and out of the veins

through their parietes, independently of any vital process, and by mere physical imbibition and transudation; so that when the veins are distended to a certain point with watery fluid, the introduction of more of the same fluid through their coats is impeded or prevented; and when the distension is still greater, the aqueous part of the blood may even pass, in the other direction, out of the vessel. On the other hand, when the veins are comparatively empty, the serous fluid passes readily into them; or, in common language, is absorbed. Venous absorption is explicable, therefore, upon the principles of endosmose and exosmose,—as laid down by Dutrochet; or rather (according to professor Daniel's happy generalization of Dutrochet's facts) by the theory of heterogeneous attraction. Imbibition, being a form of that attraction, belongs in various degrees to all the tissues of the body. Its rapidity, and even its direction, with respect to the sides of a vessel surrounded by fluid, and also carrying fluid of a certain consistence, must vary with the varying distension of the vessel. When the vessel is moderately full, the exterior fluid passes uninterruptedly inwards, and is conveyed away by the internal current. When, on the other hand, the vessel is much distended by its contents, the contained fluid, or its thinner part, passes continually outwards. And there is an intermediate degree of distension, at which the pressure is just enough to prevent the transit of fluid in either direction. Magendie found, accordingly,—in an ample, well conducted, and conclusive series of experiments,—that by regulating the conditions of comparative emptiness or fulness of the circulating system, he could accelerate, retard, or altogether suspend the operation of a poison dissolved in the humours of the body. In other words, he could thus accelerate, retard, or prevent the process of absorption or imbibition through the blood-vessels. If we are once satisfied of the absorbing and transmitting property of the sides of the vessels, we shall have no difficulty in perceiving how any mechanical obstacle, occurring in a venous trunk, may give rise to dropsy.

Having then deduced, from physiological data, that dropsy may occur from mechanical obstruction in any of the larger venous trunks, let us, in the next place, ascertain whether, in point of fact, it ever has this kind of origin. The truth of this was first determined, experimentally, by our countryman Dr. R. Lower; who, though these experiments were not instituted with any reference to the pathology of dropsy, perceived their bearing upon that subject;—as appears from the following remark:—"Quantum hæc ad ascitis et anasarcæ causas investigandas conducant, aliis judicandum relinquo."[a] In one of these experiments, he applied ligatures to the jugular veins of a living dog; in two days the dog died; and the cellular tissue about the head and face was found to be distended, not with blood (as Lower had anticipated), but with clear and limpid serum. In another experiment, he tied the *vena cava* just after it emerged through the diaphragm; in a few hours the animal died; and a large quantity of fluid, precisely similar to the fluid of ascites, was found in the peritoneal sac. These results have been confirmed by more modern and conclusive experiments; and afford a satisfactory explanation of nearly every form of local dropsy, or even general anasarca.[b]]

Dropsy from Obstruction.—As in many cases of hæmorrhage the flow of blood proceeds from mechanical obstruction, so does the same occurrence take place in dropsy. If great obstruction take place in any of the

[a] "Library of Medicine"; Volume 5; pages 101 to 103.

[b] "The bearing of these investigations on the causes of ascites and anasarca, I leave to the judgment of others."—"*Tractatus de Corde*", *by Richard Lower, M.D.*; 1669; *Page* 82.

veins, dropsy must be the consequence. Local, and more or less extensive plethora takes place, in all the vessels on the other side of the obstruction. As a mere physical effect, the watery parts of the blood ooze forth from their extremities; and the part becomes more or less turgid,—from the great serous congestion. There is every reason to believe, that the swelling of the leg after parturition, called "phlegmasia dolens", depends upon mere mechanical obstruction. There is more or less œdema of the leg; and it usually arises (according to Dr. D. D. Davis and others) from obstruction.[a] There is an obstruction of the veins at the upper part of the extremity; and perhaps, also, in the veins still higher up. The pressure of a very enlarged womb will often, in this way, induce dropsy of the lower extremities. In cancer affecting the axillary glands, or when the breast is attacked by cancer or scirrhus, an upper extremity becomes œdematous;—simply from mechanical obstruction. It is not necessary that the absorbents should be affected; for if the veins be obstructed, the same effect is produced. A local plethora takes place;—both of veins and capillary vessels. These pour forth a watery secretion; and dropsy is sure to occur at last;—simply as a mechanical effect.

If the obstruction occurs at that point where all the veins of the body meet, anasarca of the universal cellular tissue, and an accumulation of fluid in all or most of the serous cavities, supervene.

Dropsy from Debility.—It frequently happens, however, that general dropsy arises from debility. The patients are exceedingly pale, with a very weak pulse, and extreme debility of the whole frame. In these cases, the more they are weakened, the worse they become;—the more does the dropsy increase. When there are no signs of inflammation,—no fulness of pulse (for there may be quickness without fulness), but (on the other hand) debility, and when the powers of the patient are becoming exceedingly reduced, the disease must be put upon a footing with passive inflammation, or passive hæmorrhage, or a passive discharge,—a gleet from a mucous membrane; and every thing which debilitates the body will make the matter worse. This will be the case if the dropsy arise from visceral disease; such as disease of the liver,—a liver full of tubercles, or indurated; scirrhus, or carcinoma of the womb; or ulceration of the lungs.

[But, independently of debility arising from organic disease, dropsy may arise purely from debility of the heart;—producing a serious retardation of the venous circulation. We see this every day in weak, chlorotic girls, with bloodless cheeks and pale lips. Such persons have weak and flabby voluntary muscles; and it is reasonable to presume that the involuntary muscles (of which number the heart is one) should partake of the general feebleness of the muscular system, and become incapable of performing their office with proper energy.

Nay, it is credible and likely, that a feeble heart may in these circumstances yield a little, and dilate under the resisting pressure of the blood which enters its chambers; and that, in this way, the occasional but temporary bellows-sound may arise;—in consequence of the altered relation between the cavities of the heart and their outlets. And the *juvantia* and *lædentia* confirm this view of the matter. If, tempted by the pain complained of by the patient, or by the violence with which her overtasked heart is throbbing, we take away blood, we find that, whatever present relief she may experience, she is ultimately weakened by the depletion.

[a] It is, however, the belief of more recent pathologists, that there is, in addition to the obstruction, a peculiar inflammation induced in the coats of the affected veins;—having no tendency, like common phlebitis, to spread.

On the other hand, if we give her steel, feed her well, and administer the cold shower-bath, we find that she regains her lost strength;—that colour returns to her lips and cheeks, her palpitations cease, and her dropsy departs. In proportion as the muscular system in general receives fresh tone and vigour, does that particular muscle, the heart, recover the degree of power necessary for the effectual discharge of its proper function; which is very much that of a forcing-pump. Such is the way in which we would explain both the dropsy and its cessation. In such cases our patients do not simply recover;—they are cured; and we would apply the same explanation to some other forms of dropsy. Andral describes a certain cachectic condition of the body, as being a cause of dropsy;—persons may be bled into a dropsy, and starved or weakened into a dropsy. These are genuine instances of dropsy from debility;—such as the ancients conceived all dropsies to proceed from. It may be that the thin or watery condition of the blood,—induced by frequent bleedings, by insufficient nourishment, by poisons, or by other causes,—may facilitate its escape through the sides of the vessels; but it seems more probable, that all dropsies arising in the circumstances just referred to, and without any apparent organic disease or change, are mainly, if not entirely, to be ascribed to debility of the heart; and, viewed in this way, they are all brought under the same general principle; namely, the retardation of the blood in the veins, and the consequent preternatural fulness of the blood-vessels. All passive dropsies, at least in our opinion, may ultimately be referred to this principle. This principle being once admitted, several other phenomena, which could scarcely be adduced in proof of its soundness, may find in it their explanation, and thus serve to confirm its truth. Persons of a full habit are observed to perspire readily and profusely; and it is asserted, that if such persons are bled, the tendency to perspiration either yields entirely, or is sensibly diminished.

Different Forms of Dropsy Contrasted.—In the preceding remarks, extreme cases have been taken to elucidate the two classes of dropsy, that have been respectively denominated "active" and "passive." It may help towards a clearer notion of the pathology of which we are in search, if we contemplate the points of resemblance and the points of distinction between the two forms. They resemble each other in the result; namely, in the collection of serous liquid in the circumscribed cavities and vacuities of the body. They differ in the rate at which the collection augments.

In well-marked acute cases the liquid is rapidly effused, in quantity much exceeding the natural amount of exhalation. In well-marked chronic cases, the exhalation goes on as usual; but the fluid exhaled is not taken back again into the circulating vessels with sufficient facility. In the one case, the circulation is disturbed and tumultuous; in the other, it remains tranquil. It is probable that, in the more acute forms, the serum passes through the coats of the arteries, or of the capillary vessels next adjacent to the arteries. In the completely chronic form, there is a defect of absorption by the veins.

But there are intermediate degrees, in which it appears that the full veins are not only unable to admit a new supply of aqueous liquid, but also to retain that which they already hold; and serosity exudes from them also.

What connects all these forms of dropsy, is a preternatural fulness in some part, or the whole, of the hydraulic machine. And this seems to be the great key to the entire pathology, as well as to the remedial treatment, of the disease.[a]]

[a] "Library of Medicine"; Volume 5; Pages 105 to 107.

Characters of the Fluid.—With regard to the fluid of these various dropsies in the chest (the pleuræ and the pericardium), in the peritoneum, and in the head, it is sometimes perfectly clear; but more frequently it is at least turbid;—not transparent, though translucent. Sometimes it is very turbid indeed; and sometimes bloody. The fluid which forms the swelling, in anasarca, is perfectly clear; as is proved by the operation of acupuncture. If we make a minute puncture of the skin, with the point of a needle, (which is acupuncture,) a bead of fluid, beautifully transparent, follows. In the case of chronic dropsy within the head,—chronic hydrocephalus,—the collection of fluid is almost like rock-water. In chronic hydrocephalus, more frequently than otherwise, the fluid is collected within the ventricles of the brain; and this fluid is very little different from pure water. It contains the least possible quantity of animal matter and salts. I believe the fluid of chronic hydrocephalus comes nearest to pure water, of any fluid that is morbidly collected in the body.

The Fluid sometimes Shifts its Place.—The swelling, of course, is most considerable where gravity directs the fluid in the greatest quantity; so that any part which is dependent, becomes much more swollen in consequence; and we may regulate the swelling, by regulating the posture of the part. But sometimes the swelling will shift, independently of any particular position. Where a person is lying straight in bed, one day one arm will be swollen, and the next day the other. Sometimes it will shift to the leg, and then return to the arm again. This is a remarkable circumstance; but one that does occur continually, without any connexion with posture.

Prognosis.—I did not mention any particulars for forming a prognosis, in cases of hæmorrhage, or in the case of the various fluxes; because the prognosis is only to be made by observing the degree of disturbance on the one hand, and the strength of the patient on the other. In dropsy, we must of course follow the same rule; but as dropsy, when it is not inflammatory, so frequently depends upon organic disease, our prognosis will depend, in a great number of cases of a chronic character, upon the evidence which there is of organic affection. We have also carefully to note, in giving a prognosis with regard to dropsy, whether, although the dropsy improves, some other symptom does not continue or get worse. Dropsy will sometimes diminish rather suddenly; and the patient, so far from being better, (although that is apparently the case,) will die within a very short time. Sometimes, a short period before death, all the external symptoms of dropsy have diminished. Sometimes ascites will nearly disappear, or greatly improve at last; and œdema of the legs and the whole body diminish very considerably; and yet the patient will speedily die;—perhaps of apoplexy, perhaps of effusion into the chest. We must not be satisfied with the disappearance of any of the symptoms of dropsy. We must also carefully observe whether there are not still sufficient symptoms of mischief within, to make us fear the result of the case. Very frequently the severest symptoms may still exist; and may soon exhibit the most dangerous character, after a dropsy has spontaneously diminished.

Having now given a sketch of the general pathology of dropsy,—let us, in the next place, trace out the peculiar features of each of its leading varieties.

SECTION II.—ACUTE OR FEBRILE DROPSY.

Anasarca frequently exists alone, as an acute febrile dropsy; sometimes as a chronic affection;—without, however, any indication of organic disease

during life; though perhaps, after death, we may find extensive organic disease of the kidney or heart.

Signs of Febrile Dropsy.—When dropsy occurs in the cellular membrane,—that is to say, when it contains a preternatural quantity of fluid,—we have a white, soft, and inelastic swelling of the surface; which swelling pits upon pressure. The swelling may sometimes be red; because the skin may become inflamed, as well as the cellular membrane beneath. It sometimes is not soft, but intensely hard;—owing to the high degree of inflammation of the cellular membrane, and the fibrinous nature of the effusion.

When this dropsy of the cellular membrane is sudden and febrile, it generally is more apparent in the face, than anywhere else; and I believe the reason to be, that it generally arises from cold, and the cold is more frequently applied to the face than any other part. Usually, when these collections take place,—wherever they may be seated,—the urine is scanty; but when the cellular membrane is the seat of the affection, and the affection is of an inflammatory nature, it is very common to see the urine of its natural quantity;—nay, very frequently, I have seen it more than it should be.[a] If we inquire into the state of the head, we commonly find that the patient says it is heavy;—perhaps he has violent pain there; but generally it is heavy. If we press the abdomen, we frequently find tenderness; but, above all, there is generally an inflammatory state of the chest. The patient complains either of pain in the chest or of cough; or if the naked ear, or the stethoscope, be applied to the chest, either the sonorous or sibilous rattles of the bronchia will be detected; or the crepitous rattle which indicates inflammation of the air-cells.

State of the Pulse.—The pulse, in dropsy of the cellular membrane, is frequently hard and full; and it is from the occurrence of the local symptoms of inflammation in the head, chest, or abdomen; from the strength of the pulse; from the suddenness of the occurrence of the dropsy; together with the nature of the causes which have produced it, being such as produce inflammation;—it is from these circumstances that we judge the disease to be of an inflammatory kind.[b] For, although the affection is so decidedly inflammatory, the cellular membrane is not tender. Patients, in general, do not complain of pain, when pressure is made on the surface of the body. Yet the inflammatory nature of the disease is sufficiently shewn by the relief experienced on free bleeding, by the buffed and perhaps cupped state of the blood, and by the nature of the causes

[a] In febrile dropsy, the urine is scanty, deep-coloured, brown, and more or less turbid, like muddy beer. It is full of albumen, also; and its specific gravity is somewhat diminished. Often it deposits a brownish or black sediment,—consisting of small black grains; and sometimes it is red;—either appearance evidently resulting from an admixture of the colouring matter of the blood, more or less changed in its characters. These, indeed, are the phenomena that constitute the link of alliance between febrile and renal dropsies.—"*Library of Medicine*"; *Volume* 5; *Page* 131.

[b] If the serous fluid be the product of inflammation, what is the part inflamed? It cannot be the distended cellular tissue itself; for if so, the inflammation must shift its quarters under the influence of gravity. We are far from denying the frequent agency of inflammation in producing changes which, in their turn, lead to dropsy; but it will be well not to confound those collections of serum mixed with blood or coagulable lymph, which are distinctly events or products of inflammation, with other collections of serum which resemble the former in that respect only, but differ entirely from them in every other particular. To those cases of dropsy occurring suddenly from obstruction of one or more of the usual channels of aqueous excretion, and which are usually attended with considerable disturbance of the whole system, the epithet "*febrile*" would not be inappropriate; though the hot and dry skin, thirst, flushed cheeks, full and hard pulse, and furred tongue, render it necessary, practically, to regard it as an inflammation.—*T. Williams.*

which produced the disease. The local inflammation that exists within the head, lungs, or abdomen, may generally account for the buffy state of the blood, and the relief that is experienced by bleeding; but when the dropsy itself ceases so rapidly as it does after bleeding, it is impossible not to believe, that the dropsy itself was of an inflammatory kind.

Causes.—This inflammatory dropsy of the cellular membrane, more frequently arises from cold and wet, than from any other cause; whereas inflammatory effusion into the arachnoid, pleura, pericardium, and peritonæum, may or may not arise from that source. I hardly recollect a case of dropsy of the cellular membrane, of an inflammatory kind, which did not arise from cold and wet; and it is generally accompanied by inflammation of some internal part; or, if not by inflammation, at least by an inflammatory state. Perhaps it is combined with an inflammatory state of the head;—not with decided phrenitis; but with heaviness, giddiness, and pain. Sometimes it is united with an inflammatory state of the abdomen; but, as far as I have observed, it is much more frequently combined with an inflammatory state of the lungs; either in the form of bronchitis (which is by far the most common) or of pneumonia.

The more chronic kind of dropsy, which appears independent of inflammation, is sometimes united with, and is one of the last symptoms of, structural disease of an internal organ. In disease of the heart, it is very common for a person to become dropsical. In a large number of instances of phthisis, there is œdema of the legs, towards the conclusion of the affection; and when the liver, the uterus, or the spleen is diseased, dropsy is exceedingly common. But anasarca, as only one form of dropsy, often follows others. When a person has fluid in the cavity of the pleura, it is usual for the legs, and perhaps the whole body, to become œdematous. When there is effusion into the peritoneal cavity, it is very common for this *ascites* (as it is called) to be, sooner or later, followed by œdema of the lower extremities; and at last the effusion may become general, and constitute anasarca.

All these particular dropsies closely resemble hæmorrhage and fluxes. Hæmorrhage and fluxes, as already mentioned [a], are frequently of an active inflammatory kind; and are to be treated, not by remedies calculated to arrest the flow of fluid, but by the remedies of inflammation;—not by astringents, but by antiphlogistic measures. On the same principle, inflammatory dropsy is to be treated, not by remedies calculated to carry off the fluid, or stop up the mouths of the vessels which pour forth the secretion, but by remedies calculated to remove inflammation.

Renal Disturbance.—[That the functions of the kidneys—which are, in so great a measure, complemental of the functions of the skin—should sustain a proportional derangement, is what we might expect; and the altered qualities of the secretion—the bloody or albuminous condition of the urine—testify, invariably, the strain which these organs undergo. Sometimes, though not often, death is the early result of the attack; and it is usually preceded by an extreme deficiency, or an absolute suppression of the urinary secretion, and by coma. In all the fatal cases of febrile dropsy that have fallen under our observation, the kidneys have been found large, of a dark chocolate or purplish red colour throughout;—turgid with blood, that seemed to be venous. We regard these appearances as being evidences of excessive congestion, rather than of inflammation; because neither the ordinary and striking symptoms of nephritis, nor the unambiguous products of inflam-

[a] See Pages 150, 156, and 157.

matory action, are usually observed in such cases. We have been informed however, upon good authority, of one instance in which coaguable lymph was found effused in the pelvis of the kidney.

When the disease does not prove fatal at once, the dropsical and other symptoms give way;—either spontaneously, or under the treatment to be hereafter described. But there is much reason for thinking that, unless the overcharged system be speedily relieved, the germ of future and progressive disorganization of the kidneys may be sown. "Febrile dropsy", and "acute renal dropsy", may be considered, without much risk of error, as convertible terms.[a]]

SECTION III.—RENAL DROPSY.

Having, thus far, shewn that febrile dropsy is intimately connected with a disturbance of the renal function, we shall next proceed to the consideration of that form of dropsy, which arises from organic disease of the kidney, and to which the term "*renal dropsy*" has been specially applied. The following are the chief indications which guide us in the diagnosis of these cases:—1. The absence of any direct symptoms of cardiac disease. 2. The complexion of the patient. 3. Occasionally, certain parts of his previous history. 4. Certain conditions and qualities of the patient's urine.

The morbid conditions on which this form of dropsy depends, have been pointed out by Dr. Bright; to whom, indeed, we owe most of our knowledge on this subject. They relate to the size, figure, and consistence of the kidney; and also to the colour and condition of its surface and interior.

a. Morbid Appearances of the Kidney.

Size and Weight.—[The size of the kidney varies greatly. The average weight is about four ounces. M. Rayer has met with some kidneys, in this disease, weighing twelve ounces. The increment and the decrement of the natural bulk belong principally, if not altogether, to the outer secreting portion of the gland. If a longitudinal section of an exaggerated kidney be made, the cortical part is seen to be unduly broad; and the same part is evidently narrow when the whole organ is smaller than common. For this reason, in the latter case, the radiating medullary parts approach nearer to the surface than they are observed to do in a healthy kidney. Furthermore: it would appear that the enlargement is most commonly coincident with the earlier, and the contraction or shrinking with the later, periods of the renal disease.

Consistence and Form.—The *consistence* of the diseased gland is also variable. Sometimes, and for the most part in the earlier periods, it is soft and flabby; sometimes, and especially in the later periods, it is remarkably compact and hard. The size and the consistence of the kidney may be said to be, in most cases, inversely proportional to each other. Again: the *form* of the kidney, in the disease in question, often undergoes some modification. As the special change proceeds, the exterior of the gland shows a tendency to become indented by linear depressions, and to present a lobular shape. This, however, is by no means a constant phenomenon, even in the most advanced stage of the malady.

Colour and Condition of its Surface.—When the proper investing tunic is stripped off, and less dictinctly through the same tunic before its separation,

[a] "Library of Medicine"; Volume 5; Page 132.

the surface of the kidney appears mottled, marbled, or stained; of a yellowish grey colour in one place, and of a dark or purple tint in another; occasionally it is pale throughout its whole extent; more commonly of divers hues, and variegated with little streaks; which are portions of veins containing red blood. Sometimes the surface is curiously speckled; often uneven, as if strewed with prominent grains; and, in some instances, quite rough and scabrous. These several appearances are usually the more conspicuous, in proportion as the complaint is the more advanced.

Appearance of the Cut Surface.—The most uniform and characteristic of the morbid appearances, however, are those presented by the cut surface of the kidney, when it has been divided into two symmetrical portions by a longitudinal incision. We then perceive that the cortical substance is the main seat of the morbid alteration. It has lost in a greater or less degree, or sometimes almost entirely, its natural red colour and uniform aspect; sometimes it puts on a speckled or granular appearance; but this, in our experience, is less common than a pale homogeneous surface, streaked in general by linear marks; and bearing, when well pronounced, a near resemblance to the section of a parsnip. The view of the incised surface conveys to an observer the notion of some deposit having taken place; whereby the natural texture of the part is obscured, and its blood-vessels are (many or all of them) emptied or obliterated; while the healthier medullary masses are displaced and pushed aside,—sometimes compressed and encroached upon,—sometimes exhibiting the same yellowish appearance interposed between, and opening out, their radiating striæ. In several instances, along with these changes of appearance and structure, we have found the veins that emerge from the kidney blocked up by firm coagula of blood.

Cysts.—The kidney, in some rare cases, is studded, both on its surface and throughout its interior, with numerous small cysts or cells containing a thin transparent fluid. These cysts have been inaccurately called "hydatids." It is not at all uncommon to meet with one or two such cysts in this diseased state of the organ.

Sanguine Congestion.—There is still another state of the kidney very different, in its appearance, from any that have yet been mentioned; which is thought however to be in some cases, if not always, the first stage of all in the disorganizing process. Without prosecuting for the present the inquiry how far this notion may be founded in truth, we shall describe the state in question. It may be briefly expressed in two words;—"*sanguine congestion.*" The whole organ is gorged with blood; which sometimes drips freely from it when it is cut open. The kidney is in general somewhat flabby, of a deep and dark red, even of a chocolate or purplish colour, nearly uniformly diffused; except that the exposed surface is usually diversified by still darker tuft-like spots, which have been ascertained to be the Malpighian bodies filled with blood.

b. Signs of Renal Dropsy during Life.

Let us in the next place investigate those circumstances which, during the lifetime of the patient, conduce to the conclusion that the dropsy under which we see that he labours is renal.

1. There is nothing, that we are aware of, very peculiar or distinctive in the characters of the anasarca itself. When the renal disease sets in suddenly and with acute symptoms, dropsy usually supervenes soon. So also, during its more chronic progress, anasarca is apt to show itself, or to

ncrease, whenever inflammation of any part, or febrile disturbance, may appen to ensue. The more rapid and copious the effusion, the less do he dropsical parts pit upon pressure. Of this renal form of the disease it nay also be stated, that an accumulation in the larger serous cavities is not, n general, a prominent feature.

2. We naturally look, in a case of general dropsy, for evidence of disease n the thorax, especially of the heart; and, most particularly, of retarded irculation in the veins. If we find no material or adequate embarrassment f the respiratory functions, no deviation from the natural sounds of the eart, no derangement of its regular movements, no alteration in the force f its pulsations, or in the space over which they may be heard and felt, no istension of the large veins of the neck,—we then have reason to suspect, t least, that the anasarca is connected with some vitiated state of the idney.

3. Again: our judgment is guided or assisted, in some degree, by the omplexion of the patient. When general dropsy depends upon disease of he heart, the cheeks and lips are occasionally florid, often purplish or livid, requently dusky and loaded: sometimes the face and mucous membranes re pale (as in chlorotic women, where the heart may be temporarily dis- nded without any strictly organic disease, and the blood is thin and poor): ut, in the renal variety of dropsy, there is commonly a strikingly cha- cteristic hue;—an evident want of red blood, indeed, in the capillaries; ut an unhealthy, dingy sallowness withal;—an aspect such as reveals, to n experienced eye, the existence of some visceral disease in the abdomen.

4. Our suspicion that the kidney is the organ in fault, is strengthened we trace certain accidents in the history of our patient;—an attack of ness, for example, attended perhaps with temporary swelling of the body nd disturbance of the urinary functions (acute dropsy, in short), soon after me exposure, in unfavourable circumstances, to the influence of cold, ther applied to the external surface, or to the stomach by a draught of ld drink. For there is reason to believe, that in acute dropsy is often d the foundation of those peculiar changes in the kidney, which, since ey were first pointed out by Dr. Bright, have been chiefly studied in their nnexion with chronic dropsy;—that as rheumatic carditis may occur, d become latent as to its effects for some time, and yet implant the germs future cardiac dropsy, so the stress or strain (of whatever nature it be) at befalls the kidney, in cases of febrile dropsy, may set on foot a morbid ocess which long works silently and unobserved; but which, at last, gives tice of its operation by symptoms;—the reproduction of dropsy in a more ronic form being the most significant symptom of all. The acute attack y have been forgotten; there have been no obvious (though there may ve been ill understood) indications of the renal affection; and its exist- ce has been unsuspected.

The previous history of intemperate habits, also, would be of import- ce in aid of our diagnosis, if these same habits had not a like influence in using disease of other organs as well as the kidneys, and especially of the art. There may, however, be no such episodes as these in the history the patient: the dropsy may have come on immediately after some ex- sure or obviously injurious influence; yet not with acute symptoms, and a temperate subject: in which case it is probable that the renal disease l pre-existed in a latent state; or the anasarca may have arisen by grees, and without any apparent exciting cause. Suppression of the amenia, and blows on the loins, have each been precursory of this form

of dropsy, sufficiently often to raise a suspicion that the change in the kidney has been somehow a consequence of these accidents.

5. The most remarkable and sure evidence of the existence of the renal disease, is to be found in the state of the urinary secretion. Some of the characteristic qualities of the urine are very obvious, or easy of detection when sought for; others require for their discovery some little chemical knowledge and skill.

c. Characters of the Urine in Renal Dropsy.

The more obvious characters of the unhealthy urine relate to its quantity, its sensible qualities, the presence of albumen, and its specific gravity; and, because they are obvious, these are the circumstances which, for the generality of practitioners, are of chief importance, and most require to be attended to and understood.

Its Quantity.—The quantity of urine secreted in this disease of the kidney, is inconstant. It always falls short of the ordinary standard, in the outset of the dropsy. In the acute cases, also, and whenever febrile symptoms supervene in the chronic, it is invariably diminished; and by this deficient expenditure of aqueous fluid through the kidneys, while the exhalation from the surface is also scanty or annulled (as in most instances it is found to be), may be explained, in great part, the occurrence of the dropsical accumulation. As the disease advances, the urine often returns to its natural amount; and not unfrequently is secreted in excess.

The average quantity of urine voided in the twenty-four hours, by a healthy adult, has been variously estimated. It may safely be put at about two or two and a half imperial pints; that is, from forty to fifty fluid ounces. Sometimes in the disease in question it does not exceed one or two ounces, or is even suppressed altogether; and when this is so, the patient must be considered in imminent danger of some fatal affection of the brain. More generally, the patient voids from half a pint to a pint and a half of urine daily. In certain cases, or in certain stages of the disease, and chiefly in the advanced stages, the quantity may reach four or five, or even six, pints daily. These observations are to be understood as having no reference to the effects of diuretic medicines.

It may be stated as the rule, that the dropsy lessens as the urine becomes more copious, and contrariwise. But to this rule there are numerous exceptions. The dropsy may even augment while the quantity of urine is increasing. In such cases, other agencies are probably in operation besides the mere kidney-disease;—such as debility of the muscular parietes of the heart, engendered by the disease; or an altered and more aqueous condition of the blood;—to be more particularly described hereafter.

Whenever we find anasarca steadily persisting, or perhaps extending, while the quantity of urine (uninfluenced by diuretics) exceeds the average proper to the patient, we have reason to suspect the dropsy to be renal. The same phenomenon is, however, sometimes to be observed in the cardiac form of the complaint; as well as in the anasarca that occasionally supervenes in the latter stages of diabetes.

Its Sensible Qualities.—The sensible qualities of the urine are variable also, and differ at different periods of the disorder. Often it is dingy and dark-coloured,—brown, like slightly turbid beer; sometimes it is distinctly, sometimes obscurely, tinged by the colouring matter of the blood; frequently

t deposits a dark-brown or soot-like powder; which is evidently composed of the coloured particles of the blood, changed in appearance, and probably blackened by the acid in the urine. Often, also, the urine is of a pale hue, not quite transparent, hazy, exhaling but little of the characteristic smell of healthy urine, frothing readily, and long retaining its head of froth. This depends on the copious presence of an unusual ingredient;—to be presently mentioned. Sometimes, but not very frequently, the urine throws down more or less of the common lateritious sediment, and paints the bottom of the vessel pink. Sometimes, again, the secretion does not deviate materially, or appreciably, in its appearance from that which belongs to health. Of these several appearances, that which manifestly arises from the admixture of a greater or less quantity of blood, is most to be relied on as indicative of the renal disease. It is most common in the early stages of the dropsy; and in the acute variety these sanguineous impregnations are rarely, if ever, absent.[a]]

Presence of Albumen.—A still more important quality of the urine, in these cases, is the presence of albumen; and we have been told that our guide for bleeding in dropsy,—that our guide in forming a judgment as to whether it is inflammatory or not,—is to be taken from the appearance of the urine. It has been stated, in a work published by Dr. Blackall, that the quantity and firmness of the coagulum of the albumen, is usually proportionate to the existence of inflammation, and to the necessity for carrying into practice anti-inflammatory means; but that nevertheless albuminous urine may, in some cases, be associated with an opposite state,—that of debility,—where the use of tonics is clearly indicated. Subsequent writers however, more especially Drs. Bright and Christison, have corrected the results of, and added much to, the original observations of Dr. Blackall.

[While Dr. Christison directs attention to the different *appearances* of the coagulum of albumen, he does not appear inclined to refer them to any variation in the intensity of the inflammation. At the same time, he proposes a very scientific nomenclature for the different degrees of coagulability shewn by albuminous urine when subjected to heat:—1. Gelatinous by heat. 2. Very strongly coagulable;—the precipitate separating by heat, and in twenty-four hours occupying the whole fluid. 3. Strongly coagulable;—the precipitate occupying half the volume of the fluid. 4. Moderately coagulable. 5. Slightly coagulable. 6. Fully coagulable. 7. Hazy by heat;—where the urine becomes cloudy, but does not form visible flakes for a few seconds after being boiled.[b]]

Method of Detecting Albumen.—[Its presence may be established by the majority of re-agents which serve for its detection in pure water. The combination of the three characters,—coagulability by heat and nitric acid, and its *non*-precipitation by acetic acid,—affords alone incontestable evidence of the presence of albumen. But these three characters must co-exist;—since a mistake might arise from the circumstance, that urine containing milk will coagulate with heat and nitric acid; but, *unlike* albuminous urine, will also coagulate on the addition of acetic acid. When the urine contains *alkaline* materials, although albumen may be present, it will *not* coagulate by heat. Nitric acid, however, by removing the alkalinity, will induce coagulation. Some curious results have been made out by Rayer and

[a] "Library of Medicine"; Volume 5; Pages 117 to 121.

[b] Dr. Christison, on Granular Degeneration of the Kidney; Page 44.

Guibourt [a] on albumen. They have shewn, that nitric acid in *minute*, acetic acid in *large*, and phosphoric acid in small or large proportions, will *deprive* albumen of the property of coagulating by heat. But—what is remarkable—larger quantities of nitric acid will immediately precipitate it. These are practical facts, that should be known, in the examination of the urine. It may here be stated,—on the authority of recent microscopic discoveries and researches by Quevenne, Donnè, and others,—that the epithelium of the genito-urinary mucous surface, undergoes continual desquamation, and that in some diseased states this desquamation increases very much; so that, unless carefully examined, the turbidity of the urine dependent upon their presence may be mistaken for albuminous opacity.—*Thomas Williams.*]

Bright's Discoveries.—We are indebted to Dr. Bright for a knowledge of the fact, that, in organic disease of the kidney, the urine is generally in this albuminous state. Andral, in his "Clinical Reports", had previously mentioned a case where he found the urine albuminous, and the kidney in a granulated state; but as he had no more facts in his possession, he came to no general conclusion; nor would he have been justified in doing so. Dr. Bright, however, has collected a large number of cases; and he finds, that when the kidney is in a disorganized state, the urine is generally albuminous.

Organic Disease not necessarily present.—When the urine is albuminous, it does not follow that the kidney *must* be in a state of organic disease. But still, even in Andral's case, the kidney was *affected*, and stated to be gorged with blood. Some have gone farther than this; and declared that nobody can have albuminous urine, without organic disease of the kidney. I cannot subscribe to this assertion; for I have seen patients who were perfectly well a day or two before, but who have been exposed to cold and wet; symptoms of inflammatory dropsy have come on; the urine has become albuminous; but, on bleeding them, the dropsy has presently been got the better of, and the urine has recovered its healthy appearance. Why these poor people should be supposed to have had diseased kidneys, merely because they had albuminous urine for a week, is not easily understood. I could not open them, to ascertain whether their kidneys were diseased; but as they are in perfect health now, and had been in perfect health just before, and the urine is no longer albuminous, I do not believe there is any more foundation for supposing the existence of organic disease, than there is for supposing that cancer of the stomach is present in every case of temporary dyspepsia; because, when people *die* of dyspepsia, we find more or less organic disease. Although a person may *die* with albuminous urine, and we find structural disease of the kidney, it does not follow that, when the urine *temporarily* presents the same phenomenon, and the person recovers, he has had any thing more than a functional complaint. Because the affection of the kidneys may arrive at such a degree of intensity as to destroy life, and organic disease is then always found, it does not follow that the *temporary* formation of albumen in the urine, should be any thing more than a functional disturbance of the kidneys. I should draw just the opposite conclusion; and should suppose, that if the symptoms were temporary, the disease must be functional. Dr. Mackintosh informed me, that some medical students in Edinburgh ascertained, that when they ate pie-crust, and it produced dyspepsia, their urine became albuminous. They fre-

[a] "Traités des Maladies des Reins, et des Alterations de la Secretion Urinaire." Par M. P. Rayer. Tome Premier; Page 625.

quently repeated this experiment, and the circumstance is nothing more than I should expect. Dr. Graves has done much to dissolve the supposed invariable connexion between albuminous urine and disease of the kidney. He shows that it often depends on disease of the *liver*.[a]

If, however, no organic disease whatever can be discovered, in any of the other viscera of the body, and there are no indications of acute febrile action;—if the patient be evidently sinking under dropsy, and the urine is albuminous, I believe, in the majority of cases, (provided the urine is *constantly* albuminous,) that there is organic disease of the kidney. It is generally found granulated, mottled, or labouring under great sanguineous congestion.

Specific Gravity.—[We ascertain, in the next place, the density of the suspected urine. The same discrepancy is to be regretted in the statements of different authors respecting the average specific gravity, as respecting the average quantity, of healthy urine. While Dr. Prout places it anywhere between 1010 and 1015 (that of distilled water being 1000), M. Solon describes it as ranging from 1020 to 1024, and Dr. Christison estimates it at 1024 or 1025. We shall assume the latter to be the nearest to the truth;—both because it is avowedly founded upon the result of numerous trials; and because, if it be not exact, it is less likely than the number given by Dr. Prout, to lead us into erroneous conclusions in reference to the disease in question.

Perhaps it is scarcely requisite to admonish the reader, that the question of specific gravity must always be contemplated in relation to the absolute quantity of urine secreted. The specific gravity depends upon the proportion of the solid constituents of the urine contained in a given quantity; if the aqueous portion be augmented, the effect upon the absolute density will be the same as if the solid contents were proportionally diminished. But when, as frequently happens in this renal disease, the specific gravity decreases while the quantity of urine decreases also, that conjunction of phenomena becomes especially significant.

The three circumstances that have now been mentioned (all of which it is easy to determine)—namely, the quantity of urine secreted in a given time, its impregnation with albumen, and its specific gravity—constitute, together and by comparison with each other, a very accurate and trustworthy test of the presence or absence of the renal disease.

The albumen, not unfrequently, disappears for a time, even early in the disease. Sometimes it ceases altogether, although the renal disease may be fixed. This is most frequently the case in the advanced stages of the disease. The general rule is, that the albumen is plentiful and almost constant in the outset of the malady; less certainly present as it proceeds; and sometimes entirely absent in its latter periods. Now it is of importance to remark, that the alteration in the specific gravity of the urine follows a contrary law. The declension of density, so far from being corrected, augments with the progress of the disorder. Hence the one of these morbid phenomena is a valuable check upon the other;—considered as an index of what is going on in the kidney.

At first the specific gravity is not much below the natural standard; but it sinks from 1020 perhaps to 1016; and at length, as the renal malady increases, to 1010, 1008, and even lower. Solon once noticed it as low as 1003, when the diurnal quantity was forty-four ounces. The lowest

[a] See his valuable papers in the "Dublin Journal of Medical Science."

density ever noted by Dr. Christison,—the quantity not being in excess,—was 1004. We may, with Solon, place the average specific gravity of the urine in this complaint at 1013.

Allowing always for the quantity of the secretion, if we find that albumen ceases to manifest itself on the application of the proper tests, and the density be decidedly low, we must not be led to infer or hope, merely from the absence of albumen, that the kidneys are sound.

These characters of the urine, rightly weighed and interpreted, reveal therefore not only the existence of the renal disease, but also, with great probability, the stage or degree it has reached.

d. Changes in the Blood in Renal Dropsy.

It has also been ascertained, in the disease we are now considering,—1. That the blood often contains urea. 2. That the serum of the blood is apt to be of a lower specific gravity, and to be less albuminous, than in the healthy state. 3. That the proportion of its fibrin varies. 4. That the colouring matter of the blood gradually decreases in quantity during the progress of the disease.

Urea in the Blood.—Modern physiologists are agreed, that urea is not formed by the kidneys; but merely abstracted by those organs from the blood, as fast as it is received or generated there. Whenever this process of separation is suspended or defective, a portion of urea remains in the circulating blood, and may be detected by its proper tests. Urea has been thus discovered in the blood of animals after the extirpation of their kidneys. In the blood of patients afflicted with renal dropsy, it has been found as plentiful even as in their urine; and not in the blood only, but in the various fluids derived from the blood; and particularly in the liquids effused into the ventricles of the brain, the pericardium, pleuræ, and peritonæum. According to Dr. Christison, whenever there is a material reduction of the daily discharge of urea by the urine, it may be distinctly found in the blood; but not otherwise. And he considers the reduction to be material, if the quantity excreted be diminished to about one-third of the natural amount.

Deficiency of Albumen.—Again: the serum of the blood has been ascertained to contain, in this disorder, a less than common share of albumen, and to be of an unnaturally low density. The average specific gravity of healthy serum is 1030. It is apt to be reduced to 1024, 1020, and even to 1013. Dr. Babington declares that, in cases of coagulable urine, he has always found the specific gravity of the serum much below the healthy standard. The quantity of albumen in healthy blood averages from 65 to 69 parts in 1000. In this disease, Dr. Babington has met with as little as 16·10 parts. The general truth of these statements is corroborated by the results of Dr. Christison's experience; but the information which he renders is more precise. He has noticed that a definite but inverse relation subsists between the coagulability of the urine and the density of the serum;—that the more albumen there is in the former, the lower is the specific gravity of the latter fluid. Hence it is, that the density of the serum is most diminished in the earlier periods of renal dropsy; inasmuch as the urine is then most highly charged with albumen. In proportion as albumen, with the progress of the malady, becomes less perceptible in the urine, it becomes more abundant in the serum; the specific gravity of which returns towards, and may reach, the degree that belongs to health. But in all stages of the disease, whenever albumen appears plen-

ifully in the urine,—as during febrile reaction,—the density of the serum inks.

Increase or Decrease of Fibrin.—Again: it results from the concurring xperience of Dr. Christison and Dr. Babington, that the ratio of the fibrin n the blood is usually increased in the early stage, and during the existnce of febrile disturbance in any stage of the disease. At the same eriods, the blood presents the buffy coat. In ordinary circumstances, fter the early stage has gone by, the quantity of fibrin most commonly everts to the natural proportion. In healthy human blood, Dr. Christison as found the quantity of dry fibrin to vary from 25 to 52 parts in 10,000. During the early stage of the renal malady, he has known it as high as 82, nd as low as 30 parts. Reaction being present, he has met with as much s 85 parts in the middle stage, and 56 parts in the advanced stage. In ther circumstances, it commonly ranges between 27 and 43 parts.

Decrease of Hæmatosine.—Lastly: the colouring matter of the blood, hich is but little if at all affected in the outset, diminishes gradually here the disease continues; and at length is so much reduced, as to form ss than a third of the healthy average. If venesection be occasionally mployed, this process of depravation is accelerated; but it takes place, hether blood be artificially withdrawn from the system or not. "I am cquainted", says Dr. Christison, "with no natural disease,—at least of a hronic nature,—which so closely approaches hæmorrhage, in its power of mpoverishing the red particles of the blood." In the male sex, the healthy roportion of the hæmatosine is 1335 parts in 10,000. In a young man, l three months and a half, subsequently to scarlatina,—who had never een bled before,—Dr. Christison has seen this reduced to 427. This hange in the blood is invariable.

e. Complications of Renal Dropsy.

With Cerebral Derangement.—One of the most common and most imortant of these complications, is the occurrence of what are compendiously alled "head-symptoms";—various manifestations of derangement in the erebral functions;—headach,—drowsiness,—delirium,—epileptic seizures, —or apoplexy. So frequently, indeed, is the death of the patient preceded y convulsions or coma, that Dr. Christison has rightly considered this to e the "natural termination" of the disease, or "the mode in which it roves fatal, when life is not cut short by some other incidental or seondary affection." Of seventy fatal cases observed by Dr. Bright, death as ushered in by well-marked cerebral symptoms in thirty.

The circumstances in which these affections of the brain take place, ave been ascertained with tolerable accuracy. They are almost always receded by a great diminution, or an entire suspension, of the secretion f urine. This connexion of coma with suppression of urine, has long been cognised; and it is well exemplified in the disease under consideration. f the quantity of urine becomes very scanty,—so as to amount to no more an two or three ounces in the twenty-four hours; and especially if the eficiency occurs suddenly; and more particularly if there be a total cessaon of the secreting function, we may reckon upon the speedy dissolution f our patient, and that he will die comatose, and perhaps after convulons. But this rule is not so strict as to offer no exceptions. Occasionly (though seldom) it happens, that the urine is reduced to a very small mount, while the head remains unaffected. Of this Dr. Christison records

a remarkable instance:—One of his patients passed no more than two ounces of light urine daily, for nine days before his death; yet he remained sensible to the very last minute of his existence, and died simply of inanition. Somewhat less unfrequently, apoplectic symptoms arise and carry off the patient; although there has been no extreme or material reduction in the quantity of urine.

When a case has terminated in this manner, serum is sometimes found accumulated in unnatural measure in the cerebral ventricles, and in the tissue of the pia mater. The dropsy has extended to the brain; and, in these circumstances, although it may be difficult or impossible to determine when and with what rapidity the serum has been effused, its presence and its pressure may fairly be assumed to have produced the fatal symptoms.

In many instances, however, there is found no morbid collection of water within the skull, nor any appreciable change; and in some instances there is no dropsy of any part: and this fact—taken together with the usual failure in the quantity of urine, and the ascertained presence, sometimes, of urea in the blood, and even in the natural serosity of the encephalon—has led to the construction of a theory, which refers the ultimate symptoms (the stupor and the death), to the poisonous influence of the urea of the unpurified blood upon the brain and nervous system. Another not improbable hypothesis connects the supervention of stupor and coma with a pale and watery condition of the blood. That similar symptoms are apt to arise in conjunction with a similar defect of hæmatosine, has been well known since the publication of the remarks of the late Dr. Gooch, and of Dr. Marshall Hall, on that peculiar form of cerebral affection. It would seem that, in such cases, the functions of the brain are exercised irregularly, languidly, and at length not at all;—in consequence of the failing supply of its appropriate stimulus through the arteries.

Inflammatory and other Affections.—Another striking circumstance observable in this disease, is a readiness of various organs of the body, and particularly of the serous membranes, to inflame. Such intercurrent acute inflammation is a not uncommon cause of death. The pleura is much more often affected in this manner, than the peritonæum or the pericardium.

Disorder of the stomach and bowels is, certainly, a frequent companion of the malady;—nausea,—vomiting,—flatulent distension,—diarrhœa.

It would appear, however, that these incidental complications prevail with irregular frequency in different places. They are probably owing, in some measure, to local and peculiar agencies. Thus, vomiting and diarrhœa have been more familiar to the Edinburgh observers, than in London to Dr. Bright, or in Paris to M. Solon; while the headachs and coma so often witnessed by the British physicians, have been comparatively uncommon in France.

With Cardiac Disease.—All the writers on this subject, acknowledge the frequent association of cardiac disease with the renal; and, with respect to this concurrence of structural alteration in the heart and in the kidney, several obvious and interesting, but hitherto unsettled, points of inquiry present themselves. Some of these we may mention,—as being fit subjects for future investigation. It is generally difficult, when we find both organs altered in structure, to trace the course of the patient's maladies so accurately, as to determine which change has been primary, and which consecutive. It is highly probable, indeed, that, in certain

cases, the cardiac disease and the renal disease have no relation to each other, as cause and effect; but are both consequences of some general cause;—of habitual intemperance, for example.

Is the Renal Disease ever produced by the Cardiac?—We might more easily arrive at an answer to this question, if the real nature of the change which the kidney undergoes were better understood. In the acute renal cases, when they prove early fatal, the kidney is always found to be gorged with blood; and the accustomed admixture of blood with the urine warrants the belief, that the same condition was present in patients who have recovered. From this state of engorgement (which is not acute inflammation, since the ordinary events of acute inflammation in that organ do not follow) springs, apparently, the subsequent series of changes. It is therefore a plausible conjecture, that whatever tends to cause congestion of the kidney, tends also to aggravate, and may even produce, the peculiar changes in question. That disease of the heart, and especially such disease of the heart as leads to dropsy, occasions congestion of the venous system, and in this way gorges the viscera with blood, is well known. Under this influence the liver often enlarges. So that, in cardiac disease connected with dropsical accumulation, we might *à priori* expect congestion of the kidney, and structural alteration in consequence of such congestion.

A serious objection to this view of the matter is presented by the fact, that dropsy often arises from disease of the heart, lasts long, and ultimately proves fatal, without the occurrence of albuminous urine, and without any appreciable change of structure in the kidney. It is plain, also, that passive congestion of the kidney, produced by disease of the heart, cannot be the sole cause of the renal change; for that change is sometimes well marked, though the heart has been unaffected.

Does the Renal Disease ever produce the Cardiac?—That it may do so is, at least, very conceivable. The heart, no less than other parts of the body, will suffer from the deterioration that has been shown to take place in the blood in these cases. A sort of anæmia is produced; and anæmia implies debility of the muscular texture of the heart, and tends to dilatation of its cavities; and the weak heart, becoming irritable also, grows thicker as it labours. This is the form of cardiac disease which has been found, in many cases, to be coincident with renal dropsy.

Where the heart, as well as the kidney, has undergone organic change, the disposition to dropsical accumulation will evidently be augmented; but what share these two organs respectively possess in producing the dropsy, it is very difficult, and practically not very important, to determine.

Pain of the Loins.—Pain or tenderness of the loins is sometimes an accompaniment of the renal disease; this symptom is more often present in the early than in the later stages of the malady. It occurred in one third of the twenty-eight cases narrated by M. Solon. Dr. Gregory noticed it in the half of his patients.

Vesical Irritability.—Irritability of the bladder, or rather a morbid frequency of the call to micturition, has been spoken of by Dr. Bright and Dr. Christison as a common symptom in renal dropsy. It is a symptom, however, belonging to so many other disorders that, taken by itself, it has but little value.

Causes.—The causes of this disease are obscure. It is clearly ascertained that its most obvious symptoms, in their chronic form, have, in very many instances, begun soon after the exposure of the body to wet and cold under unfavourable circumstances. But it is by no means certain—indeed, the probabilities preponderate on the other side—that, in these in-

stances, the renal disease had not previously existed in its latent state. The influence of external agencies upon the excreting functions of the skin, in exciting definite symptoms, is beyond question.

It is certain, also, that what is called "acute dropsy" (already described[a]) arises in similar circumstances of exposure, and is attended with a marked disturbance of the functions of the kidneys; and chronic renal dropsy has sometimes been noticed as occurring in persons who had previously suffered, and had apparently recovered, from the acuter form. Are we not warranted in supposing that the recovery was imperfect in such cases?—that the kidney had sustained irretrievable injury?—and that the disease, although (under treatment, or by lapse of time) it had become tranquil or latent, was ready again to give indications of its existence, upon any repetition of its exciting cause?

The possible dependence, in some cases, of the renal disease upon disease of the heart, has been already noticed.[b]

Again: it is matter of common observation, that intemperate habits have often preceded the development of the disease. Yet we conclude, that intemperance is rather a *predisposing* than an *essential* cause;—from the fact that the complaint is not unknown among children, and other persons whose manner of life has been strictly temperate. A marked example occurred lately to the writer in a young girl, fifteen years of age, who had not menstruated. And this leads to another remark; namely, that dropsy with albuminous urine has been observed not unfrequently to follow a sudden check or suppression of the catamenia. In a few instances, it has seemed to owe its origin to blows received upon the loins, or to extreme fatigue.

Age at which it Occurs.—The disease occurs at all ages; less often, however, in extreme youth, than afterwards. This malady is much more common in adults;—not, in all probability, because the system is more readily affected by it at one period of life than another; but because, as life advances, the circumstances which tend to produce or foster it become of more frequent operation;—namely, intemperance, exposure to vicissitudes of temperature, fatigue, and disease of the heart. It occurs, probably for the same reason, oftener in men than in women.[c]]

SECTION IV.—CARDIAC DROPSY.

[The mode in which disease of the heart may occasion general dropsy, has already been sufficiently explained.[d] In such cases, indications (more or less distinct and certain) of the cardiac affection, are generally observable. We judge that the dropsy has this origin by the following circumstances:—1. The presence of thoracic symptoms; such as cough and dyspnœa, occurring prior to the dropsy. 2. The direct signs of cardiac disease; such as distended jugular veins, irregular movements of the heart, unnatural impulse, or altered sounds. 3. The history of some previous acute disease, affecting especially the left side of the thorax; or, particularly, by an account of antecedent arthritic rheumatism. 4. The advanced age of the patient;—rendering it probable that some of those organic changes in the heart and large blood-vessels are in progress, which are

[a] See Pages 168 to 171.
[b] See Page 180.
[c] "Library of Medicine"; Volume 5; Pages 123 to 130.
[d] See Page 165 and 166.

almost natural in the decline of life. 5. The absence of all evidence of renal disease. But we see many persons who labour unequivocally under organic disease of the heart, yet who survive even for years without becoming dropsical. The interesting question, therefore, at once arises,—"Of what kind of heart-disease is dropsy a consequence and symptom?" The answer is,—"Of such disease of the heart, as produces a certain amount of permanent obstruction to the passage of the venous blood." The permanent obstacle must be sufficient, in degree, to distend the veins beyond their natural capacity. Hence dropsy is especially associated with dilatation of the right chambers of the heart. It would be incorrect to say, that the dropsy is dependent on such dilatation; for the dilatation itself is at once an effect and a sign of impeded transmission of the blood from the right side of the organ. Nor is such dilatation a necessary attendant on the general accumulation of water. The impediment may be sufficient to gorge the right cavities; while it is yet too slight in amount, or too recent in duration, to have dilated them.

Conditions on which it Depends.—What, then, are the conditions which imply an impediment of the kind we are now considering? The two great vital organs contained within the thorax,—namely, the heart and the lungs, form different parts of one common mechanism; the object of which is to supply every part of the body with blood that has been recently exposed to the air; and these organs, thus closely related in respect to function, are, moreover, so reciprocally dependent, that any structural change occurring in the one tends to produce disease, sooner or later, in the other also.

It is well worthy of observation, that the order in which the diseases of these organs are connected, as cause and effect, is a definite and constant order;—taking place in the direction opposite to that in which the blood circulates. Disease existing in any part of the circuit formed by the right chambers of the heart, the lungs, and the left chambers, becomes a cause of consecutive disease, first in the part immediately behind it. The heart itself, as is well known, is seldom diseased throughout, or diseased in a like manner and degree throughout; and its partial affections, which are exceedingly common, obey the law just announced, as being applicable to the whole circuit of the lesser circulation. Thus, organic disease situated at the aortic outlet of the heart, and of such a kind as to hinder the exit of the blood from the left ventricle, gives rise to permanent changes in that ventricle;—to hypertrophy, either with or (less commonly) without dilatation. The hypertrophy is here a truly compensating and conservative change; and when it is exactly proportioned to, and keeps pace with, the impediment which has given it birth,—so as precisely to countervail and balance that impediment, no delay takes place in the stream of arterial blood; and the injury is, as yet, confined to the left ventricle. That chamber is remodelled and adapted to its purpose by the *vis medicatrix naturæ*; and no other evil manifests itself than, perhaps, some slight encroachment and pressure upon the neighbouring parts,—in consequence of the augmented volume of the heart.

So long as the mitral valve remains healthy and effective, it offers a barrier of protection against the extension of the disease in the direction which is retrograde in relation to the course of the blood. But at length, in most instances, the stress becomes sensible further back. The left auricle and the pulmonary veins become embarrassed, distended, dilated; and the blood is detained in the lungs. Then dyspnœa commences. At first it is occasional only;—whenever the heart is tasked with the conveyance of a greater quantity of blood, in a given time, than usual; as in brisk

movements of the body, or strong emotions of the mind; or when it is oppressed by circumstances that diminish the capacity of the chest;—by a full meal, therefore; by flatulent distension of the stomach and intestines; or by the recumbent posture. Afterwards the dyspnœa becomes more or less constant and distressing.

This gorged and embarrassed condition of the lungs, even when it is permanent, and has reached a considerable degree, may exist without materially interfering with the functions of the right cavities of the heart; for the pulmonary plethora may be relieved by increased secretion from the bronchial mucous membrane. Dyspnœa, even when it has thus become habitual, may precede for some time any appearance of dropsy.

At last, however,—the effects of the original evil augmenting and extending,—the right ventricle also becomes unable duly to propel its contents into the pulmonary vessels. It continues morbidly full; is first distended occasionally, then permanently, and at length dilated; and with the dilatation we have a turgid venous system;—of which we see a part in the prominent veins of the neck.

In this manner, then, may be explained the series of symptoms, so commonly noticed as life advances. We find irregularity of the pulse, preternatural impulse of the heart, occasional dyspnœa, larger crepitation (habitually audible in the lower portions of the lungs), and more or less expectoration (sometimes tinged, sometimes even loaded with blood). Eventually the ankles begin to swell, and the patient becomes by degrees (unless cut off earlier in some other way) decidedly and universally dropsical.

Signs accompanying Cardiac Dropsy.—Many of the direct signs of diseased heart may exist, therefore, while there is no dropsy;—intermissions and irregularity in its movements, palpitation, or the impulse proper to hypertrophy. But when dropsy has supervened, we may expect also the signs which denote the dilatation of the right chambers. The heart is heard and felt to beat beyond the præcordial limits; the pulsations become feeble and unequal, if they were not so before; the patient is liable to fluttering palpitations,—to extreme and panting dyspnœa on the slightest exertion;—even on taking food into the stomach, or adopting the horizontal posture. His skin assumes a dusky hue; and his lips and extremities are apt to be livid. In these cases, the anasarca first becomes manifest about the ankles. During the earlier stages, the œdema disappears in the night, and returns towards evening. It is sometimes confined, for a considerable period, to the legs; but by degrees it ascends towards the trunk of the body,—the integuments of which become doughy; the scrotum fills, and water collects in the serous bags of the abdomen and thorax. In extreme cases, the dropsy is universal,—pervading the cellular tissue of the head and face and upper extremities. As the accumulation of serous fluid is commonly gradual, the reticular tissue,—partly perhaps through maceration, but chiefly from continued pressure and stretching,—loses its elasticity; and the œdema is soft, and pits readily. Sometimes, the fluid continuing to increase, the cuticle is separated by it; and large vesications take place on the limbs; or some part of the cellular tissue sloughs, and a breach of surface is made. The fluid drains off, by this vent, in great abundance;—to the signal relief of the patient. This beneficial accident furnishes a valuable hint to the practical physician.

Causes; Age.—The most common of them all is advancing life. The morbid change appears to commence in the aorta; and consists in a deposit of cartilaginous or calcareous matter beneath its innermost membrane. By this

alteration, the elasticity of the artery is impaired; it acquires a facility of dilatation; and the onward passage of the blood, after it issues from the left ventricle, is virtually delayed: hence increased efforts, on the part of that hollow muscle, to propel its contents; and the gradual backward propagation of organic change. It would perhaps be more correct to attribute those alterations of structure to that decay, which occurs in virtue of a law that extends to all organized bodies, rather than to disease. Earthy concretions in the coats of the arteries are met with (according to Bichat's experience) in seven persons out of every ten who die beyond the age of sixty; and Dr. Baillie declares ossification to be much more common in old persons, than a healthy state of the arteries.

Inflammation of the Cardiac Membranes.—But the cardiac mischief often originates, at an earlier period of life, in acute or chronic inflammation of the membranes that invest and line the heart. Chronic endocarditis, marked at its outset by slight or vague symptoms, appears to be of common occurrence; for its effects are very frequently seen in the dead body. Among the causes of this chronic disease, habitual intemperance,—especially an excessive or long-continued indulgence in ardent spirits,—holds, we believe, the first rank; but acute inflammation of the pericardium, or of the endocardium, or of both simultaneously, is also a frequent source of subsequent changes in the proportions of the several chambers of the heart. Such inflammation may arise from ordinary causes; and exist and run its course independently of any other diseased condition. In by far the majority of instances, however, it takes place in connexion with acute articular rheumatism. The frequency of this complication, in those persons at least who suffer from rheumatism in London, is very remarkable. The heart is found to be more or less involved in the disease, in not less than one-third of all the patients admitted into our hospitals with acute rheumatism. Of *rheumatic carditis* the following particulars have been noticed:—1. Its proper symptoms are often unheeded by the patient, amid the severer pains that affect his limbs; and may easily be overlooked by the practitioner who does not vigilantly search for them. 2. When the cardiac symptoms are well marked, or (being but slightly marked) have been looked for and detected, they generally cease (in a great measure, or entirely) with the cessation of the joint-disease they accompany; or those signs which remain (as unnatural sounds) are not of a kind to induce evident distress, or to claim the attention of the patient. 3. Nevertheless the organ seldom (according to the writer's belief, never) reverts to its former state, or undergoes complete repair; but the structural changes left by the inflammation form the germ of further changes, progressive in their character, and ultimately destructive of life.

Rheumatic endocarditis is more common than rheumatic pericarditis. Each tends gradually to produce such conditions of the heart as occasion dropsy; and it may be worth while, in our endeavour to analyze and trace home these conditions, to consider for a moment the manner in which the consecutive changes are brought about.

Disease of the Valves.—When, in the course of rheumatic fever, inflammation befalls the lining membrane of the heart, it affects chiefly the valves; especially, but not exclusively, the valves of the left side of the heart; and, most constantly of all, the sigmoid valves of the aorta. It will at once be seen how these valves,—by being thickened, or shrivelled, puckered, or rendered stiff by adhesion to neighbouring parts, or affected with ulceration, or perforation, may have their peculiar functions permanently injured;—so that they are apt to become, on the one hand, an ob-

stacle to the free passage onwards of the blood; or incapable, on the other, of effectually preventing its backward passage. Hence an imperfect emptying of the chamber that precedes the seat of the special alteration;—hence continued striving and hypertrophy; and ultimately, according to the degree and place of these changes, an extension of disease towards the right side of the heart.

Again: when acute pericarditis is set up, the inflamed membrane either adheres—partially it may be, but more often at all points—to the heart; or it does not adhere. If it does not, the patient dies in the primary attack. If it does, all signs of cardiac disease may disappear. But the seed of future mischief has been sown: "*hæret lateri lethalis arundo.*"[a] The free movements of the heart are fettered by the adhering bag; the muscle is urged to stronger or more frequent contractions; and this is aided by the effects of the endocarditis; which probably never fails to accompany, in some degree, the inflammation of the outer membrane. Hence, again, the extension of disease in the direction contrary to that of the blood.

When these facts are taken into account, they will serve to explain how it is, that when we come to examine a patient labouring under manifest disease of the heart, we so very often trace, in his history, one or more attacks of acute rheumatism. They who have not been in the habit of putting the question as to this point, would be surprised at the number of such cases. When the articular rheumatism was present, the heart-affection was perhaps unnoticed; or, if noticed, the patient (as he and his medical attendant are apt to think) got quite well; and when, at length, unequivocal symptoms of organic disease of the heart force themselves upon our attention, its rheumatic origin is too often unsuspected or forgotten.

Obstruction to the venous current and dilatation of the right chambers of the heart may be propagated, in the manner now described, from the left side of that organ. But the obstacle may begin at an earlier link of the chain;—as in the lungs; and an incidental question of much interest also presents itself; namely:—"In what kinds of pulmonary disease is cardiac dropsy liable to originate?"

Pneumonia.—Whatever tends to gorge the right cavities of the heart with blood, tends also to the production of general dropsy. On this principle it might be expected, that dropsy would form a symptom or direct consequence of some of the acute disorders of the organs of respiration. When, in pneumonia, a large portion of one or of both lungs becomes impervious by air and blood, or when pleurisy fills one side of the thorax with liquid,—which, by its pressure, shuts out at once air and blood from one half the respiratory apparatus,—the egress of the blood from the right ventricle, and therefore from the venous system, must be impeded. And, in truth, dropsical effusion is occasionally the result of such disease. That it does not occur more frequently, is to be attributed to the free evacuations, and the abstinence, which are early put in force in these complaints; and which relieve the distension before it produces effusion. In one remarkable instance of acute laryngitis, which fell under our care, the whole body was anasarcous at the time of the patient's admission into the hospital. His life was saved by tracheotomy; but the dropsical effusion had previously disappeared, a few hours after one copious bleeding from the arm. This case illustrates the tendency to dropsy arising under im-

[a] "The deadly arrow remains fixed in the side."

peded transmission of blood through the lungs: it both exhibits a conformity to the general principle, and affords a probable explanation of its infrequent operation.

Tubercular Disease.—Again: lungs that are hollowed out into large cavities, or rendered solid over a wide space by numerous tubercles, are manifestly incapable of admitting into their vessels, from the right side of the heart, the ordinary quantity of venous blood. In these cases, however, the whole mass of blood is diminished, and kept within the limit which does not imply distension of the veins, by the constant agency of various causes;—by the imperfect nutrition of such patients, in consequence of abdominal disease; by the sometimes copious expectoration; by the wasting diarrhœa; and by the profuse perspirations. Accordingly, dropsy is an unusual symptom in pulmonary phthisis, or shows itself in the latter periods only of the disease, in the form of œdema of the legs; and its occurrence then is mainly owing to the debility which affects, in common with the other muscular parts of the body, the moving organ of the blood.

Emphysema of the Lungs.—The disease of the lung which most commonly and certainly, though often very slowly, leads to dropsy, is dilatation, with or without rupture, of its air-cells;—in modern nomenclature, "*emphysema of the lungs.*" In this morbid condition, many of the smaller blood-vessels of the organ become gradually obliterated;—in consequence of the pressure arising from the stretching of the membranes, upon or between which they ramify. When the dilatation is extensive and advanced, the pulmonary texture is visibly white and bloodless. Meanwhile, the nutrition of the body is not impaired. The same quantity of blood continues to be returned towards the heart; but it finds not a ready entrance, when sent from that organ, into the pulmonary blood-vessels. A certain amount of accumulation in the right side of the heart and great veins becomes habitual; at length, the capillary vessels feel the congestion; and more or less anasarca takes place.

Debility of the Heart.—The same effects upon the venous circulation may arise, when there is no primary organic disease of the heart, from mere debility of its muscular tissue;—such as often occurs in anæmia;—in what is vaguely called "cachexia";—in exhaustion from habitual loss of blood;—in any case, in short, in which the muscular tone is considerably reduced. The muscle is ill-nourished by the thin and watery blood; it cannot tighten upon its contents with sufficient force to drive them effectually forwards; it may even dilate somewhat under the centrifugal pressure of the resisting liquid; the attenuation of the blood concurs to facilitate transudation of its serosity through the coats of the minute vessels; and dropsy ensues. The anasarca thus arising from debility of the heart and poverty of blood in young, feeble, or delicate women, is so common, as to require a more particular description of its features and circumstances. It seldom goes beyond œdema of the legs; but occasionally the trunk and arms are slightly infiltrated, and the face is puffy and bloated. It is rarely that the large serous cavities are affected.

These patients are pale; their lips, gums, and tongue are without colour, or but faintly red; their muscles flabby and weak. They are "nervous", easily agitated, of variable spirits, and often hysterical;—subject to palpitation of the heart and shortness of breath whenever they ascend a hill, or a flight of stairs, or make any exertion. In very many of them, the systole of the heart is attended with a bellows-sound; and a roaring noise, con-

tinuous or intermittent,—like the murmur heard in certain shells when applied to the ear,—may be heard in the vessels of their neck. Their extremities are readily chilled; their feet are cold at night; and they suffer in the winter from chilblains. They complain of pain in one or the other hypochondrium, most often in the left; and of headach, which either occupies now one and now the other temple, or is more generally diffused.

In most instances they are subject to amenorrhœa, or irregular menstruation. Commonly, the discharge is scanty, pale, postposed, and attended with pain; and leucorrhœa is present in the intervals. Sometimes they have tenderness along the course of the veins of the lower extremities;—particularly of the saphena and femoral veins. This symptom is frequently observable when the irregularity dates from some sudden check to the actual process of menstruation. Usually the appetite of these patients is slender and fastidious; and they do not like meat.

This form of cardiac dropsy is almost always curable. Most of the symptoms are referrible to a deficiency of red blood; and gradually disappear, as the improving complexion indicates that the quality of the blood is restored.

It is necessary to remark, that tumours of various kinds (aneurisms of the aorta, cancerous growths, &c.)—occupying the thorax, and causing pressure upon the large veins in their neighbourhood—may be the cause of general dropsy. The same is true of certain malformations of the chest, and of certain displacements of the parts within it. In all such cases, the production of the dropsical accumulation may be accounted for upon the same general principles as have been applied to the explanation of cardiac dropsy.[a]]

SECTION V.—GENERAL TREATMENT OF DROPSY.

[We have next to consider the principles by which our practice in the *treatment* of dropsies is to be regulated. As, in most cases of dropsy, there are two distinct sets of symptoms observable,—namely, those which result from the presence of the accumulated water, and those which depend on the bodily conditions that have produced the accumulation,—so there will arise, in most cases of dropsy, two main indications of treatment;—the removal of the dropsy itself, and the suspension of its physical cause. The latter object implies either the complete remedy of the morbid conditions productive of the dropsy, or the establishment of some new condition which shall prevent or countervail their operation.

These two main indications may be fulfilled, in different cases, with very different degrees of facility. If the morbid conditions productive of the dropsy be cured, or their tendencies averted, the accumulated liquid will in most cases soon disappear of itself. But even in these favourable circumstances, its departure may often be accelerated by art. On the other hand, the removal of the accumulated water may often be accomplished; while the more important indication,—which strikes at the root of the disorder, and would prevent its return,—is capable of being effected only slowly, and with difficulty,—imperfectly, or not at all.

The evacuation of the dropsical fluid is first to be attempted through the medium of the blood-vessels. Whatever empties the turgid veins, enables and disposes them to refill themselves, by drinking up the superfluous liquids

[a] "Library of Medicine"; Volume 5; Pages 111 to 116.

of the body;—to be afterwards discharged by some of the natural channels of excretion.[a]]

Inflammatory Dropsy.—All these particular dropsies closely resemble hæmorrhage and fluxes. It is to be remembered, that hæmorrhage and fluxes are frequently of an active inflammatory kind; and are to be treated, not by remedies calculated to arrest the flow of fluid, but by the remedies of inflammation;—not by astringents, but by antiphlogistic measures. On the same principle inflammatory dropsy is to be treated, not by remedies calculated to carry off the fluid, or stop up the mouths of the vessels which pour forth the secretion, but by remedies calculated to remove inflammation. Dr. Blackall, indeed, says that "a correct guide to venesection may be found in the firmness, copiousness, and early appearance of an albuminous coagulum in the urine; its *limits*, in the improvement of the discharge of albumen in the urine (that is to say, in the diminution of the coagulum), in the state of the blood, and the relief of the other symptoms." But I am satisfied, that if we take the state of the urine as our guide, we shall often practise very badly.

I have found it very common for persons to be cured of dropsy by bleeding, although no albumen could be discovered in the urine; while, on the other hand, during the presence of albumen in the urine, persons have derived little benefit from bleeding. I have also seen abundance of albumen in the urine, with such debility of the frame, as to forbid bleeding altogether. I should therefore advise that, in every case of dropsy, the question as to bleeding, should be determined simply by observing whether there are inflammatory symptoms or not;—considering, not the state of the urine, but whether the symptoms are those of inflammation or not. If in any case of dropsy, we find a full, strong, and quick pulse, with strength of body, we are then to presume that the case is of an inflammatory nature. If there be local pain, and other symptoms of local inflammation anywhere,—whether in the head, chest, or abdomen,—that is quite sufficient to determine the inflammatory nature of the case. Again: if we cannot learn much from these particulars,—if the pulse do not shew any phlogistic diathesis; and if the head, chest, and abdomen, be particularly free from inflammation, and the disease have come on suddenly,—as inflammation often does;—if it be not the work of slow disease, like visceral affection; but has come on suddenly, and come on from the common cause of inflammation (such as the application of cold and wet, especially when the body is overheated);—then the presumption is that the case is inflammatory; and we shall not do wrong if we bleed, so far as the pulse will justify us; for the pulse will often *justify* this treatment, though it will not *point it out.* We must frequently have recourse to the pulse;—not to learn what to do, but to learn whether it will sanction us in doing what other symptoms indicate to be a proper procedure. Whenever dropsy comes on suddenly (from the application of cold and wet), and the pulse will justify me, I certainly treat it as an inflammatory complaint. When the pulse is full, accompanied by a phlogistic diathesis, and signs of local inflammation, there can be no doubt about the treatment of the case.

In this form of the complaint, it is useless to employ diuretics; for the same reason that astringents are useless in active hæmorrhages from mucous membranes. If, however, we employ antiphlogistic measures, the fluid will, in most cases, gradually disappear. Sometimes it does not; and then it is well, when we give purgatives, to exhibit those which are called "*hy-*

[a] "Library of Medicine"; Volume 5; Page 109.

dragogue"[a]; which cause very watery stools. In general, they will answer every purpose. Purgatives are exceedingly beneficial, in cases of inflammatory dropsy; for they not only act as anti-inflammatory remedies (like bleeding, in diminishing the bulk of the fluids) by causing a rapid secretion of fluid on the mucous surfaces; and thus, by acting upon the cause of the disease, tend to subdue the inflammation; but they act as palliatives, by causing the absorption of the effused dropsical fluid. It would be in vain to give diuretics in inflammatory dropsy; for they would not act during the inflammatory state of the system. Diuretics will not then act upon the kidneys; and the more the kidneys are stimulated, the less urine is secreted. But when we are giving hydragogue purgatives, we are doing the same as bleeding does; and, at the same time, we hasten the absorption of what has been collected; and in proportion as the inflammation is lessened, so do the hydragogue purgatives exercise more and more power over the kidneys. Among the best are elaterium, and a mixture of jalap and cream of tartar.

Treatment of Passive Dropsy.—If the dropsy be of *another* description,—being *without* any marks of inflammation,—low diet and bleeding will increase the collection ten-fold. Here wine and perhaps good nourishment become necessary; together with steel, sulphate of quinine, and various diuretics. In this case the disease hangs on the patient so long, and such great inconvenience is felt from the collection of fluid, that, although diuretics will not *cure* the complaint, yet they are necessary for the purpose of lessening the quantity of fluid, which is collected in the body. Diuretics cannot go to the *cause* of the dropsy; they only tend to lessen the *effect* of the dropsy. Among the best are digitalis, calomel, squills, and acetate of potass; and it is very useful to give these in combination. When we cannot increase the dose of digitalis, or squills, we may that of the potass; therefore, by giving a great number of remedies, we do better than by trusting to one. We may give them to a full amount, by combining several together. The hydriodate of potass, and all the other salts of this alkali, are strongly diuretic.

Mercury.—The effect of diuretics is very much increased by the exhibition of mercury. In inflammatory dropsy, mercury is highly useful as a remedy against inflammation; but, in the opposite kind, it frequently would do harm by increasing the debility, especially if there were much organic disease; but given in great moderation, so as to produce a slight affection of the mouth, it will enable the other diuretics to act much more powerfully on the kidneys. Though we sometimes succeed in curing dropsy, by putting a patient under a profuse ptyalism, when all other things have failed; yet generally that is not the case, unless the dropsy is in some degree inflammatory, or unless there is inflammation of some organ; but, in all cases, the moderate administration of mercury increases the effects of diuretics.

When the chest is oppressed, and we find the patient in danger of suffocation; or when the abdomen is distended, and the patient suffers great pain; or when the cellular membrane is distended, so that a patient cannot move about; and we cannot wait for the cure of the dropsy itself, or of its cause (whatever this may be);—it would be right to have recourse to means calculated to get rid of the fluid as soon as possible. In these circumstances, violent purgatives (such as elaterium) in full doses, answer better than diuretics; and for this reason;—they cause a greater discharge;

[a] From ὑδωρ, *water*; and αγω, *to drive out.*

and they frequently go to the *cause* of the dropsy; and remove some obstruction, some congestion, or some inflammation. But, of course, diuretics may be given with the purgatives, to increase the effect. It is found useful to give diluents at the same time; for diuretics are frequently so very acrid, that they irritate the kidneys, much more than is necessary for secretion; and their operation is much facilitated by the patient's drinking largely of diluents. The same is observed with respect to purgatives. They seem to operate a great deal better, if plenty of diluents be taken at the same time.

Mechanical Means.—Sometimes patients are so oppressed with the fluid, that they cannot wait any longer. We find that our remedies do not remove it; and then we are obliged to have recourse to certain mechanical means for accomplishing this object. These are paracentesis [a] of the chest, or of the abdomen, and (in cases of anasarca [b]) the making of minute punctures in the skin, with a needle.[c] Some persons scarify; but I am

[a] From παρακεντεω, *to pierce through.*

[b] From ανα, *through*; and σαρξ, *flesh.*

[c] The introduction of the needles is effected either by smartly pricking the skin, and pressing onwards, while the operator rotates the needle, or by a blow of a small mallet. Since the adoption of acupuncture by scientific practitioners, the following mode is preferred:—the spot being selected,—usually the seat of pain, or (when any circumstance forbids this) the adjacent parts,—the operator, having stretched the skin with the fore and middle fingers of the left hand, pierces it perpendicularly with a gentle pressure; and the body of the needle is advanced by means of a semi-rotatory motion, in opposite directions, till it has penetrated to the required depth. This is repeated till the desired number is introduced. Their withdrawal is sometimes effected by means of a forceps; but it will be better to withdraw them by the same motion with which they were introduced, as the skin is painfully elevated by their direct and forcible retraction; possibly, also, by the latter mode, the point of the needle might be broken off, if it were not well tempered. The withdrawal of the needle is not followed by hæmorrhage; but sometimes a single drop of blood oozes from the puncture. In penetrating, the needle often meets with variable degrees of resistance;—according to the nature of the parts through which it passes. The Japanese and Chinese allow the needles to remain only while the patient makes thirty respirations. M. Cloquet states, that he derived the most marked benefit in cases where he caused them to be kept in several days: this accords with my own experience. It is true, the pain may cease instantaneously on the introduction of the first needle; but we observe this by far more frequently after the needles have been in some time. Indeed, so satisfied am I on this point, that I prefer a single needle remaining for some time in the part, to several introduced and withdrawn speedily. But there is yet no general rule as to the time which the needles ought to be allowed to remain. Dr. Bache—who has employed acupuncture successfully in America, in cases of rheumatism—states, that the more chronic (or long-standing) the disease, the greater will be the length of time the needles should remain in the tissues. Practitioners who are best acquainted with the mode of performing the operation, object to forcing the needle in by sudden and direct plunging; because the tissues on its route are thus wounded; whereas, when the needle is gently rotated, they maintain that the fibres are only separated. In general, the pain of introduction is so slight, as to be entirely disregarded. As a proof of this it may be mentioned, that when M. Cloquet drew the attention of the profession to acupuncture, in Paris, it was by no means uncommon to see the students bare the calves of their legs, and insert common pins into the substance of the muscles; to convince the incredulous of the innocuity of the operation. Sometimes, however, the progress of the needle is marked by sudden and severe pain. M. Cloquet describes the pain as bearing some analogy to an electric shock. M. Dantu has made the same observation. (When the needle is of an oxidable metal, a galvanic current issues from it, and is recognised by the galvanic multiplier of *Schweigger.* But this circumstance does not appear to have any influence on the efficacy of acupuncture; which is equally successful when the needles are of gold, silver, or platina.) After the needle has been a short time introduced, it produces a sensation of pricking, heat, and in some instances cold and numbness; it is surrounded also by an areola, more or less vivid. Beclard saw one case, in which the introduction of a needle into the leg, to soothe acute pain, was followed by fainting and delirium.

quite sure that every purpose may be answered with a fine needle. By making minute punctures in the skin, an immense quantity of water may be drawn away. There is no occasion to introduce the needle deeply; we have simply to put it through the skin, by rotating it between the finger and thumb; and when it is withdrawn, a bead of clear serum will appear; and the oozing will perhaps continue for some time. I have known it continue for days even after death. Twenty or thirty punctures may be made; and I never saw harm arise from the practice, when it was put in force above the knee. But although these punctures made with a needle are very minute, and the aperture is merely through the skin, patients have lost their lives through them. Gangrene has taken place even through this slight operation; but, in every case of this description that has come to my knowledge, the apertures had been made *below* the knee. It is an established rule in scarifying, to make the scarifications as high as possible towards the trunk of the body,—near to the most powerful parts of the body; and the same rule should be observed with respect to acupunctures. I have used them with great success all over the trunk, and upon the thighs, as low as the knees; and I have used them with equal success in all parts of the upper extremities; and I never met with any inconvenience. Before I was aware of the danger I frequently used them below the knee; and never once did any accident at all dangerous occur to me. Gentlemen, however, have related to me cases which came to their own knowledge, where the operation below the knee was dangerous;—where it was followed by sloughing of the skin; and, indeed, by sloughing of many muscles. One patient lost the gastrocnemii[a]; and, at the end of two or three weeks, his life.

These mechanical means are now and then necessary; but less frequently, if the disease be treated according as it is inflammatory or not. If we carefully determine the presence or absence of inflammation, we shall cure the complaint in a large number of cases. At St. Thomas's Hospital, when I have admitted a patient with the word "*dropsy*" on his letter, I have frequently been asked—"how I could admit such a case as that; since it was well known that dropsy could not be cured; and that Doctor Fordyce never admitted such cases." One of the greatest improvements in medicine, is that of distinguishing inflammatory diseases from those which are not so; and the establishment of the fact, that a great number of diseases are nothing more than so many inflammations. One half of the cases of dropsy which I see, are of an inflammatory nature; and yield to bleeding, and the other common remedies of inflammation.

From the impression which it made on his mind, he felt disposed to reject the operation altogether. Fainting, however, must be of rare occurrence. M. Cloquet did not observe it oftener than once in thirty times, in the thousands of cases in which it was employed at St. Louis. In upwards of fifty cases in which Dr. Bache employed the needles, he did not observe a disposition to swooning in more than one case;—in which, moreover, syncope did not take place; and in no case was any untoward consequence observed. Care should be taken to have the needles perfectly polished before using them; as the pain of introducing one that is quite smooth, will be comparatively slight. For this purpose, they should be passed into the emery-bag, both before and after use.

[a] From γαστηρ, *the stomach*; and κνημη, *the leg*.

CHAPTER V.

DEFICIENT SECRETIONS.

Some diseases are exactly the reverse of hæmorrhage, the profluvia, and dropsy;—being distinguished by a *deficiency* of secretion. In the height of inflammation, the ordinary secretion of the part may become scanty. Although it is increased at first, it will subsequently decrease;—usually remaining, however, beyond the natural quantity. Sometimes, in inflammation, the secretion is suspended. The secretions of the part itself, as well as the rest of the body, may be diminished under active inflammation;—"of the *part*"; for the condition of the secreting vessels in this state is incompatible with the discharge of their functions;—"of the *rest of the body*", from the disturbed state of the circulating fluids. This circumstance, may occur, however, independently of inflammation. As in violent discharges, so we sometimes have, without inflammation, a perfect deficiency of secretion. This happens, in a most remarkable way, in the case of the kidney. Old men will sometimes cease to make water, not from any *retention* of urine, but from a *suppression* of it;—the kidney ceasing, or nearly ceasing, to secrete. In "ischuria renalis", as it is called, we have an instance of a case exactly opposite to that which occurs in the profluvia. The treatment of this particular disease will be given hereafter; I am now only speaking of these affections in general. We sometimes observe, on opening bodies, a similar state of the serous membranes. Sometimes the pericardium, and sometimes the pleura, is perfectly dry;—almost as dry as a piece of dried bladder. This is mentioned in many works on Morbid Anatomy. I do not know that this state induces any symptoms during life. According to Reynaud and Stokes, this condition of the pleural surfaces, gives rise to the peculiar *friction*-sounds in breathing, which mark the approach of pleurisy; but the state which is found after death, is precisely opposite to that which occurs in the affections of which I have just been speaking.

Antagonism of the Secretions.—[It is difficult for the student to understand the increase and decrease in the quantity of the various secretions, unless he possess some acquaintance with the laws of relation which exist between them.

"1. If one surface be more vascular and irritable than another in its neighbourhood, counter-irritation excited in the latter, will not diminish the morbid action in the former. An illustration of this principle is afforded in the example of conjunctival inflammation. If a blister be applied to the temple, for the relief of this state, it does not diminish the severity of the action; since the mucous membrane of the eye is more irritable than the neighbouring skin.

"2. An increased secretion of any given surface or structure, cannot be diminished by instituting an artificial discharge in some other part of the *same* tissue; because different portions of the same structure are related to each other by sympathy, and not by antagonism. Hence a copious secretion from the nose, will afford no relief to the conjunctiva under inflamma-

tion attended with discharge; nor will a disease of the mucous tract of the urinary organs be benefited by diarrhœa.

"3. Structures *dissimilar* in their offices antagonize each other; and the cutaneous secretion, therefore, may influence that of the kidneys. This is well known to occur; and augmentation of the one, is followed by a proportional diminution of the other. In extensive anasarca, the functions of the kidneys are almost entirely suspended; and suppressed cutaneous exhalation, is oftentimes succeeded by discharges from the intestinal and pulmonary mucous surfaces.

"4. When the functions of one organ exercise a positive control of those of another, it is observed that their respective secretions have some resemblance, with respect to their effect upon the economy. The skin and kidneys *combine* to excrete *water* from the blood. Or the *vicarious* organ must be labouring under morbid predisposition; as when disease of the bronchi or intestine is excited by exposure to cold, and a general impression upon the surface of the body."[a]

These principles of correlation between the organs of the body, have been gathered from the physiological writings of Müller. They are, however, now generally recognised in the science of medicine.—*T. Williams.*]

[a] Müller's "Physiology"; Second Edition; Volume 1; Page 518.

CHAPTER VI.

CHANGES OF STRUCTURE.

INFLAMMATION sometimes produces changes of structure; and as I have spoken of those circumstances which merely affect secretion, or the escape of different fluids[a], I now proceed to those which affect the substance of the body itself. Changes of structure, though frequently produced by inflammation, and frequently connected with inflammation, are sometimes (like hæmorrhages, dropsies, and the profluvia) *not* connected with it. They are, in the first place, changes of *consistence*, and changes of *size*; in the next place, transformations,—in which the substance is changed in its *nature*; and thirdly, new formations,—in which something new appears, totally different from what we see in the body naturally. Two, or even all three of these changes, may occur together. The first of which I shall speak, and which are more frequently the effect of inflammation than not, are changes of consistence, and changes of size. With respect to changes of *consistence*, I need not say that they can only be two;—hardening on the one hand, and softening on the other. I shall first speak of induration.

SECTION I.—INDURATION.

Turgescence.—It is to be remembered, in the first place, that induration may be only apparent. An organ may feel much harder than natural,—may be really harder; and yet we are justified in saying, that the hardness is only apparent. I will explain this. If there be extreme congestion in a part that can expand, it will become larger, and feel much harder than natural. If there be an obstruction to the flow of blood from the liver, though the proper structure of the liver itself will only be of its natural hardness, yet, in consequence of the obstruction, it will feel exceedingly hard; but, on liberating the blood, or making an incision, and letting the blood escape, it will come down to its natural consistence. This affection may be induced by an obstruction during life; and I believe that the same thing may be induced after death, by a violent injection of fluid. We must therefore consider, when we see a part indurated, whether it is organic induration, or merely a state of great turgescence, or repletion, in consequence of an excess of fluid.

Organic Induration.—When a part is really hardened, it is generally pale. Of course, if the hardness be merely dependent upon the collection of blood in the part, it will be of a deeper colour than usual; but if the part be organically hardened,—if it have undergone a hardening process, it is generally paler. As the part is more compact, we must suppose that, in general, the diameter of the blood-vessels will be less; and, therefore, there will not be such a proportion of blood as there was before. Sometimes the hardened part acquires a new colour. It may be grey, yellow, brown, or even black; but, for the most part, a portion of the body which has become indurated, is paler than usual. It does not follow, because a part has

[a] See Chapters 2 to 5; Pages 146 to 194.

become indurated, that the size should be altered. A part may be hardened; and it may be larger or smaller than before; or it may retain its natural size. We have (every day) instances of induration, in the case of a fistula along the side of the rectum, and in "fistula in perinæo." The parts we find here may be all exceedingly hard. The heart is not unfrequently in this condition; for though this organ is more frequently affected in *size*, we not unfrequently find the heart hard. Even the general cellular membrane is frequently seen hardened; and especially in young children.

Cause of Induration.—This process of hardening is, for the most part, slow; and is generally the effect of chronic inflammation. Sometimes it does not occur till the inflammation is entirely over;—till the part has become pale, and there is no reason to suppose that inflammation exists; and then that process will take place, by which the part becomes hardened.

[It is important to establish that distinction between induration and hypertrophy, which is indicated by the essential difference in the actions upon which they respectively depend. The former necessarily owes its origin to inflammation; the latter is the result of an increase in the natural assimilative powers of the part. To consider intimately the process of induration, it must be remembered that the *slowness* with which the product of the chronic inflammation is effused, allows sufficient time for the absorption of the fluid portions;—thus leaving the cells of the tissue to be occupied by the hardened fibrin exclusively.

This view of its production immediately suggests, that the mode in which counter-irritation frequently either softens or removes the induration of parts, consists in exciting a more active inflammation; which, by its rapidly effused product, liquefies the hardened material, and thus renders it absorbable. In induration, then, the albuminous and fibrinous portions of the blood accumulate, unassimilated, in the primitive cells and between the particles of the tissue. The material, therefore, upon which the hardening of structures depends, is always the same, however dissimilar the composition of the latter. That the process of inflammation, however, is intimately modified by the organization of the structure in which it occurs, appears obvious from the fact, that mucous membranes never undergo the hardening process. Nor could such a change be *à priori* expected; for it is well known, that inflammation in them is seldom marked by the effusion of albumino-fibrin; and this further accounts for the fact, that mucous surfaces are never agglutinated by common inflammation. From these observations it at once appears, that if the liquor sanguinis, in this simple and chronic action of hardening, were altered by disease in the blood, it may give rise, by assuming modified forms, to various malignant and non-malignant affections;—the deposition of tubercles, carcinoma, melanosis, and so forth, may be the result. These, however, will be separately considered. In reference to this state, Dr. Carswell[a] remarks:—"Induration differs from the solidification in acute inflammation in this;—that there is, at the same time, increased cohesion of the anatomical elements of the affected part. Tissues, instead of being more easily separated (as in the former state), are more firmly united, or so often confounded together as to have lost their distinctive characters; and soft, spongy, or cellular organs, frequently acquire a very great degree of density and tenacity. It is obviously the consequence of the organization of the coagulable lymph effused, in the *second* stages of acute inflammation, either into the interstitial cellular structure of organs, or into the tissues themselves, in the state of softening induced by the *first* stages.

[a] "Pathological Anatomy.—Illustrations of the Elementary Forms of Disease. By Robert Carswell, M.D." &c.

It is always accompanied by the grey discoloration of chronic inflammation, and by a greater or less degree of opacity of the membranous tissues." For a valuably practical account of inflammatory changes, we direct the reader to this splendid work of Dr. Carswell.—*Thomas Williams.*]

Treatment.—When there is no inflammation, the affection is best removed by irritating the part. If the hardening be evidently attended by inflammation, antiphlogistic remedies are the best that can be adopted. Bleeding, both local and general, together with mercury, iodine, fomentations, poultices, friction, and pressure, are particularly proper. But sometimes there is no inflammation to be discovered; and then stimulation of the part answers much better than any thing else. It is also of great use to excite a discharge from the part itself, or close to it. It will frequently cause an absorption of the excessive matter which has been deposited. Occasionally, when there is no inflammation to be discovered, the treatment of induration becomes so irritating, that inflammation is set up; so that inflammation, although it may at first have laid the foundation of the disease, and produced it, yet afterwards has ceased; and then comes on again, as a third stage.

SECTION II.—SOFTENING.

The opposite to this change of parts, is softening; called by the French "*ramollissement*"; which means nothing more than "*softening.*" Formerly this change was very vaguely described. Even induration was commonly described as a termination of inflammation, by the name of "*scirrhus*";—scirrhus being confounded with simple induration. The process of softening is remarkably seen in central parts of the nervous system; and also in the alimentary canal. The mucous membrane of the stomach and intestines, is frequently reduced to a mere pulp, which may be brushed off with a slight touch of the finger; and sometimes it appears to be removed even before death. In the case of the brain, we (every day) see that organ reduced, in certain portions, to a mere soft paste. It occurs, also, in the skin;—sometimes in the epidermis, sometimes in the cutis itself, and sometimes in the nails. We must all have seen the nails so softened, as to appear more like wet card than any thing else. This softening will affect the cellular membrane; and then it will allow the serous membrane without the intestines (for example), or the mucous membrane within, to be peeled off. If we can peel off the peritonæum from a portion of the stomach and intestines, it must be from the subjacent cellular membrane having become so softened, that the serous membrane is no longer attached. So, if we can peel off portions of the mucous membrane, it must be from the sub-mucous cellular membrane having become so softened, that it is no longer properly attached. The cellular membrane will sometimes remain solid, while all the other parts are excessively softened. This is seen in the case of the brain, for example, and of the spinal marrow. They will become soft; while the pia mater (which corresponds with cellular membrane) immediately upon the brain, and immediately upon the spinal marrow, will be perfectly firm. A serous membrane, such as the peritonæum, will sometimes soften; as also will arteries, and even cartilage, and bone itself. Bones may shew such a disposition to become softened, that one species of disease has acquired the particular name of "*mollities ossium*"; and in rickets,—another disease of the bones,—they are much below their natural consistence. The muscles, too, will sometimes become soft. After a person has been long exposed to the operation of lead, in painting, I have seen the

muscles become much softer than natural; and so pale, as to look like any thing but muscles. The heart itself, like other muscles, will frequently become soft. Sometimes the finger may be pushed through its parietes, in consequence of the excessive softening which occurs. But every structure in the body may become softened. When parts are softened, they frequently retain their natural colour; but sometimes they are paler than they should be; sometimes they are redder; and sometimes they become brown and dark. There are great varieties with regard to colour; both when a part is indurated, and when it is softened. The colour may be unaltered; or it may be paler than natural (which is generally the case), or it may be deeper than usual.

As with induration, so with softening, a part may sometimes acquire an augmented volume; or it may become smaller; and sometimes its bulk remains unaltered. You would not suppose that a part could be very rapidly softened; and yet it is certain that a part may be softened in a very short time; —at least, for myself, together with many French writers, and perhaps others, I feel satisfied that that is the case. It is mentioned by the French, that a few days, if not a shorter time, are sufficient to produce a pulpiness of an organ, which before was apparently in a state of health. I think I have seen sufficient to make me believe that, in an acute disease, an organ (previously sound) may lose its natural firmness, and become a mere pulp, in a very short space of time. This result is unquestionably due to the solvent power of the inflammatory product upon the component tissue of the organ; combined with the pressure which, by distending the cells, it exerts upon their walls;—thus impeding and suspending their nutrition.

Induration is generally the effect of chronic inflammation; and softening, in some circumstances, arises from the same source. But I have seen a person in tolerable health suddenly, without any evident reason, fall into a state of the greatest debility;—with most complete prostration of strength; with no pulse; and, in two or three days, some organ or other has been found reduced to a pulp. I had great doubts, when I first noticed this, of the accuracy of my observation; but on reading the French writers, I found that they detailed cases exactly similar; and that they came to the conclusion which I felt inclined to entertain, though not without hesitation. When very rapid, I do not believe it is always the result of inflammation, or is even inflammatory; and when a slow process, I am sure it is not always inflammatory; for the parts are often exceedingly pale. In rickets (or *mollities ossium*), what inflammation is there of the bones?

[This change, which consists in the softening of structures, has been more accurately examined in the brain than in any other organ; and, since the process is essentially the same in every structure, the brain may be allowed as the type of softening in other parts. Dr. Hodgkin[a] instances the brain of a child affected with hypertrophy, to illustrate the dependence of ramollissement upon excessive growth; for the texture of the brain, under this rapid nutrition, has not acquired the firmness which interstitial deposit may give.

It is, however, pathologically important to distinguish between the one,—which is only an excessive process of growth; and the other,—which unquestionably is distinct from, and injurious to, the process of nutrition when associated with inflammation. Dr. Symonds[b], in reference to this point, coincides with the above opinion; and declares that softening, as a disease of nutrition, is (compared with that which results from inflammation) of infrequent

[a] "Cyclopædia of Surgery"; Page 200. [b] "Library of Medicine"; Volume 1; Page 40.

occurrence.—"When softening is due to inflammation, the fluid effused, in most cases, not only breaks down the structure by infiltration, but also by its *pressure* impedes the nutritive deposition. But when softening presents itself as a true perversion of nutrition, we find the tissue in one of two states;—either those molecules which impart the usual degree of firmness are deficient; or, when the tissue is less composite, the ultimate molecules are softer than natural."—It is now generally admitted, by morbid anatomists, that the colour of the softening is regulated by the previous amount of blood in the part;—the transition of the part, however, from one colour to the other, after the commencement of inflammation, will depend upon changes in the effused matter. When redness of a part is at first intense, the colour of the resultant softening is permanent, until suppuration occurs; when it successively assumes a chocolate-brown, green, or grey colour. If the lungs or brain be the seat of these successive changes, each state receives distinctive appellations. In the lungs they are known, in the language of Andral, as the "ramollissement rouge" and "grise"; in that of Laennec, as "hepatisation grise", and in the brain they are recognised under the epithets, "red" and "yellow softening." Abercrombie[a] has described a white or colourless softening, in which the cerebral matter is curdy and glistening. This change he states to depend upon inflammation; and instances the *corpus callosum*, the *septum lucidum*, and *fornix*, as its frequent seat.—*Thomas Williams.*]

Cadaveric Softening.—I have mentioned[b], that every case of *apparent* induration is not to be considered *real*; for it may depend upon great congestion. From the presence of fluid, a part may acquire increased bulk and firmness. But softening cannot be merely apparent. If a part be soft, there can be no deception in it. It is necessary, however, to guard against an error on this point. Softening may occur after death; and merely because, on a *post-mortem* examination, we find a part excessively softened, it is not to be concluded that it was in that state during life. Parts will become softened from decomposition;—they will melt down to a reddish pulp. I mentioned, when speaking of redness, that a red appearance is sometimes mistaken for inflammation[c]; whereas it may be only the effect of a red fluid which transudes, and encircles and dyes the part. Parts will become softened from decomposition. The brain, without any morbid state, very speedily becomes soft. Every body knows, that if he wishes to dissect a brain well, he must have it fresh;—that if the person has been dead any time, or the brain has been exposed to the air, it becomes too soft for accurate dissection. But the fluids within the body will themselves sometimes dissolve parts. There can be no doubt that the gastric juice will produce a softening of the interior of the stomach; and even do more than that. It will soften the whole coats of the organ, escape into the cavity of the peritonæum, and soften whatever it comes near. This was discovered by John Hunter; and I think we have sufficient proof of the accuracy of his observation. The appearances thus arising from the gastric juice, have sometimes led persons, who were ignorant of the fact, to imagine that a patient had been poisoned.

Effects of Softening.—I need not say that, when softening occurs during life, it must produce some effect. A large number of cases of paralysis, depend upon a softening of the brain, or of the spinal marrow. Some cases of fatuity, likewise, depend upon a softened state of the anterior portion of the brain. Sometimes extreme debility supervenes, when any essential organ (such as the liver, the lungs, or the heart) becomes softened.

[a] "Pathological Researches on the Brain and Spinal Cord." Part I. Section II.

[b] See Page 195.

[c] See Page 76.

Except in bones, and parts at or near the surface, the existence of this softened state cannot, of course, be well known during life. We only infer it as probable.

Treatment.—Induration, I have stated[a], may in certain cases be removed by the remedies of inflammation; while, in others, stimulants will frequently cure it; especially if aided by mercury. But it is not known whether a softened state of a part can be recovered from. Indeed it is extremely difficult, if not impossible, to restore the consistence of an organ, after it has been reduced to the state of pulp. If the part shew signs of inflammation, the only treatment is that appropriate for inflammation. It is difficult to know that the part is softened; it is only seen to be inflamed. In cases of paralysis, we cannot tell that the part is softened; but when symptoms of violent pain at one part of the head and great heat occur, and the patient gradually becomes paralytic, there is a probability that the part is softened; but still no proof of it is given. If signs of inflammation be observed, they must be treated;—without regard to softening or induration. If prostration of strength come on, it must be our endeavour to remove it;—not knowing whether the parts are softened or not. In the case of the heart, extreme feebleness of its stroke, when examined at the chest, is frequently found.

SECTION III.—HYPERTROPHY.

The foregoing are changes with respect to *consistence*; we have others with respect to *size*. If a part really obtain an addition of substance, not dependent on transformation, or a new formation, it is said to be *hypertrophied*. This is a new word; but it is a very convenient one. The part suffers an excess of nourishment; it is therefore hypertrophied,—overnourished.

[An important principle, regulating the formation of all organized textures, has been brought to light by the microscopic labours of Schwann and Schleiden, in Germany. They found, that in the production of any given form of tissue,—such as fibre or tube,—nature does not at once unite the organic molecules in that form; but first creates, by a definite process, "round vesicles or cells", and subsequently transforms these into the various elements of the organic textures. By the adaptation of these views it can be shewn, that nutrition exemplifies the fundamental principle of organic assimilation;—each elementary particle attracting similar particles from the blood, in order to maintain the integral organ; and, by the changes thus impressed upon them, they are caused to participate in the vital principle of the organ itself. Under the head of "induration", however, it has been already remarked[b], that organs may increase in size, independently of inflammation. In this state, the albumen and fibrin of the blood accumulate, unassimilated, between the particles of the tissue. In proper hypertrophy, however, the assimilative action continues, and at an augmented rate. The uterus, in the pregnant state, increases in bulk by the addition of real contractile particles, duly assimilated to the original tissue. But inflammation is not an increase of the plastic, or nutritive process; although its products are susceptible of organization. In hypertrophy and inflammation, "nucleated cells" are equally generated in the effused material. These cells may undergo no further transformation; and, with the fluid in

[a] See Page 197. [b] See Page 196.

which they are contained, may constitute pus; or they may proceed to assume the form of fibres. But the tissue which thus results is always the same, whatever may be the structure of the organ in which the inflammation is seated. In parts which are undergoing hypertrophy, however, though the nutritive matter effused assumes at first the form of nucleated cells, each tissue exerts a different assimilating influence upon it; and causes the transformation of the cells into structure of its own kind, whether fibrous or cellular.—*T. Williams.*]

Nature of Hypertrophy.—Hypertrophy may affect one elementary tissue of an organ only; or it may affect the whole of an organ together,—every tissue of which it is composed. It will sometimes affect the cellular membrane; and then this becomes thicker and perhaps denser than it should be. A part may be over-nourished, without increasing its size. The excess may be such as merely to harden it; so that, in one sense, induration may be an hypertrophy. But, very generally, when a part is over-nourished, it acquires a considerable excess of bulk. If the cellular membrane be over-nourished, and at the same time indurated, dead-white lines, or semi-translucent streaks, are seen along it. Frequently, only portions of it fall into this state of excessive nourishment. There may be produced tumours which, when cut, resemble a turnip in consistence, and in which white and greyish fibres are seen. This is the character of scirrhus; and there is a doubt among those who cultivate morbid anatomy, as to whether this ought to be called a new formation; or is merely an excessive nourishment—hypertrophy and induration—of the cellular membrane. But however this may be, when the cellular membrane is thus affected, it presents dead-white, or semi-translucent lines; and it may form a tumour in one particular spot. Sometimes the cellular membrane, in this state, on being cut, will resemble lard, or imperfect cartilage.

Tissues and Organs liable to Hypertrophy.—Mucous membranes are frequently hypertrophied. The villi of the intestines are sometimes very much enlarged; the mucous follicles are likewise enlarged; and the whole are increased in size. The skin frequently suffers this change;—becomes excessively indurated and thickened. The brain will sometimes be hypertrophied; though I never saw more than one instance of this affection. I have seen many instances of partial induration, and cases where all the brain was very firm; but there was nothing except a hardening of the organ. In this instance, however, the brain had become larger than it should be. It caused the skull to be very much beyond the usual dimensions; and looked, on opening the skull, as if it had been ready to burst it asunder. The convolutions were all very large. This is a state described by many authors; and, for the most part, fatal disease of the brain is at length produced. This patient—a lad, who was exceedingly precocious—had a head larger than a man's. His character corresponded with that of an adult; and he suddenly became apoplectic and hemiplegic, and then died. Nothing was to be found but an excessive size of the organ;—the brain, in other respects, being healthy.

The spinal marrow has been seen hypertrophied. Nerves will fall into this state after amputation. The nervous ends will become very large; and frequently there is a morbid sensibility. Muscles are sometimes seen hypertrophied; but the organ most frequently thus affected is the heart. The most common disease of the heart, is excessive nourishment of some portion; and that portion is, by far most frequently, the left ventricle. Blood-vessels, as well as the heart, will become hypertrophied; vessels are sometimes only accessorily hypertrophied; vascular tumours may like-

wise occur. On examining these tumours, we find nothing but a congeries of blood-vessels. Some tumours of this description have been called "fungus hæmatodes"; but such an appellation leads to a confusion of terms. By "*fungus hæmatodes*" we more particularly understand a combination of this state with a deposition of encephaloid (brain-like) substance.

Changes in Size accompanying Hypertrophy.—When a part is over-nourished, there is usually (I said [a]) an increase of bulk. But an excess of nourishment may go only to condensation; and then a change of size does not occur, but only a change of consistence; and sometimes an organ which is partially over-nourished, may be smaller than usual. It will sometimes happen, when an organ is composed of more tissues than one, that one tissue will entirely waste; and the wasting of the one, may more than counterbalance the over-nourishment of another. With respect to the cavity of an organ so hypertrophied, it may sometimes be seen diminished, sometimes increased, and sometimes unaltered. That occurs in the case of the heart. Sometimes, if the heart be hypertrophied, the cavities enlarge; but sometimes the deposition of matter takes place outwards, and the heart really is enlarged, but the cavity remains much the same. Occasionally, however, the deposition takes place inwards; and the cavity becomes greatly reduced. When a part is thus hypertrophied, the consistence sometimes remains the same; sometimes it is increased; and sometimes it is diminished. There is just the same variation in colour. Sometimes the colour remains natural; sometimes it is paler; and sometimes it is heightened.

Causes.—I believe that hypertrophy of a part is generally, more or less, of an inflammatory nature. Certainly, that is the case with the heart. Hypertrophy of the heart is, in most instances, entirely of an inflammatory nature; and, indeed, it may be supposed that an excess of nourishment must be the result of an excessive action in the part itself;—it must be supposed, therefore, that all the natural processes of the heart are going on with tenfold vigour. If a certain operation be necessary to the continuance of nourishment, and it is much increased, an excess of nourishment will be afforded. It is impossible, in a great number of cases, to consider hypertrophy as any thing more than a sort of inflammatory state. Excessive exercise of a part, however, will sometimes cause it to be over-nourished. We know that muscles will increase by exercise. A great excess of action in a part, will sometimes cause it to acquire a bulk much beyond its natural dimensions. Still this is excessive excitement. It is *chronic* inflammation which causes hypertrophy; *acute* inflammation rarely does;—except so far as it lays the foundation for hypertrophy. Andral mentions, that hypertrophy may sometimes arise from a defect of absorption;—that the absorbents do not carry away the materials that they ought. An accumulation of nourishment takes place, without undue nourishment being deposited. This, however, is but a mere hypothesis. He calls it a want of de-assimilation;—the want of removal of those particles which are already deposited, and have served their purpose.[b]

[a] See Page 201.

[b] Dr. Carswell, in his "Illustrations of the Elementary Forms of Disease", resolves the causes of hypertrophy into three:—

"1. The frequent and increased action of an organ in the exercise of its function.

"2. The existence of a mechanical obstacle to the accomplishment of the function of an organ.

"3. The long continued influence of a morbid stimulus."

The first is exemplified in the hypertrophic growth of the voluntary muscles, from frequent and excessive action. Examples of the second are presented to us in the enlargement of the walls of the hollow vis-

State of General Health in Hypertrophy.—When a part falls into this condition of hypertrophy, it is necessarily in a state of excessive activity,—though perhaps without strength; and, indeed, no mark of inflammation may be discernible. Persons of the most sickly character, are frequently subject to this affection; as in those unhealthy parts of the world where bronchocele exists;—where the thyroid gland falls into a state of hypertrophy. Individuals in those situations are, for the most part, in a state of delicate health;—sallow,—shrivelled. So, in rickets, the ends of the bones enlarge very much;—they are hypertrophied; but the case is one of debility. In scrofula, we frequently see parts become enlarged. The ends of the fingers, in a case of decided scrofula, are oftentimes much enlarged; the mesenteric glands, and also the upper lip, are much larger than they should be; and yet such persons are not instances of strength, and of increased vigour. Indeed, in the most unhealthy districts, (the valleys of the Alps, for example,) hypertrophy—not only of the thyroid gland, but also of the liver, the tongue, the bones, and the hand—frequently happens; and yet the persons are pale and emaciated, and no sign of inflammation appears. Hypertrophy may induce very serious effects in the case of the brain. I believe that sooner or later apoplexy, paralysis, or epilepsy, will ensue. In the case of the heart, very great suffering is induced. There is palpitation from the slightest causes; there is, generally, a strong violent pulse; and, at last, there is dropsy.

Treatment.—The usual remedies for hypertrophy, are the general remedies for inflammation;—rest and low diet, with moderate and repeated bleeding. But occasionally these measures are not justifiable; and the strength must then be supported. Of course, when this affection occurs in a cachectic habit of body, (as rickets, or scrofula, or the state of cretinism in the Alps,) anything that depresses the powers of the body may do harm; and good air and good food are the best remedies.

SECTION IV.—ATROPHY.

The opposite of hypertrophy is atrophy,—wasting. Sometimes the part which wastes does not become smaller, but becomes thinner than usual. Its bulk may be the same; but its texture may become lighter,—more spongy than usual. Atrophy sometimes affects the whole of an organ; sometimes only a portion, or a tissue; and sometimes the part will become thinner and thinner, till at last it is perforated. Parts that waste away are generally softer, and frequently paler than natural. Atrophy of parts is commonly induced by inflammation, or by violent irritation. The excessive nutrition of neighbouring organs, will frequently cause one to waste;—the excessive action going on in one, causing the actions of the other to decline. A wasting away of the testicles, frequently supervenes on inflammation which has followed the mumps. Andral mentions that, after suppuration near the liver, he saw the gall-bladder waste away entirely.

Causes.—Atrophy is frequently an effect of bad air, bad food, depression of mind, or deficient exercise. As we must consider hypertrophy in general

cera, from obstruction to the ready escape of their contents;—the heart, stomach, and bladder may be enumerated. Long and chronic inflammation, and irritation of a part, would induce the third. Elephantiasis, and other similar affections of the integuments, are the best illustrations.—*T. Williams.*

to be *excessive* function, so in atrophy there is diminished action, a *deficiency* of function.[a]

Treatment.—As it is usually the very opposite state of things from hypertrophy, very opposite remedies are usually required. So far from the part being allowed to be at rest, it must be well used, if possible; and must also be stimulated as far as may be.

[a] Dr. Carswell views this organic change as owing its origin to causes which are the converse of those inducing hypertrophy:—

1. Atrophy from a diminished supply of blood.

2. Atrophy from the diminished exercise of the function of innervation.

3. Atrophy from the diminished exercise of the functions of an organ.

The first kind is exemplified in the diminution of bulk which takes place in the brain, after ossification of the carotid and vertebral arteries of one side. Atrophy of the testicle results from the obliteration of the spermatic artery; of the spleen from the closure of the splenic artery; and so on. —The second is illustrated in cases of paralysis.—The third variety is shown in the effects of artificial anus;—the intestine beneath or beyond being reduced to a transparent membrane. Or when one of the bronchial tubes is obliterated, the lung beyond atrophises.—*T. Williams.*

CHAPTER VII.

TRANSFORMATIONS OF STRUCTURE.

I NOW proceed to consider those changes, in which one structure is converted into another structure, natural to the body. These are called "transformations." Though of a diseased character, they are like those which naturally occur, during the growth and decline of an individual in health; or else they are the structures of which the particular part is actually found to be naturally composed, in some orders of the animal series. The cellular membrane is the frame-work of the other structures of the body; and, in the natural condition of the body (that is, in its natural progress), we observe that when a part is no longer wanted, it degenerates into cellular membrane. An instance of this is presented to us, in the thymus gland of the fœtus. Now such a change will occur merely as a diseased process. A part may be resolved nearly into cellular membrane; and that is an instance of transformation. Cartilage will sometimes, by disease, become bone; but it is perfectly natural to the progress of the body, that cartilage should become bone in the fœtus; for cartilage precedes the formation of bone, although recent physiologists state, that there are distinctive marks by which the primitive cartilage may be distinguished from that which subsequently forms the basis of the bones. For the most part, then, the morbid changes which are transformations, are nothing more than alterations, precisely the same as those which happen naturally in the progress of the human body; or they are alterations of a part to a structure, natural to some other animals. Although they are morbid processes, they observe exactly the same law as those which are natural. One structure is not changed into another, unless that same structure is observed to be naturally changed into that other, at some period of the progress of the body; or unless that other is the natural structure of the part, in some other of the series of animals. Cartilage, I have said, will become bone through disease; and the same is observed as a natural process at certain ages; whereas it is never known that, by any disease, a mucous will become a serous membrane. As such a change is unknown in physiology, so it is unknown in pathology.

Mucous membranes may be converted into skin, and skin may be converted into mucous membranes; muscles will also degenerate into fibrous membranes. Now the very same part which is mucous membrane in one animal, is skin in another; and what are muscles in some animals, are merely fibro-ligamentous substances in another. These same changes, however, will occasionally take place out of their natural course, through disease; and they are then called "transformations." Cartilage, on the other hand, is never known, in physiology, to become mucous membrane. What is cartilage in one animal, is never mucous membrane in another; and in the transformations which take place in the progress of the human body naturally, cartilage never becomes mucous membrane. So in disease, cartilage is never known to be converted into a mucous membrane.

Cellular Transformations.—Almost all the structures of the body will waste into *cellular membrane.* It is perhaps hardly right to say they are

transformations into it; because cellular tissue is the frame-work of all the other structures. Indeed, it has been said, that if all the various other substances were absorbed, and nothing but the cellular substance remained, (provided it could be kept firm,) it would maintain the entire form of the body. Parts often appear to be transformed into *fat*; but Andral considers that this is merely an instance of inordinate secretion of fat, with or without atrophy of the tissues.

Membranous Transformations.—We have frequently a transformation to *serous* membrane. When the extremity of a bone has been dislocated, it will be found, after a considerable lapse of time, that a serous membrane is formed round it. If a coagulum of blood be effused into the brain, or any other firm substance (even a bullet) be deposited there, it will become surrounded by a serous membrane (a "capsule", as it is called); which secretes serous fluid. Occasionally, when there is a loss of substance which nature cannot entirely repair, the space is enveloped by a serous membrane. Even when a portion of substance is deficient, not by external violence, but by a natural defect, its place is frequently supplied by a serous membrane. In a defect of portions of brain, we find in their room a bag, containing liquid; which bag is, to all intents and purposes, a serous membrane. What are called "apoplectic cells" in the brain, are nothing more than cavities formed by a coagulum of blood which has been effused; and which coagulum has had a serous membrane formed around it. The coagulum will be absorbed, while the serous membrane may remain, and continue to secrete fluid. [a]

Such cysts may be formed in almost any part of the body. A serous membrane is a closed sac, with a smooth internal secreting surface; and is found in the body naturally. Precisely such sacs are formed by disease; and are of all sizes;—from that of a pin's head, to a very considerable bulk. We find these cysts sometimes placed in juxta-position, either attached or unattached to each other; and sometimes they are closely united to the surrounding parts. They may be single, or they may be numerous, —solitary, or crowded. Generally there is no red vessel to be traced beneath the external surface; and the utmost vascularity is an arborisation upon this. The part which surrounds these cysts is found in different states. Usually it is perfectly healthy, sometimes it is wasted, and sometimes it is in other states of disease; as, for example, in a state of induration. Occasionally we find these cysts surrounded by pus, or some other secretion. They are frequently surrounded by cellular substance, which gives them an additional coat; sometimes they become indurated,—even to car-

[a] It is remarked by Müller, and Heule, that the adventitious membranes, which are produced in the lungs to line vomical cavities, and in the brain to circumscribe a clot of blood or a collection of matter, although presenting a smooth surface internally, are notwithstanding wholly unlike serous membranes in organization. Delpech and Mr. B. Phillips and others state, that these artificial membranes consist of nothing more than a condensation of the surrounding tissue, from infiltration of its cells. Bichât, however, declares that all cysts are analogous in structure to serous membranes; but this statement is found, by all subsequent writers, to be incorrect. But, further, these cysts may undergo a variety of changes, without any conformity with the law expounded in the context by Dr. Elliotson. The factitious lining of morbidly produced bursæ, and all diseased cavities, irrespectively of their contents, may indiscriminately be transformed into an osseous or cartilaginous substance; or hair may even grow in the most unnatural situations, and from the most different structures. These, in addition to other physiological reasons, would induce me to question the accuracy of the law of transformations, sought to be established by the author. It is certain, that many transformations of which no type or analogue can be found, either in inferior animals, or in the earlier stages of man's development, frequently occur from diseased action.—*T. Williams.*

tilage or bone; and sometimes they become more or less fibrous. The cellular membrane becomes very firm round the fibrinous cup of an abscess, and gives it an additional support; and so it is with respect to these serous cysts. The cellular membrane around them is frequently condensed.

Interior of Adventitious Cysts.—The internal part of these cysts, presents very different appearances. Occasionally, and indeed for the most part, it is smooth,—exactly as in a natural serous membrane; but it varies, just as natural serous membranes do when diseased. When natural serous membranes are diseased, they are frequently rough, granulated, or flocculent within; and so the interior of these adventitious membranes presents a great variety of appearances;—being occasionally rough, with minute granules; and sometimes with large caruncles, as it were. The granules which adhere to the interior of these cysts, are frequently of an osseous character; or contain, at least, more or fewer particles of bone. Occasionally we observe false membranes lining the interior of cysts; that is to say, fibrin has been poured out;—giving them exactly the appearance presented by inflamed serous membranes, and of which I spoke formerly.[a] There are frequently partitions in these cavities,—dividing them into compartments. Frequently there are prolongations from the interior, running through the cavity of the cyst, and not completely dividing it; but causing it to have a number of compartments, communicating more or less with each other.

Contents of Cysts.—The *contents* of these new serous membranes, as well as their internal surface, are very various. Occasionally they contain merely a serous fluid;—occasionally they contain blood. They will contain something like mucus;—various saline matters, fatty matters, tubercular matter, and some things which are peculiar to cysts. There is a far greater variety in the contents of these serous cysts, than in those of the natural serous membranes of the body, when the latter happen to be diseased. Different substances may be found in different portions of the same cyst. We may also find some cysts growing from the inside of others,—hanging in them by peduncles; and sometimes, instead of hanging in this manner, they are attached to the interior by a flat surface of considerable extent.

Hydatid Formations.—It has been imagined, that all the new formations of the body are originally nothing more than cysts; and these cysts have been called "hydatids."[b] The term "*hydatid*" should be confined to a certain animal; but it is used vaguely to embrace, not only real animals, but also these serous cysts; which are nothing more than morbidly formed serous membranes. It has been imagined, that all the new formations of the body were originally hydatids;—that is to say, either parasitic animals, or such new cysts as I have mentioned. One compartment of these cysts, it is true, will sometimes be filled with scirrhous matter, another with melanotic, and another with encephaloid; and we continually see minute serous cysts by the side of scirrhus, melanosis, &c.; whence it has been supposed, that these are merely different stages and forms of the same disease. But I do not see any proof of it; for when a part has once fallen into a state of disease, all kinds of disease will frequently spring up around and in it. Where we cannot detect any new serous membrane, but where we see the solid substance of scirrhus (for example), it has been supposed, that it was originally nothing more than a serous cyst, filled with indurated substance;—that the transverse bands are nothing more than new serous cysts, which grew on the inside, and hung by peduncles; and which became filled with an indurated substance, until the whole formed

[a] See Pages 113 and 114.

[b] From ὑδωρ, υδατος, *water*.

one mass;—that the fibrous bands we see in scirrhus, are nothing more than different serous cysts, all compacted in this way. On this subject, the works of Dr. Baron[a]; and a paper by Dr. Hodgkin, in the "Medico-Chirurgical Transactions"[b], may be consulted. Their views are ingenious; but whether altogether true, I will not pretend to say. Dr. Hodgkin followed Dr. Baron; and, as far as I can comprehend his paper, has only developed Dr. Baron's views.

Minute sacs, as observed in various parts of the body, are usually nothing more than new serous cysts. They are continually met with in the choroid plexus of the brain; and they are seen of all sizes;—from the most minute, till they attain a very considerable magnitude.

Mucous Transformations.—With respect to the transformation to *mucous* membranes, when a natural mucous membrane is destroyed, it is very common for nature to supply a new one. This is, of course, not always a disease;—any more than inflammation is always a disease. When a fistula takes place by the side of the rectum, or in the perinæum, it will acquire a lining membrane of a mucous character. Even in an old purulent cavity, a lining of this character is sometimes seen. When an abscess takes place in the lungs, and does not heal, but remains for a considerable length of time, the internal secreting surface acquires the character of a mucous membrane.

When a new mucous membrane is formed in the lungs, a cavity (constituting a vomica) will sometimes exist for years; and both the fistula and the cavity will be lined by something like mucous membrane. In all instances of this newly formed mucous membrane,—formed through disease, although by a restorative process,—it will be found to be one of the most simple character. A new mucous membrane so perfect as that of the intestines, however, is seldom seen;—it will never exhibit such villi. In its utmost state of advancement, it will be only like the mucous membrane of the urethra. The urethra presents one of the most simple specimens of a mucous membrane; while the mucous membrane of the intestines, presents an example of a perfect description.

Cutaneous Transformations.—If *a mucous membrane* be exposed to the atmosphere, it acquires all the characters of *skin*. As already stated, skin and mucous membrane may be always classed together[c]; but if a mucous membrane be completely exposed to the air, so as to be dried, it becomes exactly like skin. We often have an opportunity of seeing this, in the instance of prolapsus of the womb. When the womb falls through the vagina beyond the external opening, and there remains (not being replaced by art), the vagina becomes dry, shrivelled, and pale,—like skin; and if it were allowed to remain there permanently, it would be difficult to tell the difference between it and skin. When the skin is destroyed, it may be re-instated by fresh skin.

Fibrous Transformations.—Conversion to *fibrous membrane* is very common; and it is the cellular membrane particularly, which undergoes this process. The cellular membrane will become indurated, so as to form cords; or so as to form a continuous membrane of a fibrous character; and frequently we have it indurated and accumulated into a mass. In all these cases, fibres may be seen; and in the midst of these fibrous bands may be observed cellular membrane, not yet perfectly changed. Tumours consisting

[a] "Inquiry, illustrating the Nature of Tuberculated Accretions," &c. (1819); "Illustrations of the Inquiry," &c. (1822); and "Delineations of the Origin and Progress of Various Changes of Structure," &c. (1828).

[b] Volume 15; Page 265.

[c] See Page 111.

of fibrous membrane, or of cellular membrane yet imperfectly converted into fibrous, may occur; they may be homogeneous, and may consist of lobes; or, again, of granules. Sometimes they will become vascular,—differing exactly as we see various *natural* fibrous membranes differ. They are more or less firm, according to the change which has taken place;—varying from the softness of pulp, to the hardness of bone. The structure surrounding one of these tumours, is often perfectly healthy; but sometimes it will be actively inflamed, and sometimes it will waste away. These tumours will occasionally take place after accidental inflammation; and sometimes they will occur without any obvious reason whatever. We sometimes see, that after the cellular has (in this way) been converted into a fibrous membrane, it becomes still harder; and forms cartilage, and even bone.

Cartilaginous Transformations.—The transformation to *cartilage*, is also a very common morbid process; and takes place exactly in the same circumstances as the conversion to fibrous membrane. Very often it succeeds it, and is present with it. What becomes fibrous membrane at first, will often become cartilage afterwards. Cartilage, if of diseased origin, is very often formed of cellular membrane in the substance of organs; and frequently between the different tissues; so that it is common to see it under a serous membrane. When the pleura or the pericardium is observed cartilaginous or ossified, it is the cellular membrane immediately underneath the serous membrane, that is converted into bone. When cartilage is formed in this way, it is sometimes in mere little points, and sometimes in patches. This is a very common occurrence in arteries. Spots in the interior of an artery, of a different colour from the rest, excessively firm,—of a cartilaginous character, are sometimes seen; and these are formed under the lining membrane of the artery. Cartilage is frequently formed like a fibrous tumour,—in lumps or hard knobs. It is very common, after chronic inflammation of a serous membrane,—when the whole is thickened together,—to find a knob of cartilage here and there. Serous cysts frequently have knobs of cartilage in different parts; and frequently they are cartilaginous to a great extent. These knobs are found in the substance of different organs; but I believe they are for the most part cellular membrane, extending most frequently from the surface into the substance, and there increasing in size.

Cartilage, of new formation, is sometimes seen loose in a cavity. It is very common to see it in a joint; and it is not uncommon to see it in the veins of the pelvis. I believe it is formed under the synovial membrane, in the one case; and under the lining membrane, or inner coat of the vein, in the other. It protrudes, till at length it has a peduncle; which peduncle becomes thinner and thinner, till the whole is detached; and then we have a loose cartilage in the joint, or in the veins. I sent to the University[a] a specimen of the veins of the pelvis, in which were a great many cartilages, which could be moved about from one portion of the vein to another, like peas. Transformations to fibrous membrane and to cartilage, so frequently run into each other, that fibro-cartilaginous transformations result.

Osseous Transformations.—Induration, however, frequently proceeds farther than this. The natural *change of cartilage into bone*, is continually observed to take place in disease. After cartilaginous transformation has existed for a long time, we frequently find bone produced. It is said that the cellular membrane, fibrous membrane, and cartilage, are (strictly and

[a] University-College, London.

positively) the only parts of the body that are ever converted into bone; but whether that is the case or not, they are the parts which by far the most *frequently* are so converted. The loose cartilages which I mentioned[a], as frequently existing in the veins of the pelvis, frequently become bone; so that we have hard bony substances loose in these veins; and these go by the name of "phlebolites"[b], —*vein-stones*.

When bone is deposited, the deposition may take place in the form of minute granules; so that the part is rough;—a condition in which the valves of the heart are frequently found. Or it may be deposited in the form of scales;—a character in which we frequently see it in the interior of arteries. When the radial artery is slit up, we frequently find bone deposited in minute scales, which may be removed from the interior; and sometimes it forms continuous plates. I have seen a kidney converted into a bony cyst, in which there was a *continuous* deposition of bone. This is a proper term; because the bone is deposited in a continuous manner, like membrane; but it would be wrong to say "*membranous*." Sometimes it is deposited irregularly,—in an *amorphous*[c] manner.

It is sometimes deposited abundantly,—forming very considerable masses. We occasionally, in encysted tumours, find a piece of bone larger than a walnut; or perhaps as big as two walnuts. I have seen at least two or three instances of it. Bone thus deposited is sometimes homogeneous. If it be cut, it presents no fibres, and is without any reticulated portion. Sometimes it grows harder than natural bone. Sometimes it has rays or cross fibres, like diploe[d], with an external compact substance. We see an instance of nature's highest efforts and powers in forming new bone, in necrosis; where a deposition, to a considerable extent, takes place under the periosteum; and which deposit will become a perfect bone, surrounding the old one. Diseased formations of bone are found to consist of phosphate and carbonate of lime, and of some animal matter;—just like healthy bone; but the proportion of phosphate and carbonate of lime is exceedingly various; so that we rarely find two cases of bone formed by disease, in which the proportion of the two is the same.

These are the chief observations which it was necessary to make on transformations. When structures are so converted, we say it is a *transformation*; and that it is into an *analogous* structure. That is to say, the structure which is produced, is analogous to a natural structure;—to a structure seen somewhere or other in the body during health. But besides these, we have *new formations*;—not *formations newly made* (that is not the meaning of the term); but *formations of a new character*;—something which is new to the body, and which is altogether of a diseased character. These are called "*non-analogous* or *heterologous* formations."

[a] See Page 209.

[b] From φλιψ, φλιβος, *a vein*; and λιθος, *a stone*.

[c] From α (privative) *without*; and μορφη, *form*.

[d] From διπλοω, *to double*.

CHAPTER VIII.

NEW FORMATIONS.

The chief of these formations, of a solid kind, are *tubercles*[a],—such as are seen in scrofulous cases; *melanosis*[b], which is a formation of black substance; and sometimes a yellow substance, called *cirrhosis*.[c] Besides these, there are produced certain saline substances, unknown to the healthy body. For example: when speaking of calculi, we shall find a substance called "*xanthic* oxide", and another called "*cystic* oxide";—substances unknown to the healthy body. Some of the liquid products of inflammation (pus, for example) are unknown to the healthy body. The secretion of serum and of lymph, in inflammation, may be compared to analogous transformations. They are liquids subsisting in a healthy body; although their appearance in the part is unhealthy;—at least, their quantity is unhealthy. But we have a substance produced in inflammation, that is unlike the natural fluids of the body;—is a *new formation*, and of a liquid character;—namely, pus. There is an analogy running through all these things. In inflammation we have the liquid products of the part increased. For example: from a mucous membrane we have secreted more mucus than natural, and of an unhealthy quality; and from a serous membrane we have serum produced in abundance;—so that these may be compared to those changes of structure, in which there is merely an alteration of size and consistence, and in which the part becomes hardened or enlarged. Again: I mentioned that there are some diseases in which there is a *deficiency* of secretion[d];—as, for instance, "ischuria renalis", and dryness of the skin; and these may be compared to softening and atrophy of substance, where there is a deficiency of matter. Then again we have, in inflammation, liquids secreted which are foreign to the part. For example: we frequently have lymph secreted; and though that is a fluid natural to the *body*, yet it is not natural to the *part*; and these secretions may be compared to those changes of structure, in which one part of the body assumes the character of another part; such as the transformation to cartilage or bone. Then, in inflammation, we have pus produced,—a new liquid; and (as I shall presently mention) in some diseases, a semi-fluid substance, like jelly; which substance is called "colloid"[e],—from being like jelly. Sugar is sometimes formed in the urine; as well as the cystic and xanthic oxides, just alluded to. Cirrhosis, melanosis, tubercle, and encephaloid, are new solid formations. All these are called "non-analogous" or "heterologous";—being heterodox matters. Now some of these formations may be organized;—they are *organizable*,—if such a word may be used. Scirrhus, for example, is of this description; fungus hæmatodes (as it is called), or encephaloid tumours, may also be organized; but tubercular substance cannot be organized. Scrofulous tubercles may become bone; but more frequently they are softened down, and pus is seen; but they are not substances capable of being organized, and forming part of the body.

[a] From "tuberculum", the diminutive of "tuber", *a swelling*.
[b] From μιλας, μιλανος, *black*.
[c] From κιρρος, *yellow*.
[d] See Chapter 5; Page 193.
[e] From κολλα, *glue*.

SECTION I.—TUBERCLES.

I shall begin the consideration of new formations with tubercles. The word "*tubercle*" has been employed in a vague sense. It is used by one person in one sense, and by another person in another; but there is now a great tendency to limit it to a scrofulous deposit. All small tumours in the substance of organs and serous membranes, or indeed upon the skin, have been called, and are still called "tubercles"; but the French have adopted the custom of restricting the word to tubercles of a scrofulous character; and it is in that sense that I now wish to speak of it.[a]

Seat of Tuberculous Matter.—[In whatever organ the formation of tuberculous matter takes place, the *mucous system*, if constituting a part of that organ, is, in general, either the exclusive seat of this morbid product, or is far more affected with it than any of the other systems or tissues of the same organ. Thus, the mucous system of the respiratory, digestive, biliary, urinary, and generative organs, is much more frequently the seat of tuberculous matter, than any other system or tissue which enters into the composition of these organs. The deposition of tuberculous matter on serous surfaces, is often observed; as in the cellular tissue generally, and on the free surface of serous membranes in particular. In those organs, into the composition of which the serous and mucous tissues enter, the tuberculous matter may be seen in both at the same time; as in the bronchi and air-cells, and in the interlobular cellular tissue; but in such cases it will be found to predominate in the former. And in those organs where there is no mucous tissue,—such as the brain, muscles, &c.,—we find the tuberculous matter deposited in the cellular tissue which unites their fibres or lamellæ. It very rarely occurs that tuberculous matter can be detected in the *blood*, while contained in its proper vessels. But it is frequently met with in this fluid in the cells of the spleen; the spongy structure of which admits of the accumulation of blood in such quantity, that the tuberculous matter can be seen forming in this fluid at some distance from the wall of the cells in which it is contained.

Repeated, careful, and minute anatomical researches, have led us to regard these, the mucous and serous surfaces and the blood, as the exclusive seat of tuberculous matter. In no instance is this morbid product deposited in the molecular structure of organs. It always makes its appearance on free surfaces, as a product of secretion. We must again repeat, however, that although it may form on serous surfaces, its *seat of election* is the *free surface of mucous membranes*. There, as into the great emunctory of the system, it appears to be separated from the blood, and becomes visible to us, under a variety of forms afterwards to be described. As a morbid constituent of the blood, we can take no cognizance of the existence of tuberculous matter, otherwise than through the medium of the secretions, or until this fluid has ceased to circulate. Then it is seen to separate from the other constituents (the serum, fibrin, and colouring matter) of the blood; and is distinguished from them by the peculiarity of its physical characters.[b]]

Form and Consistence of Tubercles.—A scrofulous tubercle is of a yellowish white colour; and is usually round. It varies from the size of a

[a] Tubercles, in all their varieties, form the subject of a paper (to which the reader is referred) in the thirty-eighth volume of the "Edinburgh Medical and Surgical Journal."

[b] Article "Tubercle", by Dr. Carswell, in the "Cyclopædia of Practical Medicine"; Volume 4; Page 253.

millet-seed, to that of a nut; and it is sometimes even still larger. It is firm, but friable; for although it is tolerably hard, yet if taken between the finger and thumb, it breaks down;—unless it have been converted into bone; and then, indeed, it is no longer a tubercle. Its character is curdy or cheesy; and it softens down into a substance, which is non-analogous to the rest of the body. It softens down into a sero-purulent fluid; but in this fluid we still have the friable tubercular substance, forming flakes within it. When the matter is let out altogether, a curdy substance floating in it is seen. When a tubercle softens down, the liquid (of course) has a tendency to escape, like the matter of an abscess. There is formed an abscess, which either increases or remains stationary for a time; and at length, when it is discharged, there is an attempt on the part of nature to heal up the part,—to produce cicatrization. These tubercles not being an organized substance, and not being organizable, must increase by juxtaposition;—exactly as stones would do, or any thing else inanimate.[a]

Formation of Tubercle.—It is supposed by some that a tubercle is liquid at first, and becomes harder afterwards. I should suppose that every thing in the body, when first secreted, must be liquid. One cannot conceive that vessels will pour forth solids. They all appear destined to hold liquids, however short a time the matter may remain fluid after its escape. It may, perhaps, become hardened immediately. Neither do I suppose that any thing can be absorbed but liquids. It is the opinion of Cruveilhier, that tubercles are liquid at first; and Andral likewise entertains the same opinion. Although they become of a yellowish white colour, yet they are at first greyish, and semi-transparent; and the semi-transparency gives a farther reason for supposing, that they are originally formed liquid. It is clear that they do undergo changes;—first having a transparency, and then becoming yellow; and we may suppose that there are more minute changes still; but changes which occur at too early a period, to render it possible for us to discern them.

Softening of Tubercle.—They soften down, it is said, by a deposition and secretion around them, penetrating and breaking them up. But I am not myself satisfied that this is a true account; because we often find them softened in the very centre, without any liquid which could have got into them. We find them firm externally, and liquid within. I should therefore suppose, that the softening of the tubercles was really a chemical change; and their not being organized forms an additional argument in favour of this opinion. If there be a deposition of external liquid matter, which goes into them, certainly the external part ought to be softened down as soon, at least, as the interior; but they generally soften at the centre.[b] However, it is not invariably that they are softened down at the

[a] Dr. Carswell ("Cyclopædia of Practical Medicine") defines tuberculous matter to be "a pale yellow, or yellowish grey, opaque, unorganized substance; the form, consistence, and composition of which vary with the nature of the part in which it is formed, and the period at which it is examined."

[b] This erroneous opinion, which Laennec and others have entertained, as to the *central* softening, may (as Dr. Carswell believes) be explained, by considering the manner in which tubercular deposition occurs. When tubercular deposition occurs in the lungs, it is generally confined to the air-cells and bronchi; on the internal surface of which it is secreted; and, as the deposition goes on, the central cavity becomes progressively smaller, until at last it disappears altogether, and the deposition is complete. This last condition has erroneously been considered to be that state of *crudity*, which immediately precedes softening. Indeed, if we consider the inorganic nature of tubercle, it is difficult to understand how internal softening could occur; for even if softening be a chemical change, still it must necessarily be preceded by some alteration in the condition of the surrounding parts, resulting from the irritation which

centre; for they will sometimes soften in other parts, especially upon the surface. When they are softened down, an abscess is formed; and the tubercular matter escapes. It is very common for fresh tubercular matter to be deposited within the cavity, after the discharge of the contents of the same character.

Composition of Tubercle.—When tubercles are not softened down,—when they are firm, they are found to consist chiefly of animal matter; with some muriate of soda, phosphate of lime, carbonate of lime, and traces of oxide of iron. This, however, matters little. It is right to ascertain these points as far as possible, in the hope that it may lead to some important discovery hereafter; but still we do not yet understand their nature better, by understanding of what they consist. Some have an exceedingly firm cretaceous earthy matter. Of course, the same substances are found in all of them; but in proportion as they are firm, the phosphate and carbonate of lime abound, compared with the other materials. Dr. Carswell has made some beautiful drawings, representing tubercles in all their various stages; as well as numerous specimens of transformations and new formations;—such as ossification of the trachea, an ossified cyst, ossification of the valves of the heart, and an ovarian tumour containing bone; for teeth, and even hair, have sometimes been found in tumours of this description.[a]

Organs liable to Tuberculous Deposit.—These tubercles are seen almost everywhere;—we find them in almost every part of the body; but they are more frequently met with in free cellular membrane, or in the cellular membrane which is a component part of different organs. Besides these situations, they are found in the liver, in the brain, in the kidneys, in the testicles, and in the lymphatic glands. They are also found in the air-cells of the lungs, and in the parietes of these air-cells; and they are found also in the lymphatic vessels themselves.

[We have never found tuberculous matter in *cartilage*, *fibrous tissue*, *serous*, *synovial*, or *mucous membranes*, *tendon*, or *muscle*. When tuberculous matter has been found in the serous, synovial, and mucous membranes, the morbid condition of these membranes, which always accompanies the presence of tuberculous matter in them, has not been properly appreciated; for in such cases these membranes, particularly the mucous and synovial, are completely disorganized by inflammation; and converted into a reddish brown pulp. It is in this substance that the tuberculous matter is deposited; as may be ascertained by examining the mucous membrane of the intestines, and the synovial membrane of the knee joint, when in this state of disease.[b]]

The Organs most usually affected at Different Ages.—In adults tubercles are by far most frequently found in the lungs; and, next to the lungs, in the small intestines. In three hundred and fifty adults with tubercles in various other parts of the body than the lungs, Louis (the celebrated French pathologist) found only one whose lungs were free from them. When tubercles exist in adults, therefore, they are most frequently found in the lungs; and next to them come the small intestines. Speaking still of the

a foreign body will necessarily produce; and, consequently, the surface of the mass will be first subjected to its action.—*Article "Tubercle", by Dr. Carswell; in the "Cyclopædia of Practical Medicine"; Volume 4; Page 256.*

[a] We must refer our readers to the splendid series of pathological plates which Dr. Carswell has published; entitled—"Illustrations of the Elementary Forms of Disease."

[b] Article "Tubercle", by Dr. Carswell; in the "Cyclopædia of Practical Medicine"; Volume 4; Page 259.

adult, after the small intestines comes the mesentery, in point of frequency of this affection;—so that all other parts stand at a very great distance from the lungs, with regard to the frequency of tubercles in them. The intestines and mesenteric glands stand at a certain distance from the lungs, in point of liability to this disease; but all other parts stand even at a greater distance from them. So great is the tendency to them in the lungs, that Louis has made the calculation I have just stated. The liver is a part in which scrofulous tubercles are less frequently found than in any other; but they are by no means uncommon in the spleen, particularly in infants. In infants, it is very common for other organs than the lungs to contain tubercles, while the lungs remain free; which is just the reverse of what is observed in adults. In infants we more frequently find many organs affected at once than in the adult; in whom nothing is more common than to find them only in the lungs. In infants, too, the proportionate frequency of tubercles in different organs, is not the same as in adults. The frequency does not pursue the order of lungs, intestines, and mesentery; but follows quite a different rule. For example: they are far more frequent in the spleen, in the mesenteric glands (or, as they are called, the mesenteric ganglia), and in the bronchial ganglia. They more frequently affect those three parts, than the lungs; and they are much more frequently found in the nervous centres (the brain and the spinal marrow) of infants, than of adults. They are very rare, however, in the fœtus during its first months; but about the fourth year they become far more frequent; though they are not then very numerous. From the fourth to the fifth year, they are found to be very frequent; and attack many organs at once. So frequent are they in children at this period of life (at least in Paris), that Lombard says three-fourths of them perish from tubercular disease; or, at any rate, there is a tubercular deposit found somewhere or other, after death. After this age they become less frequent, till the period of puberty; though they are still more numerous than before the fourth year. From the fourth to the fifth year, as we have said, they are very frequent; then they decline for a time; but still they are more frequent than before the fourth year. It is found that children are more free from tubercles during the second year, than at any other period before the fifth. Tubercles are said to occur in men chiefly from the age of twenty-one to twenty-eight, and in women especially before the age of twenty. In men they appear later than they do in females.

Not confined to Man.—They are not confined to the human subject: they continually arise in brutes. I believe that, both in this country and at Paris, monkeys generally die of tubercular disease; and tubercles are found in a large number of their organs. They occur also in horses, pigs, cows, rabbits, hares, sheep, and birds. It is said that a great number of the parrots which die at Paris, have tubercles. Parrots, like monkeys, come from a warm climate; and become affected by the coldness and vicissitudes of such latitudes as Paris and our own. It is said,—but I do not pretend to know much of such matters,—that they are not found in dogs.

Predisposing Causes.—The predisposing cause of tubercles, certainly appears to be a want of proper food, and a want of proper external temperature. If an animal be kept in the dark, and likewise in a damp situation, —so that it is exposed to cold and damp, and particularly if it be fed on not very nutritious food,—we may, in many instances, produce tubercles at pleasure. I believe that the great and almost the only cause of tubercles, in the human subject, is the want of good food, and of a proper external temperature. Exposure to cold and moisture, and particularly (perhaps)

alternations of temperature, will produce tubercles. When the disposition to them is once produced, it becomes hereditary; and children with every comfort around them,—well fed and well clothed,—are known to become, at a certain age, the victims of tubercular disease. The disposition, when once established, certainly becomes hereditary; but, without any hereditary predisposition, thousands and tens of thousands die of tubercular disease, from exposure to cold united with moisture, and the want of good food; and (in all probability), in a great measure, from vicissitudes of temperature. However, the influences of these causes may be much diminished by good food;—by keeping up a good fire within, we suffer much less from an external low temperature. It is food which is required for this purpose; not mere stimulants, such as spirits or wine. These will not answer the purpose. It must be good nourishment; which maintains a slow but constant fire (if I may so speak) within; and does not give merely a temporary excitement, which always increases the injurious effects of a subsequent low temperature. This subject, however, will be particularly spoken of when I come to the treatment of phthisis; which is the great tubercular disease of this country.

Encysted Tubercle.—This tubercular deposit acquires an enveloping membrane, and frequently two. Sometimes no lining membrane is discernible; sometimes the deposit takes place in a diffused manner, and it is then said to be "infiltrated"; but, in the lungs, the tubercular deposit is more frequently seen surrounded by a membrane, than otherwise. We may sometimes observe a capsule; in the interior of which we often find a softer membrane; which may be easily peeled off, while the external one is frequently pretty tough.[a] When it is formed, tubercular deposit may remain for years without injury; but if the deposition be very great, it forms a source of irritation. If a great quantity be deposited in different parts,—and often, indeed, where the deposit is trifling,—the surrounding substance falls into a state of irritation; the tubercular substance softens; and that process takes place which I have already mentioned.[b]

Appearance of the Ulcerating Cavity.—The cavity, when the matter is discharged, is for the most part irregular. It is not of a definite shape, but irregular. Its parietes generally grow harder and harder; and frequently the tubercular substance is not entirely discharged, but adheres pretty firmly to the sides. These cavities frequently have sinuses communicating with the external surface, or with the large bronchial tubes. When the tubercle has been near the surface, (which is very common in the case of the absorbent glands,) the ulcer has generally a flabby edge, which is turned inwards;—the very reverse of what takes place when an ulcer is cancerous; and it often heals up perfectly well. Even in the case of the lungs, we shall see that occasionally such cavities do certainly heal.

Character of the Pain.—These tubercles are attended by no pain, so far

[a] The term "*encysted*", whether applied to pulmonary tubercle, or to tubercle in any other organ, is (according to Dr. Carswell) almost always incorrect. "In the lungs", he says, "encysted tubercle is a deception;—the distended walls of the air-cells having, in all probability, been in almost every case taken for cysts. In like manner, the extremities of the biliary ducts, when dilated, and filled with tuberculous matter, have been described as encysted tubercles; and we have already said that the dilated air-cells, particularly in the cow, —which may vary from the size of a pea to that of a cherry,—have frequently been regarded as hydatids. We do, however, meet with encysted tuberculous matter; but not until it has undergone important changes, which precede its ultimate removal from the organ in which it was formed." ("Cyclopædia of Practical Medicine"; Article "Tubercle"; Volume 4; Page 253.)

[b] See Page 213.

as the deposition itself is concerned; but the irritation around is frequently a cause of pain; and if a tubercle be near the surface of the lungs, the pleura generally falls into a state of inflammation. There is more or less pleuritis; and the person suffers pain in the side. When a tubercle is producing much inflammation around, of course there must be the usual signs of inflammation. In the case of the glands of the neck, there is considerable pain when active inflammation is excited.

Scrofulous Diathesis.—The disposition to form these tubercles, is called "a scrofulous habit of body"; and the person is said to labour under scrofula (or struma) when labouring under such deposits as these. The marks of a constitution so disposed are, generally, a fair and fine skin, fine soft hair, a dilated pupil, and a large upper lip; and it is observed, that when the internal parts labour under scrofula,—not the external parts, but the internal viscera,—the extremities of the fingers and thumbs, and even of the toes, become enlarged. It is a remarkable circumstance; but it happens in a great number of cases of phthisis, and certainly in scrofula of many other parts,—such as the liver, and the mesenteric and lymphatic glands,—that the ends of the fingers become enlarged. I presume that a faint scrofulous inflammation attacks the last joint. Many persons, however, are scrofulous, who have neither a fair skin nor soft hair; but, on the contrary, a dark complexion. But still they look pale, and have dilated pupils and a tumid lip; and perhaps are pock-marked. Those more particularly disposed to it, however, certainly have a fair skin, a pulse disposed to be quick, and elongated fingers. When the disease, however, becomes established,—when tubercular matter is deposited, the ends of the fingers enlarge; so that the nail is prominent. It is like an acorn,—exceedingly convex; and the last joint altogether becomes broad.

This disease, as I said[a], may undoubtedly be hereditary; and is so in a very large number of cases. It is a disease that attacks persons of all ages; but particularly in the early parts of life; while the disease of which I am now going to speak, is rarely seen in the young,—rarely seen before the middle period of life; and generally not until after the middle period is past.

SECTION II.—CARCINOMA.

Definition.—[Those growths may be termed "cancerous", which destroy the natural structure of all tissues; which are constitutional from their very commencement, or become so in the natural process of their development; and which, when once they have infected the constitution, if extirpated, invariably return, and conduct the persons who are affected by them to inevitable destruction. The forms of disease which may be classed under this head, are extremely various; though, in some cases, they pass into each other by imperceptible gradations. This fact, and the circumstance that, after extirpation of the disease, one form may take the place of another, serve to exhibit the physiological connexion between growths, the extremes of which often do not shew even the most remote similarity of structure. After extirpation of common cancer of the mammary gland, "fungus medullaris" may form, either in the breast or in some internal organ. "Carcinoma simplex" and "alveolare" are sometimes met with together in the mammary gland; and "carcinoma reticulare" and "melanodes" in the orbit. "Carcinoma fasciculatum", altogether fibrous in structure, and destitute of even the most remote resemblance either to "fungus medul-

[a] See Page 216.

laris" or to common cancer, exactly resembles them in physiological characters.

Minute Structure of Carcinoma.—The most invariable anatomical character of the carcinomatous degeneration, is loss of the proper tissue of the affected part; which always disappears during the progress of cancer. Vessels, muscles, nerves, glands, bones, and all other tissues, how different soever from each other, become alike involved in the same cancerous degeneration. The first appearance of cancerous degeneration, however, does not consist in the mere transformation of the previously healthy tissues; but the elementary forms of carcinoma become developed between their interstices, and thus displace the natural structure. That this is the case, is shewn by the way in which the elementary forms of carcinoma are produced. It can easily be proved, that the germinal cells of carcinoma are formed, not from any previously existing fibres, but from a real *seminium morbi*; which develops itself between the tissues of the affected organ. This is best displayed in the alterations which the muscular coat of the stomach undergoes from "carcinoma alveolare." The germinal cells of carcinoma, are deposited between the bundles of muscular fibre; which, in the early stages of the disease, are easily distinguishable: at even a later period the muscular layer of the stomach, though enormously swollen, may still be recognised; until, at length, the production of the germinal cells, equally in all the coats of the stomach, obliterates every trace of their different layers, and of the natural structure of the organ.

The parts in the neighbourhood of a cancer, usually become firmly connected with it at an early period: hence carcinoma is less moveable than other growths. Carcinoma of the stomach adheres to the pancreas, or the liver; that of the female breast to the skin, or the pectoral muscles. In the female breast, the condition of the nipple and its early retraction are characteristic; though neither that, nor the connexion of the scirrhous growth of the pectoral muscles, is invariably met with. Indeed, the author[a] has often observed carcinomatous growths, in which neither of these occurrences had taken place. The retraction of the nipple, in cancer of the mammary gland, depends on its proximity to the disease. The swelling of the axillary glands, in carcinoma of the breast, and the existence of similar swellings in other neighbouring parts, are both important. The dilatation of the veins, however, cannot be depended on as a sign of malignancy.

Presence of Septa.—In cancer of the stomach, the condition of the muscular coat affords a sure anatomical sign of carcinoma, whatever may be its form. In most cases of carcinomatous disease of the walls of the stomach, the muscular coat not merely becomes exceedingly swollen, but its section presents a partitioned appearance; which is partly the result of the bundles of muscular fibre having been divided, but in part also is caused by the division of membranous and fibrous septa and capsules. In the intervals of the bundles of muscular fibre there become developed, in some parts, the cellular globules of "carcinoma simplex", and the cells of "carcinoma alveolare": in other situations, fibrous septa run in different directions. Often, on closely inspecting the surfaces of these sections, membrano-fibrous septa are seen running between the interstices of the muscular bundles, and crossing each other irregularly. These compartments are filled with gelatiniform cells, which enclose smaller cellules; so that the interior of the capsules themselves seems to be subdivided. On a few occa-

[a] Müller.

ions, the author[a] saw similar capsules apparently filled with fibrous masses. The septate appearance of the muscular coat, shews itself at the very commencement of cancerous degeneration: in "carcinoma alveolare" it may subsequently disappear, when all distinction of tissues in the different layers of the stomach has been completely confounded;—having given place to the cells filled with a gelatiniform substance. Engravings of this appearance of the muscular coat of the stomach, are to be met with in most illustrated works on pathological anatomy; in which the structure of cancer of the stomach, as far as it is visible with the naked eye, is represented.[b]

This septate character is not peculiar to the muscular coat of the cancerous stomach; it is also observed in other muscular parts, when affected by carcinoma. In Pockel's museum, at Brunswick, the author[a] noticed this appearance in a specimen of scirrhus of the rectum, and in another of scirrhus of the œsophagus, complicated with scirrhus of the stomach. It occurs also in the urinary bladder.[c]

This appearance is not characteristic of any peculiar form of cancer; having been observed in most of its varieties;—in "cancer alveolaris", in "carcinoma simplex", and medullary sarcoma of the stomach.

There are no other general characters of carcinoma. Eccentric development is not peculiar to it; neither does softening always begin at the centre of the growth; nor is it always characterized, in its early stages, either by a lack of vessels, or by any peculiar distribution of them. The vessels in it bear the same relations as in other parts. Sometimes they are scanty; at other times exceedingly numerous.

It is not Heterologous.—The positive characters of carcinoma do not display any thing heterologous or foreign to healthy organization.[d] Some of the elements of cancer occur in the healthy organism of the adult, while others are such as exist in the primitive fœtal state of tissues; as cells, varicose fibres, and cylindrical fibres. Varicose fibres are produced by the elongation of cells, and their linear arrangement; and perfect fibres are, in their turn, formed from such as are in the varicose state; whence it follows, that the differences of the extremes depend merely on the point at which the development of the tissues is arrested. A structure, the development of which is arrested while the cells are in their primary state, will be very unlike one in which the cells are elongated, and in progress of transformation into fibres; while those growths which tend rapidly to assume a fibrous texture, will also present a different appearance.

Principally formed of Albumen.—An albuminous substance forms the

[a] Müller.

[b] See Cruveilhier, "Anatomie Pathologique", Livre 12, Planche 6; Carswell, "Pathological Anatomy", "Carcinoma", Plate 1, Figures 1 and 2, and Plate 3, Figure 1; Seymour, "Medico-Chirurgical Transactions", Volume 14, Plate 1; Baillie, "A Series of Engravings", &c., Fasciculus 3, Plate 7, Figure 1.

[c] In Baillie's "Morbid Anatomy" (Fasciculus 3, Plate 4, Figure 2), is an engraving of the septate structure of carcinoma of the œsophagus; and another of carcinoma of the rectum (Fasciculus 4, Plate 4, Figure 1).

[d] The greater number of modern pathologists, regard these various structures as non-analogous, or heterologous formations. So great an authority as Müller, however, contends,—on the grounds of chemical analysis, and microscopic investigation,—that they are essentially analogous formations. Schleiden has also subsequently shewn an intimate similarity between the ultimate cells of cancerous structures, and the primitive formations of embryo-life. But the question of importance (in reference to this reputed analogy) which presents itself to me, is not whether the elementary components may not be the same, but whether the same elements appear in similar combinations in natural structures. The negative of this is on the side of probability. Cancer, therefore, in all its varied phases, is a tissue which has no counterpart in the normal structures of the living body.—*T. Williams.*

basis of all carcinomatous growths; for, if freed from skin and cellular tissue, they may be boiled for eighteen or twenty-four hours, without yielding more than a very small quantity of gelatine; often, indeed, without the slightest trace of it being discovered. What little of it is dissolved occasionally, contains caseine and salivary matter.[a]]

[The following table, extracted from Dr. Walshe's admirable article on cancer, in the "Cyclopædia of Practical Surgery", exhibits, in a clear and comprehensive manner, the species and varieties of cancer, together with their synonymes.]

Family.	Class.	Order.	Genus.	Species.	Varieties.	Synonymes of the Species.
Adventitious Formations.	Heterologous Formations.	Tissues.	Cancer or Carcinoma.	Encephaloid.	Common Vascular Sarcoma. (Abernethy.)	Spongy or Ossivorous Tumour. Ruysch. Palletta.
					Mammary Sarcoma? (Abernethy.)	Struma Fungosa (Testis). Callisen.
					Solanoid. Recamier. Zang.	Spongoid Inflammation. Burns.
					Nephroid. Idem.	Milt-like Tumour. Munro.
					Napiform. Idem.	Medullary Sarcoma. Abernethy.
					Carcinoma Fasciculatum vel Hyalinum. Müller.	Cerebriform Disease or Cancer. Laennec.
					Fungus Hæmatodes. Hey.	Pulpy Testicle. Baillie.
					Hæmatode Cancer. Auctores Gallici.	Carcinus Spongiosus. Good.
						Carcinoma Spongiosum. Young.
						Fungoid Disease. A. Cooper. Hodgkin.
						Medullary Fungus. Maunoir. Chelius.
						Acute Fungous Tumour. C. Bell.
						Medullary Cancer. Travers.
						Cephaloma. Hooper. Carswell.
						Carcinoma Medullare. Müller.
						Soft Cancer. Auctores Varii.
				Scirrhus.	Pancreatic Sarcoma? Abernethy.	Carcinomatous Sarcoma. Abernethy.
					Napiform. (Recamier.)	Carcinoma Scirrhosum. Young.
					Chondroid. (Recamier.)	Scirrhous Cancer. Travers.
					Lardaceous Tissue. Auct. Gall.	Scirrhoma. Carswell.
					Carcinoma Reticulare. Müller.	Carcinoma Simplex vel Fibrosum. Müller.
						Stone-Cancer. Auctores Varii.
				Colloid.	Pultaceous Cancer. (Cruveilhier.)	Areolar Gelatiniform Cancer. Cruveilhier.
					Pearly Alveolar Cancer. (Cruveilhier.)	Carcinoma Alveolare. Müller.
						Gum-Cancer. Hodgkin.

a. Scirrhus, or Carcinoma Simplex.

Formation.—It appears that there are two changes in scirrhus;—there is a *transformation* and *a new formation*. It would appear that the cellular membrane of the affected parts becomes exceedingly indurated, and is changed into a hard fibrous membrane; but in the midst of this there certainly is a new deposit, of a particular description.

Structure.—When scirrhus takes place, we see a firm, exceedingly hard, unequal, irregular mass. It is of a light greyish colour at first; and, if cut into thin slices, is semi-transparent. If a section be examined, a large number of fibres traversing morbid structure in different directions may be seen, between which fibres there is a substance less white than the rest. The deposition constituting tubercles is organic; it is not a new *organization*, but a new *deposition*. In scirrhus there is a transformed structure, at any rate; and besides that, there is an inorganic substance, deposited between the fibrous portions. These fibrous portions, running in different directions, form septa,—divisions; and are opaque and paler than the others; that is

[a] "The Nature and Structural Characteristics of Cancer"; by J. Müller, M.D. Translated by C. West, M.D. 1840. Pages 28 to 32.

o say, of a more dead white. In fact, the section of a scirrhous tumour is exctly like that of a turnip. In a turnip, we observe fibrous septa, running in lifferent directions; and a softer less white substance between them. The epta, in scirrhus, run in every direction; and sometimes are seen to form regular cells. The proportion of less hard substance between the fibres, is exeedingly various; and the mode in which the fibres are distributed, is likewise xceedingly various; so that sometimes we have a mammary tumour, sometimes a pancreatic tumour, and sometimes a tubercle;—that is to say, a tumour something like a mamma, or something like a pancreas, or something like the tumour of scrofula;—a tubercle, in the common acceptation of the word, may occur.

Microscopical Characters.—[The diseased masses are generally irregular in orm; not lobulated; hard, and resisting the knife; and presenting, when ivided, a greyish appearance, which has but very little similarity to cartiage. Whitish bands are not invariably present. Scirrhus of the mammary gland occasionally shews, here and there, whitish filaments; some of which are hollow, and contain a colourless, whitish, or yellowish matter. Probably this appearance of white filaments, is the result of thickening of he walls of the lactiferous tubes and lymphatics; and this idea is confirmed by the absence of these filaments from scirrhus of non-glandular parts. The mass of scirrhus is composed of two substances; the one fibrous, the other grey and granular. The fibrous substance is rarely apparent immediately on making a section of these growths; but is seen on scraping away he grey matter, for which it serves as a sort of basis. On removing the grey matter, either by scraping it away or by maceration, the fibrous substratum is seen to be composed of a very irregular network of firm bundles of fibres. The grey matter is found to consist of microscopic, formative globules, but slightly adherent to each other, and varying from 0.00048 to 0.00108 or 0.00130 of an English inch in diameter. They are insoluble in acetic acid, and also in water, at any temperature. In many of these cells, only a few points, which look like small granules, can be seen; while in others may be distinguished a larger body, which looks like a nucleus, or like a smaller vesicle, contained within a formative globule. Though crowded closely together, the formative globules lie between the meshes of fibrous structure, with which they have no connexion, and from which hey can be easily removed; while, notwithstanding the thinness of their walls, they can be isolated from each other with the greatest facility. It is difficult to make out whether the single or double vesicular corpuscule, which is often distinctly seen within the formative globule, corresponds to he nucleus of a cell, or whether it is a young cell encased within the old one. If it be a nucleus, then the small spot upon it would be analogous to he nucleolus, which Schwann usually found on the nucleus of the cells in he fœtus. If, on the other hand, the pale (apparently vesicular) corpuscules be in reality young cellules, then the corpuscules on their surface would correspond to the parietal nucleus from which other cells are developed. The paleness and transparency of the vesicular corpuscule which may be contained within the formative globule, does not by any means prove it not to be a nucleus; for, in the fœtal tissues, the nuclei are sometimes remarkably pale, and even present a vesicular appearance. Probably, however, the vesicular bodies do correspond to young cells; and the analogy of this structure to that of "cancer alveolaris" is greatly in favour of this supposition. In a case of "carcinoma mammæ", which occurred in a woman aged fifty, the same structure which was observed in the breast, and which here appeared to contain young cellules, shewed itself also in small tumours

of the ribs. Since many structures in the embryo are originally developed from cells, there exists a general resemblance between the cellular texture of carcinoma, and the primitive state of those tissues. But this is merely a general analogy; for the structure of carcinoma does not resemble one tissue more than another. Professor Valentin[a], indeed, has observed bodies with central nuclei,—which he considered to be cartilage corpuscules somewhat altered,—in the sanies from a carcinomatous sore of the face, as well as in the substance of the diseased mass itself. It is uncertain, however, whether these bodies were real cartilage corpuscules, or whether they might not have been cells of the kind just mentioned. In addition to the formative globules of carcinoma, oil-globules are always seen, in considerable number, diffused through scirrhous growths.[b]]

Softening of Scirrhus.—The less hard substance, at last, undergoes the same process as a true scrofulous tubercle. It softens down into an ichorous fluid,—into something like jelly or gum; and the process here begins usually,—perhaps always, but at any rate usually,—in the centre; as is generally the case in scrofulous tubercles;—the centre having been originally the hardest part.[c] The skin above becomes puckered, or retracted; and its colour also becomes changed. It assumes a leaden, or livid hue. At first, the whole tumour is moveable; though it will not allow the whole of the fingers to be placed under it;—it will not allow the edge to be turned up. But, after a time, it forms adhesions to the neighbouring parts, and becomes immoveable.

Ulceration.—Ulceration takes place in a scirrhous mass, exactly as in the case of a scrofulous tubercle; and when the ulceration begins, that state of things is called "cancer";—scirrhus being the first stage (the stage of induration); and cancer the second stage (the stage of softening and ulceration). In this form of ulcer, the edges are everted and elevated;—we see the edges much raised, irregular, and turned out. The surrounding cellular membrane undergoes the process of suppuration. Now and then we see a sort of fungus sprouting up from the ulcer;—a hard gristly fungus. The centre of such an ulcer is deep; the discharge is generally very fœtid; and great irritation is produced. Sometimes, instead of a simple suppuration around, we have sloughing; and now and then nature succeeds in throwing off the whole mass;—the scirrhous tumour has not formed adhesions to the surrounding parts; but suppurates, or rather sloughs out. The lymphatic glands, to which the absorbents of such a tumour run, generally become contaminated. They generally become indurated,—scirrhous; and undergo the very same process as the original part.

Character of the Discharge.—[The liquid ichor, or sanies, which forms the *discharge* from cancerous sores, is thin, acrid, and generally of a dirty green colour; but liable to variation in tint from admixture, in various proportions, with effused blood, or from impregnation with melanotic fluid; as in a case related by Rouzet. It possesses a peculiar, and almost characteristic fœtor. It is said by some to effervesce with acids, and turn syrup of violets green; but Ploucquet found, on the contrary, that it ex-

[a] Repertorium für Anatomie und Physiologie, 1837. 2 Abath. p. 263, 292.

[b] Müller, on "Cancer"; Pages 41 to 44.

[c] The process of softening may commence in any part of a carcinomatous tumour;—as well at the periphery as the *centre*. The notion of the constancy of *central* softening, has been shewn to be incorrect by careful observation. The change may originate in a single spot, or simultaneously in several.—"*Cyclopædia of Practical Surgery*"; *Article* "*Cancer*"; *Volume* 1; *Page* 617.

ibited the reactions of an acid. In warm countries, especially, genera-ion of worms not unfrequently occurs in this matter.[a] There is nothing, however, peculiar to the cancerous discharge in such development; yet the fact seems to have led to the singular theory respecting the production of cancer by an insect. Valentin states his having discovered nuclear globules, and cartilage-corpuscules in the "pus of a cancer"; but, according to Müller, such discharge is not peculiar to this affection;—occurring, on the contrary, from all suppurating surfaces. To the similitude of pus granules, and nuclear epithelium cells, we have already adverted. The surface of the ulcer may participate in the kind of formation displayed by the whole mass: thus, Müller has seen the white net-work of reticular carcinoma spreading into the minute asperities on the surface of fungating growths. In encephaloid, consisting of caudate corpuscles, the tailed appearance is found in course of development in the most superficial part of new vegetations. The same observer once saw a thick layer of polyhedral whole-steatomatous non-nuclear cells, forming a mass like tallow, on the surface of a cancerous ulcer in the mamma.

Sometimes Cicatrize.—Singularly as the fact clashes with the general laws of carcinomatous growths, it is no less true, that these products are not wholly incapable of *cicatrization*. Scirrhous ulcers occasionally assume a healthy vermilion tint, become covered with normal granulations, and actually cicatrize over a greater or less extent of surface. Abernethy relates a case of encephaloid tumour of the groin, in which, after the removal of a "portion of the tumour", the ulcer gradually "lost its inflamed aspect, granulations formed, and a cicatrix took place." M. Bérard witnessed a similar occurrence; and cerebriform cancer of the limbs and meninges, has been known to cicatrize in the same manner, after inopportune incision. According to Bayle, the majority of scirrhous formations in which this change is observed, are of a particular structure and character. Pouteau considered them the most intractable of all. Certain it is, that the amendment is delusive and temporary: the process ceases; and the disease advances with renewed activity. It must be understood, that we here refer solely to cicatrization occurring over actual cancerous substance.

The reappearance of carcinoma in the situation of its previous development, after the spontaneous separation, or artificial removal of a tumour, is unfortunately a most common occurrence. This *local reproduction* is effected in different ways:—1. The process of cicatrization may not distinctly commence, or may be interrupted at an early stage; and fungating growths may spring from some part of the wound. 2. A perfect cicatrix forms; and, after a variable lapse of time, a tumour grows in the subjacent tissues; presses on the inodular structure; destroys it; appears externally; and, on examination, presents the characters of carcinoma. 3. Reproduction may be accomplished in the tissue of the cicatrix itself, by the development of tuberiform, or infiltrated carcinoma.

To whichever species the original growth may belong, the secondary formation is ordinarily encephaloid; whence, probably, the observation that consecutive, run their courses more rapidly than primary, tumours.[b]]

Parts liable to Scirrhus.—This is a disease which in general primarily affects those parts which are not necessary to life. It affects glands the

[a] Vacher; "Dissertation sur le Cancer des Mammelles"; Page 81.

[b] "Cyclopædia of Practical Surgery"; Article "Cancer"; Volume 1; Pages 617 and 618.

functions of which have been interrupted, or have never been performed; it affects the breasts,—particularly when a woman is past child-bearing; and it particularly affects the breasts of women who have never had any children. It also, where there is any predisposition, particularly affects parts which have suffered mechanical injury. Many women have had cancer in the breast after a blow; though, in all probability, they would not otherwise have suffered. It particularly affects the breast, the uterus, the ovaria, the testes, and the thyroid gland; none of which parts are necessary to life;—the breast, uterus, ovaria, and testes, being all for the sake of the next generation, and not for the sake of ourselves; except, indeed, as a gratification. The thyroid gland is, of course, a part unnecessary to life.

Parts secondarily affected.—When, however, cancer has existed in these parts, it affects others secondarily; and then we find the lungs, liver, omentum, mesentery, spleen, pancreas, brain, the medulla of the bones, and the skin, become the subjects of the affection. Now and then it may affect these parts primarily; but as a general rule,—and one can only speak generally,—it affects the parts which I have last mentioned only secondarily. When it affects the skin primarily,—which it now and then does,—a kind of wart is the first thing which appears; and it becomes cancerous. If it affect the skin only secondarily, then (I believe) more generally we have a tubercle, in the common sense of the word;—a little hard lump. When the breast has been affected with cancer, the skin in the neighbourhood will become the subject of *tubera*;—little hard scirrhous lumps. We certainly often see cancer affect the cardia, the pylorus, and the rectum primarily; yet although it sometimes does so, it is by no means so frequent an occurrence, as the affection of those particular organs which are not necessary to life, and the functions of which may cease without the body at large suffering. When it affects the alimentary canal, it attacks particularly certain portions, which form divisions of it. For example: it affects the lips, which are the first part; next to them it will affect the fauces, and the cardia;—the lips forming the commencement of the mouth, the fauces of the throat, and the cardia of the stomach. Then it affects the pylorus,—the commencement of the intestines; and then, again, it affects the rectum; which is the termination of the canal. It is a curious fact, that it is generally the *apertures* of cavities that are affected. We shall see, when we come to consider diseases of the heart, that it is the openings which suffer, far more than any other portion of that organ.

Effects on the adjoining Parts.—In certain situations, cancerous deposits may acquire considerable volume, without apparently influencing the substance of the part in which they are formed; but, in other situations, the presence of carcinoma leads to certain changes in the surrounding tissues. They may be stated briefly, thus:—1. Condensation. 2. Obstruction of function, from mechanical pressure. 3. Discoloration of the surrounding parts. 4. Hypertrophy, or atrophy. When carcinoma is so situated as to obstruct the functions of some of the hollow viscera, hypertrophy of the muscular apparatus behind the obstruction is the result; as in disease of the cardia or rectum. But in scirrhus of the mamma, there is frequently hypertrophy of the glandular structure; so that it scarcely, if at all, exceeds its healthy fellow in size; while, in other cases, its general bulk may be increased, or parts of it may be tumefied, and others atrophied. 5. Absorption of the neighbouring parts. 6. Serous infiltration.

7. Inflammation, either eliminatory in its effects, or not. 8. Fibrous transformation. 9. Extension of the disease to contiguous textures, by infiltration.

Such are the changes produced on the adjacent tissues during the progress of carcinoma; but the carcinomatous tissue itself, being (like normal textures) the seat of nutrition, is (like them) susceptible of its disordered actions. Of these, the principal is congestion;—arising either from irritation of the arteries, or obstruction of the veins. The first consequence, as may be supposed, is a change in the colour of the diseased mass; which may either assume a florid hue, or a purple, brown, or black tint,—according to the cause of the obstruction; but—owing to the delicacy of the vessels in the adventitious growth, the trifling support received from the substance in which they ramify, and their imperfect communication with each other—extravasation of blood almost always follows;—frequently causing a sudden increase of the non-ulcerated tumour. The subsequent changes of the effused blood, are strikingly similar to those observed in cerebral hæmorrhage. The liquid portion is gradually absorbed, with the hæmatosine; the discoloured fibrin remains behind, in a sort of cavity lined with a smooth and delicate membrane; while the circumjacent cancerous matter acquires a yellow tint. At a more advanced period, the clot disappears; the lining of the cavity is more distinctly serous in its character; and its contents are of a serous, or glutinous nature. Such is, doubtless, the origin of the greater part of the cysts found in the interior of carcinoma.[a]]

Attendant Symptoms.—This disease is attended, in general,—almost from the very earliest stage,—with severe pain[b];—sharp, lancinating, and of the most dreadful kind. The pain certainly does not depend upon inflammation; for it will occur where no inflammation can be discovered.

[*Hæmorrhage.*—Hæmorrhage, which does not ordinarily occur before ulceration has set in, is sometimes one of the earliest effects of the disease. Thus, the discharge of a few drops of blood from the nipple, in scirrhus of the breast,—a tolerably frequent occurrence,—has, in some rare instances, been the first morbid phenomenon observed. Profuse menorrhagia, in not a few cases, precedes all other symptoms of uterine cancer; and in a case of pharyngeal carcinoma, which we observed some years past, the patient persisted in affirming, that severe hæmorrhage from the throat was the first circumstance that drew his attention to the part. In a similar manner, hæmoptysis is frequently the first occurrence announcing tuberculous disorganization of the lungs. But we would not be understood to mean, that effusion of blood is really the very first abnormal effect of the heterologous formation: others have probably led the way; but, from their trivial character, escaped the attention of individuals who are not in the habit of carefully watching the variations of their health. Admitting this to be the fact, the practical value of hæmorrhage, as a symptom, is by no means lessened.

Derangement of Function.—Derangements of function form an important item in the symptomatology of carcinoma; and, of course, vary with

[a] "Cyclopædia of Practical Surgery"; Article "Cancer", by Dr. Walshe; Volume 1; Page 612.

[b] Scirrhous formations, in their early stage, are not endowed with any marked *sensibility*. It has been remarked, however, by numerous observers, that pain is very commonly experienced about half an hour after these tumours have been examined. When pain is excited immediately after or during pressure, this, according to some writers, is owing to the presence of inflammatory action in the tissue surrounding the cancerous substance.—"*Cyclopædia of Practical Surgery*"; *Article* "*Cancer*"; *Volume* 1; *Page* 634.

the organ in which, or in the immediate vicinity of which, the morbid matter is developed. They may be included under the heads of "irritative" and "mechanical." As illustrations of the former, we may adduce the vaginal discharge produced by non-ulcerated scirrhus of the uterus; and the occurrence of hydrothorax and pleuritis, in subjects affected with mammary cancer. In exemplification of the latter, may be mentioned the occurrence of amaurosis, from pressure on the optic nerve; the interruption to vision, occasioned by tumours driving the eye from its normal site; obstinate constipation, from pressure of enlarged pelvic glands; derangement of local circulation and serous accumulation, either in the shut cavities or in the cellular membrane, produced by partial closure of adjacent circulating tubes,—arterial, venous, or lymphatic.[a]]

Sloughing Stage of Cancer.—When the stage of ulceration has arrived,—in which there is inflammation, sloughing, and suppuration,—the irritation is so great, that the whole constitution suffers materially; and the skin acquires a peculiar sallow tint;—a sort of pallid yellowish straw-colour. The state of the body is decidedly cachectic; that is, the whole body is in an unhealthy state. Andral ascribes this sallow appearance to a change which the blood undergoes;—the constituents of the vital fluid being absolutely altered. There is a sallow look; by which any experienced person will suspect, that the individual is labouring under some malignant disease. This has been called "cancerous cachexia";—"*cachexia*" meaning a bad habit of the whole body.

[To this catalogue of evils may be added, as of not very uncommon occurrence, a morbid change of the bones, exhibiting itself in some one of the following forms:—1. Atrophy of the spongy and compact structures, from defective nutrition. 2. Excess of inorganic matter in their composition. 3. Defective supply of saline materials; in consequence of which, the bony tissue appears as if it had been macerated in a mineral acid ("carnification"). 4. Carcinoma of their substance. The first of these forms is singularly rare. Recamier, however, appears to have met with an example of it. Of the third we have not met with an authentic instance; and insert it rather hesitatingly. In the first three cases, the morbid state is a manifestation of the *cachexia*; in the fourth, it is an evidence of the diathesis having reached the bones. In the first, second, and fourth cases,—especially the last,—fractures occur with extraordinary facility. In cases of cancerous deposition in the bones, the fracture may either arise from complete transformation of a portion of the cylinder into cancerous matter, or from the pressure of a central growth;—causing the absorption of the compact tissue. When the fracture is of the former description, crepitation will either be wholly absent or ill-marked; in the latter case, this sign is producible in the ordinary way. When a cancerous patient suffers persistently, or pretty constantly, from pain in a particular spot in the course of a bone, the occurrence of such fracture is to be apprehended; but such local pain is not a constant forerunner of the accident, nor is it necessarily followed by it. The pain has been mistaken by patients for rheumatism; and this error has, not unfrequently, been shared by the medical attendant.[b] In not a few cases, the occurrence of fracture has manifestly hastened the fatal issue of the disease.[c]]

[a] "Cyclopædia of Practical Surgery"; Article "Cancer", by Dr. Walshe; Volume 1; Page 635.

[b] Salter, in the "Medico-Chirurgical Transactions"; Volume 15; Page 186. Samuel Cooper, in the same; Volume 17; Page 51.

[c] "Cyclopædia of Practical Surgery"; Article "Cancer", by Dr. Walshe; Volume 1; Pages 636 and 637.

Termination of Scirrhus.—I mentioned[a] that the diseased part sometimes oughs out; and the person recovers. That, however, is so rare a circumstance, that even if the surgeon remove the disease, the relief is but o often temporary; for, in the greater number of cases, the disease reppears;—either in the same neighbourhood, or in an opposite part. It ould appear that it depends, in a great number of cases, upon some conitutional tendency; and all that art can do is to remove those parts hich have fallen into a diseased state; but, as the tendency remains in e constitution, persons generally show the disease again, sooner or later, some other situation, or around the spot of the operation.

Hereditary Predisposition.—This disease, like scrofula, may be hereditry;—I mean, of course, the disposition to it; and it is not known (at ast, as far as I am aware) what circumstances give a predisposition to it. hose which give a predisposition to scrofula, are evident enough; but am not aware of any circumstances, which are known to give a predisposition to scirrhus and cancer. I have known many persons die of canrous disease, one of whose parents had previously died of the same afction. There are several drawings by Cruveilhier, illustrating the various ages of this affection.[b]

b. Encephaloid Disease.

Its Nature.—The next disease of which I shall speak, is one which ffers from scirrhus and cancer, in affecting the young rather than the ld. It is what is called "fungus hæmatodes", or "encephaloid disse." It has been called "encephaloid", because the deposition is not rd, like scirrhus; but, to a certain extent, resembles the brain. It has so been called "fungus hæmatodes"; because, when it arrives at the ge of ulceration, a fungus, of a bloody character, sprouts out; and, on tting into it, we see large distinct cells filled with effused blood. It is, erefore, like brain in some parts, and is bloody in others. The deposited tter is like brain; but in the cells in which the deposition takes place, emorrhage continually occurs; so that blood is effused there, and a agulum forms. There is a great disposition to hæmorrhage in this disse; but the deposit itself is an opaque, whitish, homogeneous substance; d may be compared, in colour and consistency, to cerebral pulp. There an excellent representation of the affection, by Dr. Carswell; taken m cases in which it was situated in the brain and liver. I have opened ny brains and livers, containing tumours about the size of a walnut; hich, on being cut into, presented a homogeneous brain-looking pulp. here is often nothing like the firm fibres of scirrhus;—no distinct white nds ramifying in the tumour; but a mass such as I have just described. hen exposed to the air, it softens down,—just as the brain will do; and may be washed away,—leaving a filamentous texture. If a tumour of s description be taken, and exposed to a stream of water, the pulp may washed away; leaving an exceedingly fine filamentous structure, which s contained the opaque brain-looking substance; but then this structure, like scirrhus, is exceedingly fine and delicate. The consistency of enphaloid substance varies;—from that of a soft custard, down to the mest part of the brain when perfectly fresh. One portion of this is metimes pinkish; and sometimes portions will be as red as a clot of

[a] See Page 222.

[b] "Anatomie Pathologique du Corps umain; ou Descriptions, avec Figures Coloriées et Lithographiées, des diverses Alterations Morbides dont le Corps Humain est susceptible."

blood; but if the blood have been effused in great quantity, regular clots of blood appear. Various portions differing in colour, size, and consistency, are often found; and some of them are even cartilaginous;—that is to say, there is a double formation,—a double disease; and scirrhus is united with it. Now and then, bony particles are observed. Sometimes we see portions of it in a regular cyst. Instead of fine filaments, containing this brain-like matter, absolute cysts are seen; and sometimes portions resembling the white of boiled eggs,—coagulated albumen.

Softening.—This deposit, as it grows, softens down; and, like scirrhus and a scrofulous tubercle, it generally softens first in the centre. When it softens down, cavities are formed; or (perhaps we might say) cavities *become discernible.* These cavities chiefly contain blood; and, on washing this away, filaments or shreds floating in the cavity are distinguishable. If a portion of it be near the surface, the skin grows discoloured, the tumour adheres to the subjacent parts, and increases in size; or if the tumour be situated within, the serous membrane above it grows thin, till it gives way. The tumour, therefore, may ulcerate through the surface; or a serous membrane within may give way.

Ulcerating Stage.—When the tumour ulcerates, a fungus generally shoots forth;—but it is not firm,—like the fungus of scirrhus; but (on the contrary) is soft, easily torn, and bleeds very much. It is irregular, and of a dark red colour. When the fungus is very small, it exactly resembles the red soft polypi which grow from a mucous membrane. It grows very rapidly, and pours forth a fœtid sanious fluid; and people sometimes die, not from the irritation of the tumour, but from hæmorrhage. I had a patient who died from hæmorrhage, occasioned by one of these fungi in the bladder. There was, in the interior of the bladder, a fungus as large as a walnut, which never gave him any pain, or produced any irritation to the constitution; but which bled in spite of every thing which could be done. He discharged, not only bloody urine, but pure blood; and at last sunk under it. The hæmorrhage from a fungus of this description, is often very copious. Now and then portions will slough.

Varieties.—[Microscopical investigations have led to the establishment of the three following varieties, with respect to its intimate constitution:—

1. "Carcinoma medullare", abounding in roundish formative globules, which make up the greater part of the medullary mass, though intersected by a delicate fibrous network. The specimens which Gluge examined, seem to have been of this kind. The globules differed in size;—the smallest being larger than pus-globules, and having a diameter of $\frac{1}{135}$ of a millimetre.[a] They were irregular, though approaching the spherical form; their border was transparent; but dark points and round lines were distinguished on their uneven surface. He likewise observed crystals, of various kinds, in "fungus medullaris." The author regards the formative globules of this variety of morbid structure, as very similar to those of common cancer, and to those which constitute the grey mass of "carcinoma reticulare": a few points, or very minute granules, were often all that could be detected in their interior; but frequently, on making use of a high magnifying power, a nucleus may be seen;—just as in other forms of carcinoma. The size of these globules is about the same as in common cancer, though they are subject to great varieties in this respect.

2. "Carcinoma medullare", with an exceedingly soft cerebriform base; composed of pale, elliptical bodies, without caudate appendages. The

[a] The millimetre is equal to thirty-nine hundredths of an inch, English measure.

uthor[a] is acquainted with but one specimen, which he can refer to this lass: it was a case of cerebriform fungus medullaris of the foot, and of the nterior of the tarsal bones. With the exception of the vessels which were istributed to the diseased mass, its substance was almost entirely formed of niform ellipsoidal corpuscules; which cohered but very slightly with each ther. These corpuscules had a very pale hue, when looked at under the nicroscope; they were one-and-a-half or twice as large as the red particles f the blood, and equalled them in breadth. The author[a], in no instance, bserved a fibril proceeding from these bodies; nor did he ever see a single ucleus, or a young cellule in their interior. A few very minute points vere all that could be detected, by the highest magnifying powers.

3. "Carcinoma medullare", with caudate or spindle-shaped corpuscules. ometimes, on tearing a piece of this kind of fungus medullaris, the torn urface will present a resemblance to a fibrous structure. This appearance s owing to several of the caudate corpuscules being arranged in one irection; as was observed in a case related by Valentin. The author[a] has een a similar structure in several specimens of "fungus medullaris";— ometimes interspersed in the midst of round, formative globules; at ther times forming the greater part of the growth. According to the irection in which the caudate corpuscules are disposed, a radiated ppearance is sometimes produced; at other times, the structure seems nore tufted; while, in other instances, the direction of the corpus- ules is so various, that the tumour does not display the slightest trace f fibrous texture. It is, indeed, not always easy (even when the caudate odies are so disposed as to occasion a fibrous appearance) to tear the rowth into tufts of fibres; although irregular portions of it may be broken ff very readily. Frequently, however, the caudate corpuscules are ar- anged with great regularity. Their interior either contains a granular ubstance without any evident nucleus, or a nucleus with one or more ucleoli may be more or less distinctly seen. These corpuscules are pro- onged at one or both sides, and in some rare instances at more than two ides, into fibrils of different length. They are cells, the development of hich has been arrested, in the stage of transition from cells to fibres.[b]]

Parts liable to be Affected.—This is a disease which affects every part of he body. It will affect the testicle; and then it is called, by some, "soft ancer of the testicle"; or it may affect the breast, the eye, the uterus, varia, spleen, pancreas, liver, urinary bladder, brain, mesentery, and bones. t is very common in the eye of children. It is continually seen in the ex- remities; and the absorbent glands become contaminated, as they do in he case of common cancer. When the glands are affected, on being ivided, they disclose nearly the same appearances as the original tumour; ut there is this difference, it is said,—that they never send forth a fungus.

There are frequently in the neighbourhood smaller tubera,—circum- cribed, but without a capsule; varying from the size of a pea to that of a alnut; of a pale greyish colour; and firmer than the original tumour; but ey are the same disease.

Secondary Encephaloid.—This is a disease which commonly affects other rgans secondarily; so that when persons have it in the breast, it is very ommon to find them gradually become the subjects of cough, and pulmonic isease; and, on opening them, we find similar tumours within. It is said hat the organs which are affected secondarily, are never affected primarily. t is very common for many organs to become affected at once; and so

[a] Müller. [b] Müller on Cancer; Pages 63 to 65.

great is the disposition to this disease, when there is any disposition at all, that Mr. Travers says he has never known a person survive four years, in whom he had operated for the extirpation of the disease.

General Symptoms.—The constitution becomes impaired. There is a cachectic look, even earlier than in scirrhus. Usually the person becomes emaciated, but now and then there is hardly any irritation at all; and sometimes a person may die of this disease in the stomach, without having suffered any pain at all; and frequently without any person having suspected the nature, or even the seat, of the disease. With respect to the case I mentioned [a] of the disease in the urinary bladder, the man, although he died from the hæmorrhage occasioned by it, never suffered the least pain. Even when the mass is very considerable, there is generally little or no pain; and sometimes there is little or no irritation of the constitution. The case differs very materially from scirrhus, therefore, in another respect. Scirrhus, I mentioned [b], is almost always attended with violent deep lancinating pain; whereas, in encephaloid disease, there is very little pain, and sometimes there is very little irritation.

Dubious Nature of the Tumour.—A tumour of this description is exceedingly soft. Its external appearance is remarkably smooth and equal; and it gives the idea of fluctuation; so that I have known surgeons of great experience deceived in cases of this nature. They have imagined it was a collection of fluid, and plunged a lancet into it. I have seen this mistake occur over and over again;—from its extreme resemblance, with respect to the touch, to a tumour containing fluid. Frequently, for a length of time, the part will not be at all discoloured. It is soft and elastic; and it is these two circumstances that give the idea of fluctuation. The tumour, when taken out, is generally more or less round; and (as I stated before) it differs from scirrhus, in occurring at an early period of life. A kidney, taken from a child six years of age, has been seen, in which several portions of disease were of this nature. It seemed to be a mixture of various diseases;—some portions were scrofula; some were of scirrhous hardness; and in other parts there was certainly fungus hæmatodes.

Causes.—I do not know what gives the disposition to this disease. I am not aware of any external circumstances, which cause persons to be more liable to it; nor do I know whether it is hereditary. It is very probable that the disposition to it is hereditary,—exactly like the disposition to scirrhus; but it is carefully to be remembered, that this is not a painful disease, like scirrhus; and that it is a disease which affects the opposite period of life, to that in which scirrhus particularly prevails. Some consider it to be a mixture of scrofula and cancer.

c. Carcinoma Alveolare.

[This form of carcinoma was described in Germany, by Otto, as a peculiar species of scirrhus of the stomach; and in France, by Laennec and Cruveilhier, under the names of "cancer gelatiniforme", and "areolaire."

The description which Otto has given, represents the main features of this degeneration (which always appears under one form) so exactly, that it may be detailed as affording a good illustration of the general anatomical characters of the disease.

Anatomical Characters.—The scirrhus occupied more than two-thirds of the whole stomach, and extended from the pylorus over a width of more than seven inches of its anterior and posterior wall. The walls of the

[a] See Page 228. [b] See Page 225.

stomach were so thickened, at the diseased parts, that they did not collapse. In several places, they were two inches and a half in thickness. The surface of the scirrhous part was uneven and tuberculated. Otto says that its substance differed so much from that of ordinary scirrhus, that, perhaps, it ought not to be referred at all to that class of diseases. The basis of its structure was composed of innumerable white fibres and laminæ, crossing each other in all directions, and having their interspaces occupied by cells, which varied in size from that of a grain of sand to that of a very large pea. Some of the cells were closed, but many of them communicated with each other: they all contained a very viscous, clear, perfectly transparent jelly. Externally, the diseased growth was covered by peritonæum, through which the half-projecting sacculi and cells were seen. The inner surface of the stomach was almost entirely deprived of its lining, wherever the disease extended; and most of the cells, both large and small, opened into the cavity of the stomach; into which, when firmly pressed, they poured their contents. The inner coats of the stomach were entirely destroyed by the disease. The muscular coat extended, for a short distance, into the morbid structure; but small cells, filled with jelly-like matter, were everywhere deposited between the muscular fibres.

The cases of "carcinoma alveolare" of the stomach which the author[a] has examined, correspond so exactly with this description, that he can but confirm it in all points. At the commencement of the degeneration, the mucous and the muscular coats of the stomach swell; and sections of the latter present that striated appearance, observed in all forms of carcinoma of the stomach. The cellular structure containing the jelly-like matter, develops itself between the bundles of muscular fibre; but the like process takes place, at the same time, in the mucous membrane. In the early stages of the disease, the cells can be distinguished only by means of the microscope.

Occasionally, this cellular structure not only becomes developed in the stomach, but also forms isolated nodules in different parts of the surface of the peritonæum. In M. Pockels's museum at Brunswick, the author[a] observed such masses of cells; which had formed on the abdominal peritonæum, in a case of "carcinoma alveolare" of the stomach. The smallest clusters of cells were scarcely larger than the head of a pin.[b]

Symptoms.—The symptoms of this form of cancer, which occurs most frequently in the stomach, are (according to Cruveilhier) more obscure than those of any other variety of carcinomatous disease. It is certainly less prone than other forms of cancer to give rise to symptoms of general reaction, and is more slow in producing the "cachexia cancerosa." Pockels observed neither pain nor vomiting; but the peculiar colour of the face which characterizes organic diseases of the stomach was not absent. Though most frequently met with in the stomach, "cancer alveolaris" is not by any means confined to this organ; for Cruveilhier has seen it in the small intestines, the rectum, the cæcum, the uterus, the ovary, and the bones; and the author[a] has also met with it in the intestines, in the female breast, in the great omentum, and especially in the peritonæum.

Varieties.—Cruveilhier distinguished between "cancer areolaire gelatiniforme", and "cancer areolaire pultacé": the cells of the former contain a

[a] Müller.

[b] Engravings of "carcinoma alveolare" of the stomach may be found in Otto's "Seltene Beobatchtungen zur Anatomie, Physiologie, und Pathologie", Plate 1, Figure 4; Cruveilhier's "Anatomie Pathologique", Book 10, Plate 4; and Carswell's "Pathological Anatomy", Fasciculus 3, Plate 1, Figure 8.

transparent jelly, those of the latter a turbid pultaceous matter. He has observed the latter form in the uterus and in the bones.[a] The case which he relates of "cancer alveolaire pultacé" of the skull, is very remarkable; and the representation he gives of it is very interesting.[b] The diseased bones were the frontal, the ethmoid, the inferior turbinated, and the vomer. The morbid growth extended both outwards and inwards; and had attacked the mucous membrane of the nose, and the dura mater. A somewhat similar structure was once observed by the author[c], in a breast which M. Dieffenbach had removed. In this instance, the very firm puriform matter was contained within cells which had numerous communications with each other, and were lined by a membrane evidently vascular. Some lobules of this tumour were completely permeated by these cells; while other parts of the same growth presented no trace of this structure, but only the ordinary network of "carcinoma reticulare."

Characters of the Jelly.—The jelly-like matter contained in the cells, preserves its transparency even if kept in alcohol; and if expressed from the cells, and boiled, does not yield a trace of gelatine. After boiling, for eighteen hours, a portion of "cancer alveolaris" which had been macerated in alcohol, nothing was dissolved but a small portion of a substance somewhat allied to salivary matter, not precipitated by any re-agent,—not even by tannin; and of the existence of which evaporation afforded the only evidence.

In the remarkable case of "cancer pultacé" of the skull, above-mentioned, M. Boutin Limousineau, assistant to M. Gay-Lussac, analyzed the yellow matter from the cells; and found that it contained caseine. The matter had, in this case, the colour of tallow.

Microsopical Characters.—From microscopic examination of "carcinoma alveolare" of the stomach, the author[c] obtained the following results. If the smaller cells are looked at under the microscope, they are found to contain (encased within them) many still smaller cellules; which, in their turn, include others of yet more diminutive size. In the smaller cells, the darkish yellow parietal nucleus is distinctly evident. Many cells, likewise, contain (free within their cavity) mere nuclei; as cytoblasts[d], from which new cells are to be afterwards developed. The walls of the largest cells are distinctly fibrous, and their fibres run from one cell to another. Twice the author[c] observed rod-shaped crystals, in the jelly-like matter of preparations which had been kept in spirit; and, on another occasion, he saw spindle-shaped corpuscules in the jelly from a "cancer alveolaris" of the breast.

Mode of Development.—The history of the development of "carcinoma alveolare", corresponds exactly to that of the primitive formation of cartilage, and of the "chorda dorsalis", as described by Schwann. The young cells are produced from cytoblasts, or nuclei developed in the interior of the parent cell; and, although the parent cell continues to increase in size, these young cellules (by degrees) fill up its cavity. At length, the walls of the young cells come in contact with each other; and they form, together with the parent cell (within which they are encased), one compound cell. Thus, the process of development goes on, till the larger cells on the internal wall of the stomach burst, and pour their jelly-like contents

[a] "Anatomie Pathologique"; Livre 24, Table 2, Figure 1; and Livre 27, Table 2.

[b] "Anatomie Pathologique"; Livre 21; Table 1.

[c] Müller.

[d] From κυτος, *a cavity*; and βλαστος, *a germ*.

into its cavity. The fibres forming the walls of the largest cells constitute a nidus, within which younger generations of cells are developed. In order, however, to observe the manner in which the cells are encased one within the other, and the relation they bear to their nuclei, it is necessary to examine them in an earlier stage, and before their walls have begun to be split up into fibres.

The main point distinguishing "carcinoma alveolare" from "carcinoma reticulare" and "carcinoma simplex" seems to be, that, in the former, the cells continue to grow, and their walls become adherent to each other; while this progressive development, and mutual cohesion, do not take place in the delicate cellular globules of the two latter forms of cancer.[a]]

Summary.—[The following proposition directly flows from numerous facts stated in the preceding pages:—A cancerous tumour, in all circumstances,—even should it remain single and stationary for years,—is but the local evidence of a general vitiation of the system. "But", it may be inquired, "is not this a contradiction?—How is it possible that, if the organism at large be in a state of disease, a single spot shall alone manifest its presence?" We confess our inability to explain away this difficulty; but neither the fact of its existence, nor its inexplicability, shakes the solidity of the opinion advocated. All pathologists who have carefully investigated the history of the tuberculous affection, admit that local agencies, of whatever kind they may be, can never cause the production of a particle of tubercle,—that constitutional derangement must lead the way. Now here we have precisely the same difficulty to contend with;—a knot of turbercles may exist for years in the summit of a lung, and every other organ remain free to the last from the disease. Why this is so, we know not. These are the mysteries of pathology; and they are mysteries which, in the existing state of the science, it would be idle to attempt to penetrate.

From all that has been said, we may deduce the following definition of cancer. Cancer is a disease anatomically characterized by the presence of scirrhus, encephaloid, or colloid; originating in a general vitiation of the economy; and possessing the properties of assimilation, of reproduction, and of destroying life by a peculiar cachexia.[b]]

[We shall conclude the consideration of carcinoma, with the following tabular view of the distinctive characters of the three species into which it is divisible; taken from Dr. Walshe's article on "Cancer", to which frequent reference has been already made; and we may safely recommend an attentive perusal of that clear and comprehensive article, to the reader who seeks for a more extensive acquaintance with the subject than was consistent with the nature of the present work.]

ENCEPHALOID	SCIRRHUS	COLLOID
Resembles lobulated cerebral matter.	Resembles rinds of bacon, traversed by cellulo-fibrous septa.	Has the appearance of particles of jelly, inlaid in a regular alveolar bed.
Is commonly opaque from its earliest formation.	Has a semi-transparent glossiness.	The contained matter is strikingly transparent.
Is of dead white colour.	Has a clear whitish or bluish yellow tint.	Greenish yellow is its predominant hue.
Contains a multitude of minute vessels.	Is comparatively ill supplied with vessels.	(Its vessels have not, as yet, been sufficiently examined.)

[a] Müller on Cancer; Pages 50 to 54.
[b] "Cyclopædia of Practical Surgery"; Article "Cancer", by Dr. Walshe; Volume 1; Page 650.

ENCEPHALOID	SCIRRHUS	COLLOID
Is less hard and dense than scirrhus.	Is exceedingly firm and dense.	The jellylike *matter* is exceedingly soft; a colloid *mass* is, however, firm and resisting.
Is frequently found in the veins issuing from the diseased mass.	Has not been distinctly detected in that situation.	The pultaceous variety has been detected in the veins.
The predominant microscopical elements are globules, not always distinctly cellular, and caudate corpuscula.	The main microscopical constituents, are juxtaposed nuclear cells; caudate corpuscula do not exist in it.	Is composed of cells in a state of *emboitement*.
Occasionally attains an enormous bulk.	Rarely acquires larger dimensions than an orange.	Observes a mean in this respect.
Has been observed in almost every tissue of the body.	Its seat, as ascertained by observation, is somewhat more limited.	Has so far only been seen in a limited number of parts.
Very commonly co-exists in several parts or organs of the same subject.	Is not unusually solitary.	Has rarely been met with in more than one organ.
Is remarkable for its occasional vast rapidity of growth.	Ordinarily grows slowly.	Grows with a medium degree of rapidity.
Is frequently the seat of interstitial hæmorrhage, and deposition of black or bistre-coloured matter.	Is comparatively rarely the seat of these changes.	
When softened into a pulp, appears as a dead white or pink opaque matter, of creamy consistence.	Resembles, when softened, a yellowish brown semi-transparent gelatinous matter.	Undergoes no visible change of the kind.
Subcutaneous tumours are slow to contract adhesions with the skin.	Scirrhus thus situated usually becomes adherent.	
Ulcerated encephaloid is frequently the seat of hæmorrhage, followed by rapid fungous development.	Scirrhous ulcers much less frequently give rise to hæmorrhage; and fungous growths (provided they retain the scirrhous character) are now more slowly and less abundantly developed.	
The progress of the disease after ulceration is commonly very rapid.	There is not such a remarkable change in the rate of progress of the disease after ulceration has set in.	
Is the most common form under which secondary cancer exhibits itself.		
Is the species of cancer most frequently observed in young subjects.	Is much less common before puberty.	Has hitherto been observed in adults only.[a]

SECTION III.—MELANOSIS.

Nature of this Product.—The next new formation of which I have to speak, is called "melanosis", or "melanodes"; in which is deposited a mass of black substance; which, if cut, gives an unctuous smooth section; either uniformly dark coloured, or presenting certain shades; so as to be mixed up with patches, or streaks of paler coloured substance. Sometimes it is deposited in lobules, or a mass; and sometimes in plates. If a mass of this description be macerated, the black portion is separated; and this

[a] "Cyclopædia of Practical Surgery"; Volume 1; Page 647.

readily mixes with water, and stains the hand, linen, and paper;—just like Indian ink. It has neither taste nor smell. I never tasted it myself; but this is said to be the case; and it is worthy of notice, for considerations which I shall presently mention. It resembles in every respect the "pigmentum nigrum" of the eye, or the dye of the cuttle-fish; and the colouring matter of the hair, of the skin of negroes, of some parts of the brain, the bronchial glands (or ganglia of the lungs) of old people, and the placenta of some carnivora, may be similar. When it is washed out by water, the structure which is left after the separation of the black substance, is circumscribed, and more or less firm. When I say "*circumscribed*", I am supposing that a piece of an organ is taken; that the part is healthy which is washed, and thus the black portion removed; after which there will remain a circumscribed substance, more or less firm, different from the rest of the organ in which the black matter lay. Although the character of this disease is blackness, we do not always have a decidedly black colour. There are shades of brown, and even of a yellow hue, as well as the black. The masses, or depositions, are not only of all sizes, but also of all shades.

Analogous to Tubercle and Carcinoma.—Sometimes a black mass of this description is thought to soften down; but that must be a rare occurrence. It has been seen that scirrhus softens down; and that tubercle softens down; but this mass very rarely, if ever, softens. It is, of course, a totally inorganic substance. It is like a tubercle in this respect,—that it never becomes organized; but it is unlike a tubercle in rarely, if ever, softening. A dark-coloured fungus will sometimes arise, from the part in which this black deposit has taken place; and so far it resembles "fungus hæmatodes." The neighbouring glands will become affected;—I mean the glands which are connected with the absorbents of the part. Sometimes we have melanoid tubera, or tubercles (using the word "*tubercules*" in its common acceptation),—melanoid deposition in remote organs; so that the disease appears (like fungus hæmatodes or scirrhus) either in a primary or a secondary form;—beginning in one part, and being found afterwards (though not, of course, in so advanced a stage) in distant organs. There appears to be an analogy between this disease and "fungus hæmatodes", as to the organs which are primarily and secondarily affected. There is the same order observed with regard to both circumstances. An absorbent gland, or a ganglion affected with this disease, might be sometimes taken for a mass of melanotic substance. The absorbent glands frequently have this substance deposited in them; and become blackened; and, of course, it is a gland blackened with a secretion of melanotic matter, and not a real mass of new matter, which is there. If we do not consider that the part which is examined is one in which an absorbent gland actually lies, it might sometimes be mistaken for a mass of this peculiar melanotic matter.

Melanosis distinguished from Carcinoma.—[Melanotic deposition not unfrequently occurs in carcinoma, more especially the encephaloid variety; and, on this account, Müller and other writers have considered it to be merely a variety of carcinoma. Dr. Walshe, in his Essay on Cancer[a], has pointed out the following reasons for dissenting from this opinion:—1. Pure melanic pigment—no matter in what abundance accumulated—produces no other effects than those dependent on the mechanical obstruction caused by the mass it constitutes. 2. When melanotic tumours produce the local and general symptoms of cancerous growths, they are found to be composed either of encephaloid or scirrhus (more especially the former), impregnated

[a] "Cyclopædia of Practical Surgery"; Volume 1; Page 614.

with black matter. 3. Neither the local nor general symptoms of carcinoma are modified in cases where melanic matter is found to pervade it. 4. Melanic matter is incapable of forming a tissue;—being an unorganized fluid, into which vessels have never been observed to penetrate.]

Varieties of Melanosis.—[Laennec, to whom we are indebted for the first description of this disease (the discovery of which is claimed by Dupuytren), described the four following forms of this affection:—1. Masses enclosed in cysts. 2. Masses without cysts. 3. Infiltration in the tissue of organs. 4. Deposition on the surface of organs. This classification, with some slight modification, was adopted by most writers; but the results of more recent researches on melanosis, and other morbid states and products which present the same distinctive physical characters as the former, suggest the propriety of a more comprehensive arrangement. The following tabular view, which Dr. Carswell has given, presents the leading features and varieties of this disease, in a very clear manner.]

Classification of Melanotic Formations.

I. True Melanosis.

Origin.	A modification of secretion.
Locality.	1. Tissues, systems, and organs.
	a. In the substance and on the surface of organs.
	b. In the cavities of hollow organs.
	2. New formations.
Form.	1. Punctiform.
	2. Tuberiform.
	3. Stratiform.
	4. Liquiform.
Seat.	1. Molecular structure of organs.
	2. The blood.

II. Spurious Melanosis.

Origin.	A. Introduction of carbonaceous matter.
	B. Action of chemical agents.
	C. Stagnation of the blood.
Locality.	Of first kind: the lungs.
	Of second kind: the digestive organs; the surface of serous and mucous membranes; the cavities of hollow organs; new formations.
	Of third kind: the blood.
Form.	Of first kind: uniform.
	Of second kind:—1. Punctiform. 2. Ramiform. 3. Stratiform. 4. Liquiform.
	Of third kind:—1. Punctiform. 2. Ramiform.
Seat.	1. The blood, contained in its proper vessels, or effused.
	2. Pulmonary tissue; cellular and membranous.[a]

Occurs in the Lower Animals.—It has been seen, like the other deposits, in brutes; and particularly in the horse. Of all brutes, I understand, it is most frequently found in the horse; and it is said to occur most frequently

[a] Dr. Carswell, on "Melanosis"; in the "Cyclopædia of Practical Medicine"; Volume 3; Page 86.

in cream-coloured and spotted grey horses; and oftener in horses in the south of Europe than here. I do not speak from observation of my own; for I have not dissected many brutes. So large are the masses which sometimes occur in horses, that they have occasionally been found, in the abdomen, to weigh thirty pounds. It is likewise seen in dogs, cats, rabbits, mice, and rats;—so curious have some people been, in the investigation of melanosis.

Attacks all Parts of the Body.—It not only attacks so many creatures, but it is said to attack all parts of the body;—chiefly, however, the lungs and the liver. Dr. Halliday mentions an instance of most intense melanosis in the human subject; where it existed, almost universally, in the subcutaneous and inter-muscular cellular membrane,—in the cellular membrane under the skin, and among the muscles; in the peritonæum, the pericardium, the pleura, the ovaria, the sternum, and the bones of the cranium;—so extensive sometimes is this deposition.

Age at which it Occurs.—This is a disease which does not occur early in life, like fungus hæmatodes; but rather resembles scirrhus in this respect;—seldom occurring till the individual has passed the middle age.

Encysted or Diffused.—Sometimes, though rarely, this substance (I do not use the word "*matter*"; because that conveys the idea of pus) is enclosed in a cyst. Most other deposits have a cyst; but it is only sometimes that this is found to be so enveloped. Occasionally, instead of being collected into a mass, it is completely diffused;—not merely in small scales and plates, but *generally* diffused along a membrane, mucous or serous; and when this is the case, it really is deposited, not upon the membrane itself, but rather in the cellular membrane immediately underneath it. I apprehend so because it is the cellular membrane that is liable to become cartilage and bone, and which is particularly liable to other diseases.

On False Membranes.—This disease, too, is not unfrequently seen in new membranes of the body; false membranes. When a serous membrane has been inflamed, or has had lymph deposited and afterwards organized, then the false membrane becomes cellular membrane, as mentioned before [a]; and these new false membranes are sometimes seen to contain a melanoid deposit.

On Serous Surfaces.—It is said, however, to be sometimes found on the surface of a serous membrane. It is right I should mention that I have not seen it; but it is said to have been found, not *underneath* the membrane, but lying on the surface. The parts around, probably, do not undergo any change except softening. Around this black deposit, the real natural parts of the body are found softened; but in general that is all, unless this disease co-exists with another; and it is a very common thing for it to co-exist with scirrhus, with "fungus hæmatodes", and even with tubercles. Where, however, it exists alone,—where it is conjoined with no other disease, it seems to occasion nothing more than a mere softening of the surrounding parts.

In a Fluid Form.—Occasionally, this same substance would appear to exist in a fluid form. Occasionally we have a cyst filled with a liquid perfectly black; in which no difference has been observed from the mass I have now described, except that the one is liquid and the other solid. When this melanoid matter has been found in a fluid state, there is every reason to believe that it was formed originally fluid, and not softened down; because the usual course of the disease is for the mass to remain solid,

[a] See Page 114.

however long it may last. When we see black fluid contained in a cyst, therefore, we must conclude (in general) that this substance had been originally formed with a disposition to remain fluid.

Serous Membranes.—We frequently see, upon a serous membrane, spots of melanosis; that is to say, perfectly black spots, which appear to be quite analogous to this affection. Indeed, one can hardly open many bodies, without seeing these spots upon certain serous membranes; particularly the peritonæum (towards the pelvis), the uterus, the bladder, and the rectum. These appear to do no harm;—they are perfectly innocent deposits; and sometimes we see very extensive deposits, superficially diffused; and in persons who are known not to have suffered at all from that circumstance.

Mucous Membranes and Skin.—It is frequently seen in mucous membranes, after they have been injured. After a mucous membrane has ulcerated, and has healed (which is very common in the intestines), the cicatrix is frequently blackened, more or less, with a deposit of this description. The deposition, as I mentioned before [a], is sometimes not exactly black, but merely greyish;—sometimes brownish, or even yellow; and this we see in the skin after an eruption, and after ulcerations of various kinds. After an eruption, the skin will sometimes remain black, but more frequently brownish; and, after an ulcer, it is very common for the legs to remain of a dark colour,—sometimes black, but more frequently of a brownish yellow. These, I presume, may be considered various shades of a similar deposit. The same is seen in the brain, after paralysis from effusion of blood into its substance. A deposition of this sort is sometimes seen in the mucous membrane of the intestines, after chronic diarrhœa. Occasionally, in the intestines, small points of black deposit are seen; as if a very fine powder had been sprinkled, in the finest possible way, upon the surface of the intestines. I do not know that it indicates any thing particular; but, every now and then, we see such points, extensively disseminated. When I first saw this, I imagined that it was some dirt or soot; but I found that it could not be washed off. It is not any thing exactly *upon* the surface; it is seen *through* the surface; but we cannot rub it off, unless we destroy the membrane itself. I have sometimes seen the middle of the tongue of a jet black, without any unhealthy state of the rest of the organ; and without sordes, or any dangerous symptom.

Of the Entire Skin.—I think there is a very curious circumstance analogous to this. I have never seen it; but there are, perhaps, nearly twenty cases on record within my reading (and beyond it there may be far more), of white persons who have become black. A change will now and then take place over the whole of the skin; so that a white person shall become entirely black. I have seen portions of the arm become black; but I have never seen an extensive change of that kind throughout the body. Others suppose (and I coincide with them) that this is a melanotic disease, on a very extended scale;—that melanoid substance is diffused solely upon the skin, and in the most extensive manner. When we consider, that if the disease be formed in a mass, it always bears a resemblance to the "pigmentum nigrum" of the eye, we must suppose that, when a white person is converted into a black, it is nearly the same affection.

Black Alvine and other Excretions.—Persons occasionally discharge from the stomach, or the intestines, a black liquid; and the discharge of this is called, in old authors, by the peculiar name "*melæna*",—"the black disease." This stuff, when perfectly black, has (I believe) no smell; at any

[a] See Page 235.

rate, when it happens to be discharged pure, without fæces, it has no smell; and cases have been noticed, in which a large collection of precisely similar black liquid matter, has been found in the peritonæum. Some such cases are upon record. Dr. Prout has seen two or three instances (though I have not seen any myself) in which the urine was perfectly black;—not bloody, but black. The black secretion of the bronchia, in some people, is probably dependent on the same dye. When we come to consider yellow fever, we shall find that persons vomit stuff of a black colour, which is called "black vomit." It is found to be tasteless; so that some have indulged themselves in drinking it. Others have put it into their eye, to see if it were acrid; and others have made an extract of it, and formed it into pills, and taken several in the course of a day; and they all concur in stating, that it is just like the melanotic matter of which I have just spoken, as deposited in solid masses;—tasteless, inodorous, and perfectly innocent when taken into the stomach.

Nature of these Excretions.—With respect to the discharge from the intestines, it may either be entirely black, or a little reddish,—so that we observe a slight hue of red in the black. Indeed, it may occur of various kinds, down to absolute blood. I think that these discharges which take place from the alimentary canal, are blood that has undergone a certain change.

Discharge not Dangerous.—Persons are exceedingly exhausted by this black discharge; but as it comes away through the intestines, it produces no pain, and (in general) no irritation;—nothing but exhaustion. It is admirably remedied by small and frequent doses of oil of turpentine;—just like hæmorrhage from the same parts. It appears to be (and I believe we must look upon black vomit as similar) an exceedingly mild substance;—as nearly like the blood as possible, except in colour.

Pathology of Melanosis.—What the change that has been undergone really is, I do not pretend to know; but the black urine, the black discharge from the intestines, the blackness of the skin, when a patient is converted (partially or generally) from white to black, the blackness of the peritonæum, of the mucous membranes, and of cicatrices in various parts of the body, and the black masses and substances in various organs,—all appear to be the same affection in different forms, and in different degrees; and it would appear to be merely blood which has undergone a very slight change. As taken from the horse, it is found (by analysis) to contain the elements of the blood,—fibrin, albumen, &c.; but nearly one-third is a highly carbonized substance,—probably altered cruor. Every other constituent is in far less proportion. In the cells of the ovaria, we often see a black substance,—frequently blood; and all shades may be traced between the two; so that blood here appears capable of being changed to this black substance.

Prognosis.—Melanosis appears to be perfectly harmless, except from the quantity of the substance which is formed. There may be an inconvenience arising from its bulk, its pressure, and its hardness; and of course when it is discharged, in a liquid form, there may be exhaustion from its quantity; but, independently of that, I believe that the disease is not one of any malignity. Still it is to be remembered, that it is very frequently united with malignant disease; for, in a mass of "fungus hæmatodes", a black deposit often appears. This is not to be wondered at, when we consider that, in "fungus hæmatodes", there is blood effused into the different cells. It is also seen in scirrhus, as well as encephaloid disease; and all these diseases are oftentimes observed to be mixed together in the same individual;—

scirrhus, melanosis, and encephaloid disease, in one mass; but when confined to itself, I believe it is thought, by the greater number of persons, not to be a malignant disease.

SECTION IV.—KIRRHONOSIS.

Definition.—There is a disease, in which a substance of a yellow colour is deposited, in spots or patches, in the substance of the viscera, or upon the skin, or upon different membranes. A German author (Lobstein) says, that he has seen various parts of a membrane so coloured; and he calls this affection "kirrhonosis."[a] It seems particularly to affect the membranes of the head, chest, and abdomen; and when jaundice occurs in young children, Andral imagines that it is really this particular disease, and not true jaundice. I can give no opinion, from experience, respecting it. There is a species of jaundice which occurs in young children, and which is speedily removed by castor-oil; or which, even if no measures were adopted, would often cease spontaneously in a day or two; but besides that, there is sometimes jaundice, the disposition to which is congenital; for many families have died of it in succession. There are many children who are said to have jaundice; but which affection is supposed to be an instance of this yellow disease. Laennec calls it "cirrhosis"[b]; and says it is deposited in masses, or layers, or sometimes in a cyst,—such as we occasionally see in melanosis; and he conceives that a hard tuberculated liver, such as is seen in gin-drinkers, is an instance of this affection. I recollect having once seen, in the liver of a child who had scrofulous tubercles of the lungs, a cyst filled with this peculiar yellow matter. It is altogether a rare disease; unless the small brown tubercle of the liver be it. We are led to believe, from its general history, that it is an innocent affection;—that the deposit is as innocent as that of melanosis.

Coexistence of many New Formations.—When these new formations (tubercles, scirrhus, fungus hæmatodes, melanosis, and kirrhonosis) co-exist in the body, it is nothing more than a fact analogous to the circumstances which I formerly stated, respecting *transformations.*[c] It was remarked, that the various transformations sometimes co-exist in the same organ;—that cartilage may be found in one part of an organ, and bone in another. And so it is with respect to mere changes of size and consistence. We find them co-exist in the same organ; so that one part of an organ will be indurated, and another softened;—one part hypertrophied, and another atrophied. Diseases of consistence, and of size, and those of transformation, sometimes blend together,—just like the diseases of new formations. And not only so; but new formations, and changes of consistence and of size,—all blended together in the same person,—are not unfrequently observed.

[a] From κίρρος, *yellow.*

[b] A term under which it is treated and known by the majority of modern writers.

[c] See Pages 205 to 210.

PART II.

UNIVERSAL DISEASES.

The diseases of which I have now spoken, are those which may affect almost any part of the body; namely, inflammation [a], scrofula [b], changes of consistence [c] and of size [d], transformations [e], and new formations [f]. I have spoken first of diseases which will affect any part. It is not meant that each of these diseases will affect any one part; but they may be situated either here or there. Besides these, however, there are other diseases which may be called "general",—not from their being common to any part of the body; so that they may affect one person to-day in one part, and another in a different part to-morrow (as is the case with inflammation), —but because they are "general" in another sense;—they appear to affect the whole body together. Whether these general diseases have their origin in some one spot, I do not know; but, so far as I can observe, they exist (more or less) throughout the whole body. One of these is a disease called "anæmia" (*bloodlessness*);—a very curious disease; and there is another called "scurvy." I do not know whether these diseases spring from the state of any one part of the body, more than of another; for we see a person bloodless throughout, without any local affection that can be discovered. They become pale,—blanched throughout, and excessively weak; and we cannot say that any one organ is labouring under disease, rather than another. So, in scurvy, the whole mass of blood, as well as of the solids, is affected;—so that these are general diseases in another sense; or, perhaps, we ought rather to say, they are *universal* diseases;—those being properly *general*, which are able to exist here or there. Those of which I shall next speak, therefore, are rather *universal* diseases; and perhaps the distinction I have drawn between *general* and *universal*, will be seen to be proper.

Again: there is another set of diseases which may themselves be local; but which produce effects so universal, that if they have really a local seat, it is at one spot in one patient, and at another spot in another patient. I refer to fevers; for there are various kinds of what is called "fever"—independently of eruptive diseases. Many persons speak of fever (whether intermittent, remittent, or continued) as having a particular locality; but I do not think they have proved the correctness of their assertions; and, according to our present state of knowledge,—though ready, of course, to change my course, when more knowledge is imparted to us,—I shall prefer considering these also as universal diseases.

[a] See Page 64.
[b] See Page 212.
[c] See Pages 195 and 197.
[d] See Pages 200 and 203.
[e] See Page 205.
[f] See Page 211.

Besides those general and these universal diseases, there are other affections, which consist of a mere affection of function; and in which, at least in many cases, there is no structural disease. It is possible that all diseases may be more or less structural; but I cannot help believing that some diseases are entirely *functional*. With respect to diabetes, for instance, I have frequently opened persons who have died of it; and if its pathology were estimated from an examination of the viscera, the disease would appear to be entirely functional. The labours of Bright and Prout have abundantly shown, that this affection (formerly thought to be only functional) depends upon a definite derangement in the processes of assimilation, and consequently in the circulating fluids. In cases of insanity, also, frequently no disease of the brain has been discovered. It appears to have been entirely functional. Of course the disease is *corporeal*; but "corporeal" is not "structural." A disease may be corporeal and yet merely "*functional*"; for there may be no change of structure.

There are other diseases, entirely *mechanical*. Hernia is one of this class. Even fractures and luxations are classed, in systems of nosology, as diseases; but, at any rate, hernia is called a disease; and it is entirely mechanical.

There are other diseases which arise from another animal having taken up its abode with us. Such is the case with worms in the alimentary canal; and the existence of various insects upon the surface of the body.

Diseases, then, may be "general",—attacking any one part; and there may be likewise "universal" diseases; which, according to our present state of knowledge, appear to be diffused throughout the whole body, without any particular locality. Again: it will be necessary to speak of diseases which are "functional" —affecting particular functions;—not organic at all, but entirely functional; and affecting only special parts. Diabetes, for instance, as regards the kidney, and insanity as respects the brain, must be functional. Spasmodic asthma, also, is often a functional disease. Persons who have died of or with the disease have been opened, where no trace of disease could be found. "Mechanical" affections likewise, and the existence of parasitic animals,—"parasitical" diseases, are brought frequently under our notice.

But I shall content myself with the general account already given [a] of inflammation and "structural" diseases; and shall consider "functional", "mechanical", and "parasitical" diseases, not in general, but only in detail, —when speaking of the diseases of each part of the body. Previously to this, however, I must give an account of "universal" diseases.

[a] See Pages 64 to 241.

CHAPTER I.

ANÆMIA.

General Definition.—The first of these universal diseases of which I shall speak, is called "anæmia";—a word which explains itself;—"the want of blood."[a] Blood is present; but there is a great deficiency of it. I have no doubt that the fault resides in some one particular part of the function of forming blood; but, in our present state of knowledge, we can only speak of it as a "universal" disease. When a person labours under this affection, we might state, *à priori*, what the symptoms must be. In the first place, there is great debility; in the next place, the skin is soft, and of a deadly pale wax-colour; in the next place, the white of the eye is bluish, the inner part of the mouth is colourless, the lips are exceedingly white, and even the tongue is pale. The pulse is, in general, about eighty; but exceedingly feeble, and very easily excited;—the least stimulus,—the least mental emotion, as well as corporeal movement, produces a great momentary acceleration. Respiration also is hurried on the least exertion. The appetite is bad; and it is said that there is constant thirst. There is œdema of the legs at last; and, finally, sweating;—sweating induced by the great debility. After death, the colour is much the same as it was during life;—the corpse is not paler than the living subject; for when this disease is intense, persons are really corpses in appearance.

Aggravated Species.—So far, I think, one might beforehand pourtray the disease, merely upon reflection;—without ever having seen or read about it. But, in certain cases of this disease, the stools have been observed to be dark-coloured and fœtid; the appetite to be bad; and almost every thing, at last, to be vomited. When persons have been opened, there has been found universal internal paleness, softness, and want of blood, and more or less excess of fluid in the serous membranes;—a fact corresponding with œdema of the legs, and with sweating in the last stages.

Pathology of Anæmia.—[This state is the opposite of congestion;—being a deficiency of blood with capillaries. As augmented vital action is a cause of congestion by attraction, so a diminution of it, for the converse reason, produces anæmia. This is exemplified in the muscles, ovaries, mammæ, and testes, when these organs have long been in a state of inaction, and in paralyzed limbs. A more direct mode of production, is compression of the artery which supplies the organ or limb. Congestion in one organ may induce anæmia in another, by a mere diversion of the circulating fluids. Thus it is not uncommon to find the mucous membrane pale, when the peritonæum and its subjacent tissue are loaded with blood. Changes in the nervous function have a remarkable effect in producing anæmia;—witness the paleness of the face during some kind of mental affection;—not less remarkable than the fulness of the vessels produced by other emotions. Andral asks, with great sagacity, "Who shall say that 'emotion' may not exert the same influence upon the stomach as on the skin;—making it pale at one time, and reddening

[a] From ἀν, *without*; and αἷμα, *blood*.

it at another?" Some parts are deprived of their due proportion of blood by gravitation. This is experienced, in states of great debility, by the brain more than by any other organ, and the nature of the disorder is indicated by the relief which the recumbent posture affords. Andral intimates his opinion, that organs appearing anæmial, *less* from a scanty supply of blood, than from want of the colouring matter, are instances of degenerations towards a condition which is normal in the white-blooded animals.

The microscopic signs of the blood are scarcely less ambiguous than those of congestion; for, by the operation of cadaveric changes, blood may have found its way to one part which was scantily supplied during life;—just as it may disappear from another where it was superabundant.[a]]

Endemic Variety.—This disease, in a peculiarly marked form, occurred formerly in France, to a great number of workmen in one particular gallery, at a coal-pit situated at Anzain, near Valenciennes. The disease was preceded by tormina, retching, green stools, thirst, and wasting, for ten or twelve days; and then the affection appeared, as I have now described it. It lasted for six, or even for twelve months; and then ended in death. At length, the proper treatment was discovered. A description of this endemic disease is given by Professor Halle. It might be called "endemic", from having been confined to a particular mine, and even to a particular gallery in a mine;—as though it arose from some effluvia. Dr. Combe describes a similar case, in the first volume of the "Edinburgh Medico-Chirurgical Transactions."[b] The patient was a corn-merchant's son, in whom no evident cause for the disease could be discovered.

Treatment.—Mercury was given to the French patients, and did them a great deal of harm; for it is a state of the system in which mercury is very injurious. Opening one patient, and finding the internal vessels almost bloodless, they no longer gave mercury, but carbonate (or rather oxide) of iron in considerable quantity, with opiates, tonics, and good food; and the patients got well. They exhibited signs of improvement in the course of eight or ten days; and from that time the greater part, I believe, recovered. A similar occurrence took place at Dunkirk; and the treatment there was exactly the same (the exhibition of iron); and the patients recovered equally well. It was found, however, that relapse was very usual; and that the remedy had therefore to be continued for a considerable time. I believe the patients at Dunkirk, were persons who had been sent from the mines to which I before referred; but the same treatment was adopted, and was followed by the same success. In anæmia from *loss* of blood, as well as from *deficient formation* of it, iron is one of the best remedies. I must mention that Dr. Combe used both the sulphate and carbonate of iron; but he does not mention the doses, or the length of time they were given. Mercury, which appeared to be injurious in France, was also exhibited; as well as a number of other drugs;—so that the iron did not appear to have a fair chance.

[a] "Library of Medicine"; Volume 1; Page 16. [b] Page 194.

CHAPTER II.

CHLOROSIS.

THERE is a disease common to young women, either about the time they ought to menstruate, or soon after they have begun to do so. It is called "chlorosis"[a]; and appears to be a state exceedingly similar to that of anæmia. It sometimes occurs to persons more advanced in life; and a similar affection also occurs to men. Strictly speaking, it is not chlorosis in *men*; because we say that one of the symptoms of chlorosis, is an absence of the menses;—the menses not appearing at the proper time of life, or retiring just after they have presented themselves. Of course, this is not a symptom of the disease in men; although, in them, when the actual condition of the system is considered, it may be correctly termed "chlorosis." But let us consider *things*, rather than *words*. It is a fact, then, that men will sometimes fall into a state of anæmia and debility, very similar (in all appearance) to that state which in women is called "chlorosis."

These diseases, although they are not spoken of by authors as analogous affections, are all of the same family. There is a want of the production of blood; though wherein the defect consists, I do not know. In the cases which occurred in France, one would suppose that some deleterious substance affected the functions of the body. In chlorotic women, frequently, no cause can be discovered. In organic disease of the heart, patients will continually fall into a condition of the system, similar to that which we observe in chlorosis; but with palpitation ten times greater than ever occurs in that affection. In various visceral diseases, especially of the spleen and stomach, anæmia occurs.

[With reference to the question in dispute, as to whether the term "*chlorosis*" ought to be exclusively restricted to the anæmial state dependent upon disordered menstruation, the following practical observation on its varieties, by Dr. M. Hall, are important:—"Sometimes there is less pallor of the countenance and prolabia; but a ring of tumid *darkness round the eye*, and perhaps a tumid state of the upper lip. Sometimes the complexion is of a more yellow or *icterode* hue. Sometimes the complexion is of a peculiar *lead-colour*. There is sometimes a peculiar state of coldness, cold moisture, and livividity of the hands and fingers, and a lilac-hue of the nails; the tips of which often become white and opaque. The state of chlorosis *consequent on hæmorrhage*, also deserves to be distinctly noticed: there are paleness, and slight yellowness of the complexion, exanguious prolabia, a greater degree of loss of flesh, and great fluttering and nervousness. There are more chronic forms of this affection; in which there is a continued (though variable) state of sallowness, of yellowness (or icterode hue), of darkness, or of a wan, squalid, or sordid paleness of complexion; or a ring of darkness surrounding the eyes, and extending a little, perhaps, towards the temples and cheeks, and sometimes encircling the mouth;—without tumidity, paleness of the prolabia, and œdema.[b]]

[a] From χλωρος, *green*.

[b] "Principles of Medicine; by Marshall Hall, M.D." Page 205.

Symptoms.—When a woman becomes the subject of this disease (which is common), there is general paleness, with swelling of the face and ankles; weakness; a great sense of tension of the legs and feet; dyspnœa; palpitation; the pulse either quick or easily rendered so; and a deficiency of menstruation. These are the symptoms of chlorosis mentioned by authors; and they are, for the most part, exactly the symptoms that occur in the disease called "anæmia." I have no doubt the pathology, or proximate cause of these two diseases, is exceedingly similar. In women who have chlorosis, the alimentary canal is often very much disturbed; and that was the case with the Frenchmen whom I have mentioned.[a] There is sometimes a great derangement of the stomach; or, if the cause of hunger is cerebral, we must say "a derangement of mental feelings." Patients will long for all sorts of things; such as chalk, sealing-wax, or brown paper, with impunity. Such is the departure from the natural state of things. Very frequently, too, there is constipation. They will sometimes eat the most filthy things;—things that one would never think any human beings would touch, except cannibals. They will even take pleasure in offensive smells; and long to eat what they do eat in a privy. That, however, is an intense state of the affection.

State of the Blood.—[Among other changes which occur in the progress of chlorosis, there is none more constant than an impoverished condition of the blood; which is thin, light-coloured, and weakly coagulable;—being deficient in fibrin, and still more in the *proportion* of the red particles. To the latter cause is to be attributed the diminished temperature of the surface, and likewise the universal pallor and waxy state generally exhibited by the subjects of this disease. The deficiency of colour in the catamenia, and the pale stain which hæmorrhages from the nose leave on the linen, are also referrible to the same cause. In aggravated cases, if blood be drawn from the arm, the crassamentum is observed to be of a pale rose-colour, and small in proportion to the serum. It is to be regretted that in this, as in most other cases of morbid blood, pathologists have contented themselves with a general observation of facts. The only analyses of chlorotic blood of which I[b] can find a record, are given by Mr. Jenkins, in two well marked cases of chlorosis; the one of a girl aged fifteen, the other of a young woman aged twenty-one. In these cases the blood contained 871 and 852 parts in a thousand (respectively) of water, instead of 780, which is the healthy standard; and the colouring matter amounted to 48·7 and 52 instead of 133. The albumen and salt were in the usual proportions.[c]]

Its Stages.—[Chlorosis steals insidiously on the patient;—so insidiously, sometimes, that I[d] have known parents even to be unconscious of its existence, until it has been distinctly pointed out to them; although it may have attained its most marked form. It has three tolerably distinct stages;—the incipient, the confirmed, and the inveterate.

The incipient stage of this morbid affection is more particularly characterized by paleness of the complexion, an exanguious state of the lips, slight tumidity of the countenance, and puffiness of the eyelids,—especially the upper one. Along with this marked state of the countenance, there is sometimes a slight tinge of green, of yellow, or of slate-colour. In the confirmed stages of chlorosis, the state of pallor of the complexion

[a] At Page 244.
[b] Dr. Babington.
[c] "Cyclopædia of Anatomy and Physiology"; Volume I; Page 428.
[d] Dr. Marshall Hall.

is still more marked; and the tongue, as well as the lips, is exanguious;—perhaps with a slight lilac-hue in the upper lip. There is usually tumidity of the integuments in general, and of the eyelids in particular. In the inveterate or last stage, this state of the countenance is apt to be modified by a degree of loss of flesh on the one hand, and by increased œdema (perhaps partially disposed) on the other.

State of the Tongue.—In the first stage of this affection, the tongue is rather white and loaded; and somewhat swollen, and marked by pressure against the teeth. Its papillæ are enlarged; it is slightly formed into creases or folds; and its colour is rather pale. The gums and inside of the cheeks are, like the tongue, somewhat tumid; and the cheeks, like the tongue, are also impressed by the teeth. The mouth is generally clammy, and the breath tainted with a peculiar odour. In the confirmed stage of chlorosis, the tongue becomes clean, smooth, and exanguious; with a slight appearance as of transparency, and a slight lilac-hue. It is flat upon its surface, and still somewhat indented by pressure against the teeth. In the last stage, the tongue frequently becomes smoother still, and slightly shining; and I [a] have, in some cases, observed an odour of new milk in the breath of the patient.

General Pallor of the Surface.—In the beginning of this morbid affection, there is an increasing pallor of the general surface, hands, fingers, and nails; an opaque, white, and tumid state of the skin; a slight tendency to œdema of the calves of the legs, and ankles, and to loss of flesh. In the more confirmed stage, the skin is still smooth, but rather dry; and the integuments are exanguious, puffy, opaque, and perhaps yellowish, with the same or increased tendency to œdema. The nails are exanguious; and, in some instances, slightly split or exfoliated. In the confirmed stage, the appearances are the same, with the addition of some loss of flesh, and perhaps increased œdema. The nails are sometimes slightly split, and their tips opaque.

Deficiency of Nervous Energy.—The patient in chlorosis is languid, listless, sedentary, indisposed to exertion, easily overcome by exercise, nervous, low-spirited, and frequently a prey to singularities of temper. There is generally severe recurrent headach, or vertigo; sometimes heaviness for sleep; and sometimes an impaired state of the memory, and of the faculty of attention.

Palpitation and Breathlessness.—There is frequently palpitation, either recurring in attacks, or of a more permanent character; and, more frequently still, a sense of fluttering in the præcordia, with irregular action of the heart, or imperfect syncope. The pulse is sometimes rather frequent,—always easily accelerated. There is usually a degree of breathlessness experienced on any exertion; sometimes fits of dyspnœa; sometimes a sonorous cough.

Pain of One or Both Sides.—Frequently, also, there is a singular and peculiar pain of one or both sides, either together or alternately;—situate over the false ribs; and spreading a little upward, backward, or downward;—so as to occupy the space between the false ribs and the ilia. The recurrent nature, the particular situation, and the alternating character of this pain, are altogether peculiar and characteristic. The patient perhaps complains on pressure; but, on a careful examination, this pain will be found not to be aggravated by a deep inspiration. For this purpose the inspiration

[a] Dr. Marshall Hall.

must be repeated; as it may appear, at first, to increase the pain; but afterwards it will be found not to do so.

Appetite Impaired.—The appetite is generally impaired, capricious, and even depraved;—inducing longings for some indigestible substances; such as acids or pickles, magnesia or chalk, tea-leaves, flour, grits, wheat, cinders, sand, &c. The patient likes to have some one of these substances in her mouth; but especially when affected by agitation or anxiety.

State of the Bowels.—The bowels, in the incipient stages, are always constipated. Afterwards this state alternates or leads to diarrhœa, and sometimes to hæmatemesis or melæna. The evacuations are usually scanty, dark-coloured, and fœtid.

State of the Menstrual Discharge.—The flow and condition of the catamenia are, in general, very early affected in this disorder. They become irregular in their returns, inconstant or of short duration in their flow, defective in quantity, and pale in colour. Sometimes they are discoloured; sometimes they do not cease kindly, but are continued into a state of leucorrhœa; at other times, and especially in the latter stages of the disorder, there is amenorrhœa. In some instances, each return of the catamenia has been preceded and attended by much pain in the back, and in the region of the uterus.

In the more Advanced Stage.—In the inveterate stage of this disorder of the general health, the symptoms assume a modified but still more aggravated character. There is a very slow but progressive loss of flesh; the languor assumes the form of permanent debility; the œdema increases, and assumes the aggravated character of anasarca; the pulse becomes more constantly frequent; and there is altogether less of the character of functional derangement, and more of that of disease. The local complications become more permanent, or are renewed by the slightest causes; and, in some painful instances of this affection, the patient has been unable to bear the most ordinary occurrences of domestic life; and has, perhaps, been compelled to remain altogether in her room, or upon the sofa or bed. In this stage of the disorder, there is sometimes an almost permanent pain of the head, perhaps with intolerance of light or of noise; sometimes incessant pain of the chest, with tenderness, difficulty of breathing, and cough; and there are frequently pain and tenderness of the abdomen, with sickness, and constipation or diarrhœa. Various other symptoms prevail in different instances; such as locked-jaw, clenched hand, contracted foot, twisted limbs, palpitation or other forms of dyspnœa, fits of coughing, hiccup, retention of urine, &c.

Pathology of Chlorosis.—I[a] should despair of giving any thing accurate or specific, with regard to the pathology of this form of disorder of the general health. There appears to me[a] not to be a system, an organ, a texture, or even a fluid in the animal economy, which does not suffer in different instances of this multiform disorder. The complications of the more *acute* form of disorder of the general health, differ totally from those of the more *protracted*, both in their various seats, and in their nature;—the former affecting the more vital organs, the latter the superficial textures. A similar remark equally applies to that form of disorder of the general health now under consideration.

There is in chlorosis a remarkable state of the capillary system of circulation, both of the vessels, and of the fluids. It is this which gives origin

[a] Dr. Marshall Hall.

to the exanguious appearance of the countenance, lips, tongue, gums, and general surface; to the tendency to œdema; and to different species of hæmorrhages, especially those of the mucous and cutaneous surfaces; such as epistaxis, melæna, hæmatemesis, and even purpura; and it is from this circumstance that the catamenia become almost colourless and aqueous. I[a] have observed the blood which has flowed from the nose scarcely to tinge the sheets; and that taken from the arm to resolve itself almost entirely into serum, with scarcely any crassamentum. This disorder affords, therefore, one of the most unequivocal examples of the humoral pathology.

Causes.—It would be difficult to trace the series of causes and effects in the pathology of this affection; but I[a] do think the *first* cause is in the state of the bowels; that a *concurrent* cause is the peculiarity of constitution just described; and that an *exciting* cause is the inactive and sedentary mode of life usually obtaining in female youth. The stomach suffers from its continuity with the intestines; the uterus possibly by contiguous, the head and heart by remote, sympathies. The pain of the side is peculiar, and too common to be a mere accidental complication; and it also, therefore, probably depends upon the state of the large intestines.

The state of the circulating fluids is probably deteriorated, from defective digestion and assimilation; and this deteriorated condition of the blood probably becomes a cause, in its turn, of impaired vital energy;—the heart and the brain being imperfectly stimulated. It is obvious, from these remarks, that blood-letting—so apt to be prescribed for painful affections of the head or side—should be employed with the utmost caution.

The state of disorder has sometimes been mistaken for organic disease: but its character is so distinct, that there does not appear to me[a] any danger of mistake with the careful observer. The state of the complexion, especially when it has assumed somewhat of the icterode hue,—has, indeed, frequently led to the suspicion of disease of the liver. The diagnosis is, however, readily established, on comparing the state of the lips, of the tunica conjunctiva, of the urine, and of the fæces; and by a careful examination of the region of the liver.

Complications.—The patient affected with chlorosis, is extremely subject to attacks of various local affections in a more continued form. It is, therefore, essential to distinguish the complications of this morbid affection from some sudden and some chronic diseases. The first case in which I[a] saw the necessity and the importance of these distinctions, had been successively treated as inflammation of the brain, and inflammation of the liver, by bleeding, blisters, and leeches, to an almost incredible extent;—the patient having been first subject to severe pain of the head, and afterwards to pain of the right side. The case was distinguished by the usual appearances and symptoms of disorder of the general health; and it was perfectly and even promptly removed by the appropriate remedies.

Diagnosis.—The diagnosis is founded upon the state of the countenance, of the tongue, of the general surface of the bowels, and of the catamenia; the multitude and variety of the other symptoms; the variable history of the case; perhaps, the suddenness and repetition of the attack; and the effects of remedies. The only difficulty is, when some topical inflammation comes on, in a patient previously affected with chlorosis. Even in this case the disease assumes a more settled and definite form, instead of the varying and complicated character of chlorosis; and may then be distinguished by a careful examination.

[a] Dr. Marshall Hall.

These observations strictly apply to the diagnosis of chlorosis with pain of the head, from inflammation of the brain or its membranes. In the latter disease, there are not the characteristic appearances and symptoms of chlorosis;—as observed in the countenance, tongue, general surface, and general symptoms; while there are, on the contrary, the peculiar and definite symptoms of inflammation of the encephalon; which it would be out of place to mention here.

The cough and dyspnœa, the palpitation of the heart, the pain of the side, and the pain and tenderness of the abdomen, are to be distinguished from inflammation within the chest or abdomen, in the same manner, by comparing the general and local characteristics of chlorosis with those of each of these diseases; and by ascertaining the history, and observing the effects of remedies.

The pains of the side, or of the abdomen, so apt to occur as complications of chlorosis, are to be distinguished from pleurisy or peritonitis, by the same recurrence to the state of the complexion, tongue, and general surface, to the other symptoms, and by their own peculiar character. These pains, for instance, are less constant (both in situation and duration) than those of an inflammatory nature; and though sometimes aggravated by a deep inspiration, are not invariably so; especially on repeating the inspiration a third or fourth time. The accession of pain of the side, in chlorosis, is apt to be sudden; the side affected is sometimes changed; the degree of pain is sometimes extremely severe, at others less so; and there is more *expression* of pain than is permitted by the pain of *inflammation*; which represses the movements of respiration implied in the loud expression of pain [a].]

Treatment.—I believe the best remedies for chlorosis, are the preparations of iron, which were found useful in France. [b] No medicine acts so beneficially as iron. I am not sure that the carbonate is better than any other preparation of that medicine; but with that I know practitioners will generally succeed. It is a disease not to be treated by bleeding, or profuse purging. The bowels are only to be maintained in a regular state. We must not allow a collection of trash to be formed in them; but, beyond that, purging does harm. All evacuants were found to do harm, in the cases of anæmia in France [b]; and I know from my own experience (which is necessarily very extensive, in so common an affection), that iron is by far the best remedy for chlorosis. Persons will lose their puffiness under it,—lose their difficulty of breathing; and will gain strength, and soon gain colour.

When I come to treat of diseases of the heart, an affection analogous to this will be met with. Persons will have violent palpitation, and become pale; and the state is not one indicating bleeding and purging; for in such a complaint as this, I know they will be made worse by those measures. But —very much to my surprise, when I first ventured on the practice, and frequently to the surprise of others—iron has remedied this morbid condition of the system, to a great extent. It will not cure organic disease; but when the heart, and body at large, have thus become almost bloodless, and extreme faintness has been induced by it,—so that a quick, irregular, and sharp pulse results,—the patient will experience the greatest relief from the exhibition of iron.

Regulate the Diet.—[With the view of filling the vessels with healthy

[a] Dr. Marshall Hall's "Commentaries on some of the Diseases of Women"; Part 1; Chapter 4; First Edition.

[b] See Page 244.

blood, you should allow your patient a generous diet, apportioned to the powers of her digestive apparatus; and she may be supplied with all the food that she can take without producing symptoms of dyspeptic oppression, and offensive stools. Three meals, and perhaps four, she should take in the course of the day;—breakfast, an early dinner, tea, and a supper. In the way of peptic [a] preparative, you may recommend her, on rising in the morning, to take a table-spoonful of white mustard-seed, unbruised; and two or three pills, consisting of quinine, say one grain, and four grains of the best Cayenne-pepper (I [b] say "of the *best* pepper"; for some is little better than sawdust); and this pepper should be powdered thoroughly; and mixed up with a little mucilage, or any other combining substance which is likely to dissolve soon in the stomach. This peptic medicine may be taken four times a day; about half an hour before each of the four meals. The quantity of it ought to be measured according to the effect produced;—warmth of the stomach, and a little gnawing pain there, being perhaps the best criteria that the medicine is in action. At breakfast she may use biscuits, or dry toast, or stale bread; with fresh butter, perhaps a new-laid egg, and one little cupful of hot black tea;—as hot as the mouth will bear it; in order that it may warm the stomach, and stimulate the inner membrane; for these hot drinks, though hurtful to the healthy, may be found very useful in a diseased stomach; and, much in the same manner as heated water is found to swell the hand immersed in it, and to excite the capillary circulation,—so as to produce reddening and perspiration,—the hot tea may be reasonably thought to produce its action on the capillaries of the stomach. The patient should be confined to one cupful of tea, that she may not deluge the stomach; for some women are very fond of taking tea in excess; and, in this way, they may overload the gastric cavity, and dilute the gastric juice, so as greatly to impair its digestive and solvent powers. At about one or two o'clock,—namely, five or six hours after breakfast,—another spoonful of the white mustard-seed and the peptic pill may be used;—being administered half an hour before the dinner. At this meal, be it observed, *boiled* meat is preferable to *roast* meat; *white* meat, to *red* meat; that which is *well*-done, to that which is *under*-done; the *in*side, to the *out*side; and potatoes, to every other vegetable. The food is to be thoroughly masticated, and eaten slowly. There should be no drink; or if there must be some, then take half-a-tumbler of very hot water; but, in general, the drink required ought to be taken two hours before dinner is begun. Toast-and-water, table-beer, or other aqueous fluids, are to be preferred. The pepper and the mustard-seed will supersede the alcoholic stimulus. Three or four hours after the dinner, the tea may be ordered;—not sooner, lest it should disturb the digestive powers. This meal is to be similar to the breakfast; and three or four hours after tea, the patient may sit down to supper, in the form of a very light dinner. With respect to the general beverage, my opinions are a little unsettled. To the alcoholic stimulus I [b] have an aversion, perhaps even a prejudice; and, certainly, if your patient under the use of this diet is acquiring strength, I [b] should not give much stimulant of this kind; but if not, then wine, or ale, or porter, or spirit, may be given; and of the four I [b] give a preference to spirit, in measured quantity, and diluted with four or five times its bulk of water. These fermented liquors, you may tell your patient, must never affect the head; and while she keeps clear of any unpleasant impression of that kind, she cannot be considered

[a] Digestive; from πεπτω, *to ripen*. [b] Dr. James Blundell.

as indulging in marked excess. In general, in these cases, whatever beverage the patient uses, is better taken apart from the food;—say three hours afterwards; or, still better, two hours before. Both you and your patients may read Ludovico Cornaro on longevity, with great advantage.

Change of Air and Bathing.—Still more to invigorate the patient, if she is in the midst of a large town, you ought to send her to the sea-side, or into the country. Indeed, I [a] know of no means more efficacious for improving the digestive secretions, than change of air. I [a] do not here except mercury itself. You may sometimes have patients, for weeks together, in this large city [b], with a metropolitan paleness of the cheek, and a commercial whiteness of the tongue;—weak, sallow, emaciated;—rich and miserable;—in a word, labouring under gastric symptoms, too strong for your remedies; and yet these very patients, after having been eight or ten weeks, sometimes five or six only, in the country, acquire their full digestive powers, and become comparatively plump and fat. The cold shower-bath, where the patient is vigorous enough to re-act under it, may be used every day, or on alternate days. A dip in the ocean may be recommended, if the patient is at the sea-side; but it is better to defer the use of bathing, till the patient has a little recovered her strength. One of the best proofs of the salubrious action of the bath, is the production of a full glow; but if the body, after plunging, is pale-blue and chilly, or if local pains are felt, we must refrain. These different measures having been carefully pursued, the chylopoietic [c] viscera having been strengthened and amended, the quantity of red blood having been increased, and the vigour of the system corroborated, should amenorrhœa [d] continue, you may have recourse to emmenagogue [e] remedies. Chlorosis is no medical objection to matrimony.[f]]

[a] Dr. James Blundell.

[b] London.

[c] From χυλος, *chyle*; and ποιεω, *to make.*

[d] From α (privative), *without*; μην, *a month*; and ρεω, *to flow.*

[e] From εμμηνια, *the menses*; and αγω, *to compel.*

[f] "The Principles and Practice of Obstetric Medicine. By James Blundell, M.D., late Professor of Obstetric Medicine at Guy's Hospital. Carefully revised and corrected, with numerous and important Additions and Notes. By Alexander Cooper Lee, and Nathaniel Rogers, M.D." London: Joseph Butler, Medical Bookseller and Publisher, 4, St. Thomas's Street, Southwark. (Pages 647 to 649.)

CHAPTER III.

SCURVY.

Definition.—The word "*scurvy*" is said to be derived from some German words;—either from "*scharf-pocke*" (meaning "*sharp*" or "*violent pock*") corrupted to "*scharbock*"; or from "*sharf-pocke*" (meaning "*scab*" or "*scurf-pock*"). However this may be, it is from the word "*scharbock*", Latinized and corrupted, that "*scorbutus*" is derived; and a very barbarous word it is. From this we are said to have our English term "*scurvy*"; but I should rather think it came directly from the Danish word "*scurv.*" This name, "*scurvy*", is used by the vulgar in a very indefinite sense;—being applied by them to any ill-looking chronic cutaneous disease; but in our profession it is restricted to a particular affection.

Pathology of Scurvy.—[It seems to be the universal opinion of those who have seen and written upon scurvy, that it owes its origin to a morbid change in the fluids, and especially in the blood. Notwithstanding this general belief, there has been no attempt (up to the present time) at any chemical examination of the properties of scorbutic blood; and we have only the general observation made by the surgeons of Lord Anson's expedition (Messrs. Ettrick and Allan);—that in the beginning of the disease, it flows from the arm in different shades of light and dark streaks;—that as this advances, it runs thin and black, and after standing turns thick and of a dark muddy colour; the surface in many places being of a greenish hue, without any regular separation of its parts;—that in the third degree of the disease it is as black as ink; and, though kept stirring in the vessels for many hours, its fibrous parts have only the appearance of wool or hair floating in a muddy substance;—and that, in dissected bodies, the blood in the veins is so fluid, that by cutting any considerable branch, the part to which it belongs may be emptied of its black and yellow liquor;—the extravasated blood being precisely of the same kind. The prevalence of scurvy, where there has been a long continued use of salted provisions, has given rise to the supposition that the salt itself actually finds its way into the circulation, and acts (as it is known to act on blood out of the body) by *preventing* its coagulation. This, however, is not correct; for the appearance of the blood, especially as the disease advances, is exactly the reverse of what it would be on the addition of salt; which—instead of making it black and causing it on standing to become thick, muddy, and of a greenish hue—would impart to it a fine scarlet tint, that would remain permanent until it began to putrefy.[a]]

General Symptoms.—This disease is characterized by a bloated surface; and by petechiæ, vibices, and ecchymoses. By "*petechiæ*", are meant minute dark red or livid points, little larger than the point of a pin; spots still larger than these are called "*vibices*"; and when instead of spots we have patches, the word "*ecchymosis*" is employed. They all relate to the

[a] Article "Blood", by Dr. Babington, in the "Cyclopædia of Anatomy and Physiology"; Volume 1; Page 424.

same appearance, but denote a difference in extent. With respect to colour, these points, specks, or patches, are of a dark red or purple hue; but may contain all the shades which we see in bruises. In this disease, then, the surface is bloated; and upon it are seen points, specks, and patches, generally of a red or purple colour, but sometimes of all the shades which we see in common bruises. A very remarkable circumstance also attends the disease; and that is, the hardness of many parts, but particularly of the thighs. If the thigh of an individual labouring under scurvy (though only in a very slight degree) be examined, I believe it will be found generally hard, but more especially under the hams. In severe cases, I have seen it as hard as a board. I have not seen many cases of the disease; but in all of them I have noticed this circumstance. The gums are particularly affected. They are spongy, and bleed; and either they, or the breath, or both, send forth a very offensive odour. Such is the disease of the gums, that the teeth very frequently fall out; and, in addition to their being spongy and bleeding, they become enlarged and livid.

General Condition of the System in Scurvy.—This is a disease of great debility; and the spirits are always very much depressed. So great is the weakness, that people very frequently faint from time to time; and the pulse is found to be feeble, and the surface of the body cold. Very often, ulcers form upon the surface, and discharge a thin and fœtid bloody fluid; and, at last, a coagulum of blood is formed. The gums are in precisely the same predicament. The blood which is discharged and coagulates upon the ulcer, is with great difficulty separated from it; for it adheres to the ulcer and the flesh which is beneath; and, when this coagulum is removed, the flesh is found to be, like the gums, soft and spongy. If the clot be removed, it is instantly renewed. A fresh oozing of blood takes place; a second coagulum supplies the place of the first; and at length a fungus will sprout forth,—a soft, flaccid, dark looking fungus. It sprouts as fast as it is taken away; and is called, by sailors, "bullock's liver." It may attain an enormous size. If this fungus be repressed, a gangrenous tendency is frequently observed. The leg will swell, and become more spotted and painful. When a fungus sprouts forth from the "dura mater", after a fracture of the skull, it is known to be very dangerous to repress it. If the part be compressed, dangerous symptoms are very likely to ensue. In like manner, it is found injurious, in scurvy, to repress this "bullock's liver"; because the pressure induces a gangrenous tendency. The very slightest bruise, inflicted upon a patient labouring (to any considerable extent) under scurvy, will generally produce an ulcer of the description I have mentioned.

Reappearance of Old Wounds.—There are some other remarkable circumstances, respecting this disease. Old wounds, and even fractures, have a tendency to recur under it. Wherever an ulcer has existed,—wherever a solution of continuity in soft parts has taken place previously, although the parts may have been well cicatrized, yet under this disease the wound often opens again. Nor is this occurrence confined to soft parts; but even bones themselves (as just now stated) which were formerly fractured and repaired, become again disunited;—showing that the callus of bones is not so strong, as the original parts of the body; and that it suffers, when the rest of the bones do not. Another very singular circumstance connected with this disease, is the occurrence of hemeralopia[a], (or, as some authors improperly say, nyctalopia[b]),—"night-blindness." Patients labouring under scurvy,

[a] From ἡμέρα, *the day*; and ὤψ, *an eye*.

[b] From νύξ, νυκτος, *the night*; and ὤψ, *an eye*.

frequently become blind, either altogether or in part, when night comes on.

Causes.—The great cause of this disease, appears to be the want of fresh animal and fresh vegetable food. It is on this account that the disease was formerly very common at sea; for, at one period, sailors were supplied with nothing but salt provision. So badly were ships formerly provided for, and so faulty was the general management, that in the year 1726, when Admiral Hosier sailed to the West Indies with seven ships, he buried his ship's company twice; and then died himself of a broken heart. Deaths to the amount of eight or ten a-day took place, formerly, in a moderate ship's company. The bodies, after being sewn up in hammocks, were washed about the deck, for want of sufficient strength, on the part of survivors, to throw them overboard. Lord Anson, in the year 1741, lost one half of his crew, by scurvy, in six months. Out of nine hundred and sixty-one men who sailed with him, only three hundred and thirty-five were alive at the end of the year; and, at the end of the second year, only seventy-one were fit for the least duty. Sir Gilbert Blane says, that the disease used to appear in about six or seven weeks from the beginning of sea-victualling.

Historical Account of Scurvy.—A better description of the dreadful mismanagement formerly prevalent, in regard to the navy, cannot be found than that in "Roderick Random." Smollett, both in that work and in his "History of England", gives an account of the armament which, about the same time that Lord Anson's expedition took place, was sent out against Carthagena.[a] The description is from his own observation. He says[b] the provision consisted of putrid salt beef, salt pork, and musty bread. To the salt beef the sailors gave the name of "Irish horse";—I suppose that it looked like horse-flesh, and that the contractors lived in Ireland. The salt pork came from New England; and was neither fish nor flesh, but savoured of both. The bread came from the same country; and the biscuit, like a

[a] The expedition against Carthagena, which took place in 1741, is described in "Roderick Random" (Volume 1, Chapters 31 to 34), and Smollett's "Continuation of the History of England" (Book 2, Chapter 7); as well as in a "Compendium of Voyages." The following particulars from "Roderick Random" (Volume 1, Chapters 25 and 33), as to the general management of the sick on board of ship, a hundred years ago, are valuable; from the author's opportunities of personal observation:—"At seven o'clock in the evening, Morgan visited the sick; and, having ordered what was proper for each, I assisted Thomson in making up his prescriptions; but when I followed him into the sick-berth (or hospital), and observed the situation of the patients, I was much less surprised that people should die on board, than that any sick person should recover. Here I saw about fifty miserable distempered wretches, suspended in rows, so huddled one upon another, that not more than fourteen inches space was allotted for each, with his bed and bedding; and deprived of the light of the day, as well as of fresh air;—breathing nothing but a noisome atmosphere of the morbid steams exhaling from their own excrements and diseased bodies; devoured with vermin hatched in the filth that surrounded them; and destitute of every convenience necessary for people in that helpless condition."

"The sick and wounded were squeezed into certain vessels, which thence obtained the name of 'hospital-ships'; though (methinks) they scarce deserved such a creditable title;—seeing that few of them could boast of their surgeon, nurse, or cook; and the space between decks was so confined, that the miserable patients had not room to sit upright in their beds. Their wounds and stumps, being neglected, contracted filth and putrefaction; and millions of maggots were hatched amidst the corruption of their sores. This inhuman disregard was attributed to the scarcity of surgeons; though it is well known that every great ship in the fleet, could have spared one (at least) for this duty;—an expedient which would have been more than sufficient to remove this shocking inconvenience. But, perhaps, the general was too much of a gentleman to ask a favour of this kind from his fellow chief; who, on the other hand, would not derogate so much from his own dignity, as to offer such assistance unasked."

[b] "Roderick Random"; Volume 1; Chapter 33.

piece of clock-work, moved by its own internal impulse;—owing to myriads of insects that dwelt within it. The butter was served out by the gill; and was exactly like train-oil thickened with salt; and though there was water enough to allow each man half-a-gallon daily, for six months, yet each had only a purser's quart a-day[a]; and this in the torrid zone, where a gallon would have been hardly enough to repair the waste of perspiration.[b] It cannot be wondered, therefore, that scurvy formerly prevailed to the dreadful amount we have stated.[c]

Scurvy in London.—The disease prevailed likewise on shore, however. Indeed scurvy, at one period, was one of the most fatal diseases in London; so that, even so late as the seventeenth century, there were from fifty to ninety deaths from it annually; and in the year of the plague[d], there were not fewer than one hundred and five deaths. These frightful occurrences took place regularly; and not during a particular year. The same reason existed for the prevalence of scurvy in London, which produced it at sea; for the food of the Londoners was then salt beef and pork, with a little veal. The lower orders, in the time of Henry VIII, had very little else. The fact was, that only pasture land was then common; for very little was cultivated. Animals, therefore, could feed only during the summer and autumn. Hay being a later improvement, it was impossible to feed them longer than that period; and therefore, as the winter came on, they were killed and salted; and thus a store of provision was laid up until the next spring. Vegetables, too, were extremely scarce in those days; so that Catherine of Arragon, one of the numerous wives of Henry VIII, was actually obliged, in the beginning of the sixteenth century, to send to the Netherlands for a gardener to raise her a salad;—so ignorant were the gardeners of this country, of what is now considered within the reach of every body. Cabbages, and other vegetables, were not cultivated in England before the reign of Henry VIII. Government too, at that period, seemed to encourage the consumption of this meat; for the price of meat was fixed by law at one-*twentieth* of what it is now; whereas wheat was fixed at only one-*tenth* of its present price. Care was thus taken to have a good supply of *animal* food; but *vegetable* food was comparatively neglected. I may mention that, in 1700, a cabbage cost three pence; while, in 1760, it cost only one halfpenny. Such was the advance of art, and the increase of knowledge, that this great difference occurred in the price of a cabbage, at those two periods. Other greens too, at first, were proportionately dear;

[a] We loitered here [at the island of Vache] some days longer, taking in wood, and brackish water; in the use whereof, however, our admiral seemed to consult the health of the men, by restricting each to a quart a-day.—"*Roderick Random*"; *Volume* 1; *Chapter* 31.

[b] Instead of small beer, each man was allowed three half quarterns of brandy or rum; which were distributed every morning, diluted with a certain quantity of water, without either sugar or fruit to render it palatable; for which reason this composition was not unaptly styled "*necessity.*" This fast must, I suppose, have been enjoined by way of penance on the ship's company for their sins; or rather with a view to mortify them into a contempt of life;—that they might thereby become more resolute and regardless of danger. How simply, then, do those people argue, who ascribe the great mortality among us to our bad provision and want of water; and affirm that a great many valuable lives might have been saved, if the useless transports had been employed in fetching fresh stock, turtle, fruit, and other refreshments, from Jamaica and other adjacent islands, for the use of the army and fleet;—seeing, it is to be hoped, that those who died went to a better place, and those who survived were the more easily maintained. After all, a sufficient number remained to fall before the walls of St. Lazar; where they behaved like their own country mastiffs; which shut their eyes, run into the jaws of a bear, and have their heads crushed for their valour.—"*Roderick Random*"; *Volume* 1; *Chapter* 33.

[c] At Page 255.

[d] A.D. 1665.

and vegetables were only used at that time on Sundays, and (as a great dainty) when people had company.

The use of salt or putrid meat, appeared to be the cause of scurvy. But it was not the salt; for salt, though taken in the greatest excess, will not occasion scurvy; and scurvy will take place where no salt is used. Nay, persons will have scurvy, who eat no meat at all; and therefore it is not this, but the want of other food,—the want of fresh animal and vegetable food,—that induces the disease. I have seen several,—not a large number,—but several cases of scurvy, in individuals who had eaten no meat at all. They had been deprived of meat of every description; and it arose in them from the want of food. In the "Transactions of the College of Physicians"[a], two cases are mentioned by Dr. Francis Milman, of women that had the scurvy in the country. They had eaten no meat whatever; but had lived on tea and bread, after having been accustomed to better food. Sea and land-scurvy, I believe, are exactly the same; and Dr. Musgrave (who published a work on the gout, in 1703) mentions, that this disease was common in Somersetshire;—so that it prevailed at sea, in large towns, and in the country.

There can be no doubt that many circumstances conspire to the production of this disease. Cold and the want of exercise unquestionably encourage it; for sailors are observed to suffer in cold latitudes, when they are placed under precisely the same circumstances, with the exception of latitude, in which they escape it in warm climates. This fact strikingly illustrates the effect of cold. As to the want of exercise, Captain Cook says that the people of Kamschatska, who are habituated to hard labour, never have the scurvy; while the Russians and Cossacks in garrison, who live in the greatest indolence, are subject to it. Sir Gilbert Blane says, that only the prime seamen, who were exempted from pumping, were attacked with scurvy. He instances the case of a particular ship's crew; and says, that the prime seamen suffered from the disease; whereas those who were obliged to work hard at the pump, from time to time,—the ship having proved leaky,—escaped. Moisture is also said to have a considerable effect; especially, I presume, when united with cold. La Perouse attributes the prevention of scurvy, in his crew, very much to the vessel being kept dry by fumigation, and by braziers of hot coals. Captain Parry ascribes the first case of scurvy, in one of his expeditions, to moisture. When scurvy prevailed at the Penitentiary at Millbank, a few years ago, it was observed, that the persons employed in the kitchen always escaped; perhaps, however, they got better food than the rest, or more of it; but, at any rate, they had a warmer place. Captain King told Dr. Macmichael, (as he stated in a paper[b] read at the College of Physicians,) that, in a voyage round the south coast of America, no cause of scurvy was apparent,—the crew having had plenty of lemon-juice,—except that there was a remarkably cold and moist state of the atmosphere. I do not believe that moisture alone will occasion it; but moisture certainly aggravates the effects of cold in this disease; as it does in all others.

Mode of Prevention.—The difference between ships' crews now and formerly, is very striking. While the crew of Lord Anson suffered so much in a voyage round the world, that of Captain Cook, in a voyage subsequently performed, suffered nothing. The difference arose from this circumstance:—Captain Cook had a good supply of portable soup, sour crout, and fresh meat; and he kept his men in regular exercise; and took

[a] Volume 2; Page 471.

[b] Published in the "London Medical Gazette"; Volume 8; Page 184. (No. 179; May 7, 1831.)

care, at the same time, that extreme cleanliness and ventilation should be observed. In addition to this, they were away from land only about three weeks, on their longest cruise; although absent from home so long. Such measures as he adopted will generally prevent scurvy, even if there be no fresh provision on board, provided there is a supply of lemon-juice; and sometimes, in spite of the neglect of all these particulars, lemon-juice alone will prevent it.

Remedies for Scurvy.—The great remedy for scurvy, is fresh food,—animal and vegetable. Farinaceous vegetable substances alone are insufficient; but when fresh meat cannot be procured, I believe lemon-juice will be found the most efficacious medicine. The effects of lemon-juice on the disease are speedy and wonderful;—so wonderful, that the compiler of "Lord Anson's Voyage", after describing the disease, and the horrors which took place from its ravages, says that the cure of such a complaint seems impossible, by any remedy or any management that can be employed.[a] Scurvy was formerly set down, without hesitation, as an incurable

[a] In Anson's report of March 31 [1741], he makes the first mention of the scurvy, as follows:—"Men falling down every day with scorbutic complaints."

Soon after our passing Straits Le Maire, the scurvy began to make its appearance among us; and our long continuance at sea, the fatigue we underwent, and the various disappointments we met with, had occasioned its spreading to such a degree, that at the latter end of April, there were but few on board, who were not, in some degree, afflicted with it; and, in that month, no less than forty-three died of it on board the Centurion. But though we thought that the distemper had then risen to an extraordinary height, and were willing to hope, that as we advanced to the northward its malignity would abate; yet we found, on the contrary, that in the month of May we lost nearly double that number; and as we did not get to land till the middle of June, the mortality went on increasing; and the disease extended itself so prodigiously, that after the loss of about two hundred men, we could not at last muster more than six fore-mast men in a watch capable of duty.

This disease, so frequently attending all long voyages, and so particularly destructive to us, is surely the most singular and unaccountable of any that affects the human body. For its symptoms are inconstant and innumerable, and its progress and effects extremely irregular; for scarcely any two persons have the same complaints, and where there hath been found some conformity in the symptoms, the order of their appearance has been totally different. However, though it frequently puts on the form of many other diseases, and is therefore not to be described by any exclusive and infallible criterions; yet there are some symptoms which are more general than the rest; and therefore, occurring the oftenest, deserve a more particular enumeration.

These common appearances are large discoloured spots dispersed over the whole surface of the body, swelled legs, putrid gums, and (above all) an extraordinary lassitude of the whole body, especially after any exercise, however inconsiderable; and this lassitude at last degenerates into a proneness to swoon on the least exertion of strength, or even on the least motion. This disease is likewise usually attended with a strange dejection of the spirits, and with shiverings, tremblings, and a disposition to be seized with the most dreadful terrors on the slightest accident. Indeed, it was most remarkable, in all our reiterated experience of this malady, that whatever discouraged our people, or at any time damped their hopes, never failed to add new vigour to the distemper; for it usually killed those who were in the last stages of it, and confined those to their hammocks who were before capable of some kind of duty; so that it seemed as if alacrity of mind, and sanguine thoughts, were no contemptible preservatives from its fatal malignity.

But it is not easy to complete the long roll of the various concomitants of this disease; for it often produced putrid fevers, pleurisies, the jaundice, and violent rheumatic pains; and sometimes it occasioned an obstinate costiveness, which was generally attended with a difficulty of breathing; and this was esteemed the most deadly of all the scorbutic symptoms. At other times, the whole body, and especially the legs, were subject to ulcers of the worst kind; attended with rotten bones, and such a luxuriancy of fungous flesh, as yielded to no remedy. But a most extraordinary circumstance, and one that would be scarcely credible upon any single evidence, is, that the scars of wounds which have been for many years healed, were forced open again by this virulent distemper. Of this, there was a remarkable instance in one of the in-

disease;—not only as a disease incurable *then*, but as being so formidable in its nature, that it *never* would be cured; and yet, in almost every case, we can now cure it with the utmost facility. It is not only lemon-juice that will cure it, but all the hesperideæ; such as the lime, and Seville and unripe China oranges. Malt and sour crout are thought to have a similar property. Lemon-juice is preserved by mixing one-tenth of spirit with it. The custom, I believe, is to give three table spoonfuls every morning to each man, for the purpose of keeping the disease away. One ounce of lemon-juice, with one ounce and a half of sugar, is the present navy-allowance; and it is said that scurvy rarely occurs now in the longest voyage. Citric acid is thought to be inferior to lemon-juice. During the nine years previous to this supply, the average number of sick sent to the hospitals, was one man in three and nine-tenths of the whole navy; while, in the succeeding nine years, it was only one in eight and four-tenths. The juice is also said to improve the general health. I may mention, as a good illustration of the power of lemon-juice, that the ship "Suffolk" left England in April 1794, and had no communication with land for twenty weeks and a day; and yet, during all that time, she had only fifteen sick, and those slightly. They were soon cured by an augmentation of the first allowance of two-thirds of an ounce; and, at her arrival, not one had the scurvy. In 1800, the channel-fleet—consisting of twenty-four ships of the line, besides smaller vessels—had no fresh provisions for sixteen weeks; but they had plenty of lemon-juice, and not a single instance of scurvy occurred; whereas, in 1780, the channel-fleet could not keep at sea beyond ten weeks, and was worn out with scurvy and fever. Two thousand five hundred men were sent into port with the scurvy. We read in Purchas's "Pilgrim"[a], that Commodore Lancashire sailed from England, with four ships, for the Cape of Good Hope, on the second of April; and arrived at Saldanha Bay on the first of August. The Commodore's own ship was in perfect health;—owing to the administration of three table-spoonfuls of lemon-juice, every morning, to each of his men; whereas the other ships were so sickly, as to be unmanageable for want of hands; and the Commodore was obliged to send men on board, to take in their sails, and hoist out their boats.

valids on board the Centurion, who had been wounded above fifty years before, at the battle of the Boyne; for though he was cured soon after, and had continued well for a great number of years past, yet, on his being attacked by the scurvy, his wounds, in the progress of his disease, broke out afresh, and appeared as if they had never been healed; nay, (what is still more astonishing,) the callus of a broken bone, which had been completely formed for a long time, was found to be hereby dissolved, and the fracture seemed as if it had never been consolidated. Indeed, the effects of this disease were, in almost every instance wonderful; for many of our people, though confined to their hammocks, appeared to have no inconsiderable share of health; for they ate and drank heartily, were cheerful, and talked with much seeming vigour, and with a loud strong tone of voice; and yet, on their being the least moved,—though it was only from one part of the ship to the other, and that in their hammocks,—they have immediately expired; and others, who have confided in their seeming strength, and have resolved to get out of their hammocks, have died before they could reach the decks, and it was no uncommon thing for those who were able to walk the deck, and to do some kind of duty, to drop down dead in an instant, on any endeavours to act with their utmost vigour;—many of our people having perished in this manner, during the course of this voyage.—"*A Voyage round the World, in the years* 1740, 41, 42, 43, *and* 44. *By George Anson, Esq., Commander in Chief of a Squadron of His Majesty's Ships, sent upon an Expedition to the South Seas. Compiled from papers and other materials of the Right Honourable George, Lord Anson; and published under his direction. By Richard Walter, M.A.; Chaplain of his Majesty's Ship the Centurion, in that Expedition.*" *Book* 1; *Chapters* 8 *and* 10. (*Smith's* "*Standard Library*" *Edition; Pages* 25, 31, *and* 32.)

[a] Volume 1; Page 149.

Antiquity of Lemon-Juice as a Remedy.—This disease, of course, occurred in ancient times. It was known in the Roman army in Germany, and also in the "Holy Wars" (as they were impiously denominated); but it was first particularly noticed in the crew of Vasco di Gama, in 1497. We find it mentioned by Pliny, as occurring in the Roman army, under the command of Germanicus. But with respect to the remedy, its discovery appears to have been left for modern times; but still not for *recent* times; for we find it mentioned as far back as 200 years ago. There is a curious fact connected with it, and one which is very instructive; —as teaching us not to despise any thing without good reason. It is said that when the London College of Physicians was applied to by Government, for a cure for scurvy, they advised vinegar, which has very little power in the affection; and that a Fellow of the College, who wrote on the disease in 1753, never adverts to lemon-juice at all in his treatise; and yet that, two hundred years ago, it was mentioned in the "Surgeon's Mate, or Military and Domestic Medicine";—a work published in 1636, by "John Woodall, Master in Surgery." He ends his praise of it by saying, that he dare not write how good a sauce it was, with meat; lest the chief in the cabin should waste it, to save vinegar. It is said to have been mentioned even still earlier,—in Purchas's "Pilgrim", published in 1600. Dr. Lind, of Haslar Hospital, revived the knowledge of it, more than one hundred years afterwards. He stated its peculiar powers, in the third edition of his work on the "Diseases of Seamen", in 1772; but even then it was not brought generally into use; and the navy actually suffered most frightfully from scurvy till 1795. Although the remedy was mentioned two hundred years ago, and again in a well known surgical work in 1636, yet the navy suffered from the want of it till 1795. Earl Spencer, the father of the present Earl [a], was then at the head of the Admiralty; and, on the representations of Dr. Blair and Sir Gilbert Blane (who were commissioners of the board of sick and wounded seamen), a good supply of it was ordered by Government. In less than eighteen months afterwards, there was not a case of scurvy in Haslar Hospital. In 1780, there had not been fewer than 1457; in 1806, and in 1807, there was but one.

So great is the effect of this remedy, that we find the following passage in Sir William Herschel's work, published in Dr. Lardner's "Cyclopædia", on the cultivation of the physical sciences [b]:—"At present, the scurvy is almost completely eradicated in the navy;—partly, no doubt, from an increased and increasing attention to general cleanliness, comfort, and diet; but mainly from the constant use of a simple and palatable beverage,—the acid of lemon, served out in daily rations. If the gratitude of mankind be allowed on all hands, to be the just meed of the philosophic physician, to whose discernment in seizing, and perseverance in forcing it on public notice, we owe the great safeguard of infantile life [c]; it ought not to be denied to those, whose skill and discrimination have thus strengthened the sinews of our most powerful arm; and obliterated one of the darkest features, in one of the most glorious of all professions."

Prevention of Scurvy.—The scurvy is now prevented, by great attention to cleanliness; by giving sailors food as wholesome as possible; by attention to exercise and cheerfulness; and by a regular supply of lemon-juice. In spite of all this, however, sporadic cases still occur; but, in general, that

[a] A.D. 1841.

[b] "Preliminary Discourse on the Study of Natural Philosophy"; Chapter 3; Paragraph 44. ("New Edition"; Pages 52 to 54.)

[c] Alluding to Dr. Jenner, and the Cow-Pock.

is all. I have myself had several cases of this disease in London; and some of them were in persons who had never been at sea, and who had eaten no salt meat; but who had been deprived of food nearly altogether. Others were sailors, who came on shore labouring under the disease; for, in merchant-ships, there is frequently the greatest neglect. I had one patient, a few months ago, who had been sixteen weeks at sea; and had nothing but biscuit and the hardest salt beef, during the whole voyage. There was no medical man on board; but that, I suppose, is unavoidable in small ships. He was, as might be expected, labouring under scurvy to a great extent; and he said that several of the crew had died. I am not sure that the lemon-juice, which I gave these patients as a matter of course, did them any good; for they were allowed fresh meat and greens every day, with porter, and other articles of good diet; and this was quite sufficient, I am sure, to cure the disease[a]. I gave them lemon-juice in addition; because we have such great authority for its employment. However, some persons now begin to say that the lemon-juice does no good;—that the benefit entirely arises from the other means that are employed; and that the neutral salts, particularly nitre, answer a better purpose. I dare not say, however, that authority respecting the powers of lemon-juice, so accumulated and so immense as it is, is

[a] All the hands we could muster, capable of standing at a gun, amounted to no more than seventy-one; most of which number, too, were incapable of duty; but, on the greatest emergencies, this was all the force we could collect, in our present enfeebled condition, from the united crews of the Centurion, the Gloucester, and the Tryal; which, when we departed from England, consisted altogether of nearly a thousand hands.

When we had furled our sails, the remaining part of the night was allowed to our people for their repose,—to recover them from the fatigue they had undergone; and in the morning a party, of which myself was one, was sent on shore [at Tinian] well armed, to make ourselves masters of the landing-place;—as we were not certain what opposition might be made by the Indians on the island. We landed without difficulty; for the Indians had fled into the woody parts of the island. We found on shore many huts which they had inhabited; and which saved us both the time and trouble of making tents. One of these huts, which the Indians made use of for a store-house, was very large; being twenty yards long, and fifteen broad. This we immediately cleared of some bales of jerked beef (which we found in it), and converted into a hospital for our sick; who, as soon as the place was ready to receive them, were brought on shore;—being, in all, a hundred and twenty-eight. Numbers of these were so very helpless, that we were obliged to carry them from the boats to the hospital upon our shoulders. Notwithstanding the great debility and the dying aspects of the greatest part of our sick, it is almost incredible how soon they began to feel the salutary influence of the land; for, though we buried twenty-one men on this and the preceding day, yet we did not lose above ten more during our whole two months' stay here; and, in general, our diseased received so much benefit from the fruits of the island, particularly the fruits of the acid kind, that, in a week's time, there were but few who were not so far recovered, as to be able to move without any help.

This place was not only extremely grateful to us, from the plenty and excellence of its fresh provisions, but was as much perhaps to be admired for its fruits and vegetable productions; which were most fortunately adapted to the cure of the sea-scurvy, which had so terribly reduced us. For in the woods there were inconceivable quantities of cocoa-nuts, with the cabbages growing on the same tree; there were besides, guavas, limes, sweet and sour oranges, and a kind of fruit peculiar to these islands, called by the Indians "rima", but by us "the bread fruit";—for it was constantly eaten by us during our stay upon the island, instead of bread; and so universally preferred to it, that no ship's bread was expended during that whole interval.—Besides the fruits already enumerated, there were many other vegetables extremely conducive to the cure of the malady we had long laboured under;—such as water-melons, dandelion, creeping purslain, mint, scurvy-grass and sorrel; all which, together with the fresh meats of the place, we devoured with great eagerness; prompted thereto by the strong inclination which nature never fails of exciting, in scorbutic disorders, for these powerful specifics.—"*A Voyage round the World*"; *by George Anson, Esq. Compiled by Richard Walter, M.A. Book* 3; *Chapter* 2. (*Smith's* "*Standard Library*" *Edition; Pages* 94 *to* 96.)

at all to be disputed. I certainly cannot but think that, till we have further facts, it is our duty in every case to supply lemon-juice, or similar things (if that cannot be obtained);—in the hope of doing away with the ill effects, which a want of fresh food occasions. I may also mention that, with regard to local applications, lemon-juice is found to be one of the best. When there is a scorbutic ulcer, I believe a slice of lemon laid upon it, is one of the best applications that can be employed. Père Lebat is said to have mentioned this in his "Voyage to the Antilles."

Nature of Scurvy.—This disease, I should say, is of a chemical nature,—if any one be so. In one sense, the constitution is not at all in fault. All the fluids and all the solids appear to be changed; but we have only to give a different chemical state to the body, and the disease is cured. We need give nothing which acts by a specific operation;—no drug, I mean, which acts as a medicine; but we employ fresh articles of diet, and thus remedy the depraved constitution of the whole mass of solids and fluids.[a] I have, therefore, mentioned this disease, before I came to any of those which are clearly seated in particular parts. I am not aware that it attacks any one part in particular. It seems to be a cachectic state of the whole frame; and if any affection be an instance of "universal" disease, I should certainly say that it was scurvy.

There is an affection very similar to the scurvy in some respects, which has been arranged and described, by Willan, among cutaneous diseases; and which is called "purpura." Some are of opinion that this is the same as scurvy; but I cannot think so;—for reasons which I will state when speaking of diseases of the skin.

[a] Besides a great number of plants, of various kinds, which are to be met with upon the island [Juan Fernandes], but which we were not botanists enough either to describe or attend to, we found there all the vegetables which are usually esteemed to be particularly adapted to the cure of those scorbutic disorders, which are contracted by salt diet and long voyages. For here we had great quantities of water-cresses and purslain, with excellent wild sorrel, and a vast profusion of turnips and Sicilian radishes. The two last, having some resemblance to each other, were confounded by our people under the name of "turnips." We usually preferred the tops of the turnips to the roots, which were often stringy; though some of them were free from that exception, and remarkably good. These vegetables, with the fish and flesh we found here, were not only extremely grateful to our palates (after the long course of salt diet which we had been confined to), but were likewise of the most salutary consequence to our sick, in recovering and invigorating them; and of no mean service to us who were well, in destroying the lurking seeds of the scurvy; from which, perhaps, none of us were totally exempt; and in refreshing and restoring us to our wonted strength and activity.—*Anson's "Voyage round the World." Compiled by Richard Walter, M.A. Book 2; Chapter* 1. (*Smith's "Standard Library" Edition; Page* 36.)

CHAPTER IV.

INTERMITTENT FEVER.

Definition.—[FEVER (*febris*; from *fervere*, "to glow",—"to be hot") is so named, from one of its most prominent symptoms—a sense of increased heat. The term has a double signification, both in nosographical and in familiar professional language. Sometimes it is applied, especially in the plural number, to all febrile diseases; including primary fevers, eruptive fevers, and acute local inflammations. At other times it is used, particularly as a singular noun, to denote primary fevers only, or fevers proper; while, for embracing the whole class of febrile diseases, the more generic term "*pyrexiæ*" is commonly employed; which, however, according to its original meaning (from πυρέσσω, *febricito*[a],—derived from πῦρ, "*fire*"), does not essentially differ from the more specific term—"*fever*."

It is in the restricted signification,—implying those febrile diseases where the pyrexia is simple, or not combined (at least, necessarily) either with eruptions of the skin, or with local inflammation,—that the subject of fever will be here in the first place considered.

Fever has been variously defined. Probably no better definition can be found than the following,—a modification of that sanctioned by Cullen:—"After a preliminary stage of languor, weakness, and defective appetite,—acceleration of the pulse, increased heat, great debility of the limbs, and disturbance of most of the functions, without primary local disease." It is a singular instance, however, of the extreme difficulty of arriving at correct nosographical definitions, that scarcely any one of the characters here assigned is absolutely invariable; nor is it likely that any other definition will be found, not subject to the same defect.

Forms of Fever.—Fever presents itself in a very great variety of forms. The most precise mode, perhaps, of regarding them in connexion with one another, is to proceed at the outset from the simplest of them,—"ephemera", or "one day's fever." Ephemera[b]—so called because it seldom lasts above twenty-four hours—begins with chilliness or rigor, paleness, weariness, a frequent small pulse, and indifference to food. These symptoms are followed (in half an hour, or a little more) by heat of skin, flushed face, frequent hard pulse, occasionally headach, and a peculiar sense of fatigue, restlessness, and slight soreness in the muscles; to which the name of "febrile *sensation*", or "febrile *anxiety*", has been conveniently given. When this state has continued for twelve, eighteen, or (at most) twenty-four hours, gentle perspiration breaks out; under which, in the course of little more than another hour, every essential symptom vanishes;—leaving behind some exhaustion, muscular debility, and feebleness of the appetite. This disease, the simplest and slightest of all forms of fever,—although, on account of its shortness, it seldom attracts much notice,—is nevertheless not uncommon during the irregular weather of our spring-months in Britain.

[a] "To be sick of a fever."

[b] From ἐπι, *upon*; and ἡμερα, *a day*.

If such an affection be supposed to recur several times every other day, with an interval of comparative health in the intervening days, a clear idea will be formed of "intermittent fever" in its most frequent and characteristic shape—the tertian type; and from the tertian may be derived all the other forms of "intermittent." If, in the next place, the febrile state be conceived to be reinforced twice a-day (or oftener), by a fresh attack of rigor or chilliness, with subsequent re-action, before the pre-existing pyrexia has materially subsided, a distinct conception may be formed of "*remittent* fever." From "*remittent* fever" most nosologists deduce the only remaining primary type,—"*continued* fever", by supposing the remissions to become gradually less and less distinct: and this view may seem so far conformable with nature, that almost all continued fevers present, more or less, a tendency to regular or irregular remissions; especially for some days at the commencement. But it is perhaps fully a clearer, and certainly a more direct way of deducing them, to conceive the ephemera merely prolonged to such a duration, as that its several stages occupy between four and nine or eleven days;—thereby constituting, in the first instance, the simplest of all forms of continued fever; usually known by the specific name of "*inflammatory* fever", or "synocha."[a]]

Classification.—Fevers are divided, generally, into three kinds;—intermittent, remittent, and continued. Some divide them into intermittent and continued only; and subdivide the latter into those which continue unremittingly, and which are therefore called "continent"; and into those which have remissions, and are called "remittent." We may divide them in either of these ways. I shall first speak of "intermittent" fever.

SECTION I.—SYMPTOMS AND VARIETIES.

Pyrexia.—All fevers, whether intermittent or continued, are characterized by those symptoms which I before spoke of[b], when treating of inflammation, under the name of "pyrexia";—that particular set of symptoms denominated "pyrexia." In speaking of inflammation, I mentioned[c] that there are only two stages well marked in the pyrexia of that complaint,—cold and heat; but in an attack of real fever there are often three;—a *cold*, a *hot*, and a *sweating* stage. In intermittent fever, these are very distinctly marked. In *continued* fever we may have a shivering at the beginning; but then it will terminate in the course of the disease, and we shall have to treat long-continued heat. It is only towards the last, that there are any sweats; and frequently, there are none of a remarkable character; for there is often merely moisture of the skin, as the disease declines. But in *intermittent* fever there are usually three distinct stages;—a cold, a hot, and a sweating stage; the first of which is the cold stage.

Cold Stage.—When this stage is about to commence, the patient feels himself very weak and listless. He begins to yawn, gape, and stretch. He finds his mind less active; and his external senses are more or less dull. Sometimes there is even real stupor; but in all cases the patient's mind is very dull. He is unable to go on with what he is about; and even his external senses are impaired. There is also, at the same time, a great depression of spirits. Very soon a sensation of coldness is felt,—first of all in the back; and the patient will complain of chilliness, before others who

[a] "Library of Medicine"; Volume 1; Pages 113 and 114.

[b] See Page 85.

[c] See Page 86.

touch him can perceive it. As soon as the cold stage has begun, the surface becomes pale and dry; and the mouth and fauces also become dry. Then the patient begins to tremble slightly. He becomes really cold;—the temperature falls perceptibly to others. He trembles more and more, and becomes colder, till he is in a state of downright shivering; and then his jaws chatter. The constriction of the skin at this time is so great, that it becomes rough; and, in common language, is called "*goose's skin*"; but in Latin, "cutis anserina." Such is the shrinking, that rings which previously fitted very well will fall off. There is a sense of *creeping* and *shuddering* over the skin; the hairs of which stand on end; and this state is called "horripilatio." The urine which is made at this time, is pale and scanty. Probably the same constriction of the secreting vessels of the kidney takes place, which occasions the dryness of the surface of the body. It is the same constriction, I presume, of the secreting vessels, that gives rise to the dryness of the mouth and fauces, and also to the thirst. This is altogether a state of debility; and consequently the pulse is weak, and sometimes slow; and the breath is generally short;—from the accumulation of blood, I presume, in the internal parts. Sometimes the stomach is affected with vomiting. In a very intense cold stage, the face, hands, and feet, become blue; the fingers shrivelled, and the eyes sunk.

Hot Stage.—In the cold stage the blood has receded from the surface, and probably from all the small vessels; so that it has accumulated, in great quantity, in the large vessels of the interior. After this state has existed a certain period, of very various duration, the skin relaxes. It regains its warmth, colour, and sensibility; and the pulse becomes quick and fuller. The heat, the colour, and the sensibility of the skin, go on increasing; till at length they exceed their natural standard, and the pulse grows full and very rapid. Such is the excitement now, that not unfrequently the patient complains of headach; and even delirium occurs. The thirst, the dryness of the skin, and the deficiency of the urine continue;—probably because the extremities of the secreting vessels are still in a state of constriction; though the small vessels have become filled with blood. The urine, however, changes its character. From being pale and watery, it becomes high-coloured; but it is still clear. The breath becomes fuller;—most probably from the blood getting into the small vessels; and the patient can take a deep inspiration. There is not that slow breathing, which there was at first; but still there is more or less oppression; for the heart is in violent action; and when that is the case, there is always a degree of dyspnœa. That state which is vulgarly called "fever", now takes place. If the disease intermit altogether, it is called "ague"; from the French word "*aigue*" ("sharp",—"acute.") But the common people limit the word "*fever*" to the hot, or hot and sweating stages; and denominate only the cold stage "ague";—so that it is common to hear one of the lower orders say that he has got "the ague and fever"; but "ague", properly speaking, includes the whole of the three stages. There is a passage in "Macbeth", where the poet says,—

> ——"The obscure bird
> Clamour'd the livelong night: some say the earth
> Was *feverous* and did *shake.*"[a]

It appears, therefore, that the word "*fever*" was applied, in those days, to the *cold* stage, as well as to the *hot*. There can be no doubt, that both the

[a] Act 2; Scene 3.

expressions "*pyrexia*" and "*fever*", though made by medical writers to include the whole stages, imply properly the hot only; as the former is derived from πῦρ,—"fire"; and the latter from "*ferveo*",—"to be hot."

Sweating Stage.—After the hot stage, the skin at length becomes still softer. It also grows moist; and the moisture augments, till at last the person is in a profuse sweat. The same relaxation of the internal secreting vessels takes place; in consequence of which the thirst declines; the urine becomes copious; and the vessels let through so much substance, that it forms a lateritious[a] sediment.

After the sweating has continued an indefinite time, the pulse gradually grows slower; and the sweating and all the other symptoms diminish. The appetite, which is generally absent in all the three stages, now returns; and the patient is as well as though nothing had happened. If the disease last very long, the patient becomes shattered by it; but in general,—if the disease be not very severe, if there be no local affection, and if the patient have not laboured under it long,—when the paroxysm is over, he is much about the same as he was before.

There is great variety in the intensity of every one of the symptoms which I have mentioned. There is great variety in the relative intensity of the different stages; and great variety in the intensity of the whole disease together.

Incidental Symptoms.—This, however, is not all. There are, occasionally, *incidental* symptoms; such as tetanus, convulsions, fainting, violent delirium, and the appearance of petechiæ[b] on the skin. Some persons, while in the paroxysm, have been known to have their muscles rigid;—absolutely in a tetanic state. Others have been violently convulsed; fainting has occurred; and delirium, in the hot stage, is very common. Sir John Pringle mentions violent delirium, as the character of an epidemic intermittent which he saw prevail. He also mentions that, at Copenhagen, in 1652, petechiæ appeared in the hot stage of an intermittent which prevailed there. Bartholini gives an account of an epidemic, in which petechiæ appeared in the hot stage;—always disappearing afterwards. I have not seen the whole of these symptoms. Delirium, in the hot stage, is common enough; and in two cases I saw, in the cold stage, there was violent clenching of the hands;—so that the fingers and thumbs were drawn together in the most violent manner; and continued so until the cold stage was over.

Periodical Recurrence.—These stages may all take place in the course of one day, and never return; and then the disease has been called "ephemera";—"a disease of a day's duration." But, for the most part, these stages return not only regularly, but periodically; so that you do not have ephemeral ague, but intermittent fever. The intermission between two paroxysms, is usually part of one day, at least; or it may be a whole day, or two days. By "*day*", in medicine, we mean day and night;—the twenty-four hours. Beyond two days, the intermission is rarely regular. If the intermission be only part of a day,—that is to say, if the attack returns every day,—the fever is called "quotidian." If there be an intermission of a *whole* day,—so that the patient has an attack every *other* day,—it is called "tertian." It assumes this name, because the first day is counted as well as the third. The day on which a person is attacked, is the first; the day of intermission, the second; and the day of the second attack, the third. It is, therefore, called "tertian." If the intermission extend two days,—

[a] From "later", "lateris", *a brick.*
[b] From the Italian "petechio", *a flea-bite.*

so that the patient shall have a fit on Monday, none on Tuesday, none on Wednesday, but one again on Thursday,—then it is called "quartan." The day of the paroxysm constitutes the first; then follow the two days of intermission,—making three days; and then, on the fourth, we have another paroxysm. These are the most common forms of the types of intermittent fever; and, in London, the quotidian and tertian are far more frequently seen than the quartan.

But the intermission may be still longer; so that we may have, not a quartan, but a quintan, a sextan, a septiman, or even a deciman. In the last there is an interval of nine days; and the first day, being counted, makes up the ten. I heard a gentleman observe, that he saw a septiman take place for three weeks; that is to say, the person had a paroxysm after an interval of six days, occurring on the seventh day, regularly for three weeks. In 1827, I myself had a patient in St. Thomas's Hospital, with a septiman. He regularly had his disease, after an interval of six days. During the same year I had another patient, who had an interval always of four days; so that his disease was a quintan. I once treated a double octavan. A man had a paroxysm every Sunday and Thursday;—the Sunday paroxysm being at one hour; and the Thursday paroxysm always at another. When they extend to these periods,—when they are more than a quartan,—when the intermission is longer than two days, the disease is called "erratica";—it wanders out of the usual regular course. The epithet "*erratica*" is also given to an ague which observes no regular period;—which at one time is quartan, at the next, quintan, &c. The term "*erratic*" is employed by authors in both these senses.

Double Tertian.—These are, for the most part, all the varieties which it is necessary to recollect; but, as a matter of curiosity, I may mention that the disease has sometimes other types. Sometimes we have more than one paroxysm in a day,—more than a quotidian; and I heard a gentleman say, that he witnessed a case in which there were four paroxysms daily. I never did. But it is very common indeed, to see what is called "a *double* tertian"; in which there is a paroxysm every day; but where the paroxysms occur two days in succession, yet do not belong to each other. For example: suppose a patient has an attack every day in the week; but the paroxysm on Monday is at eight o'clock in the morning, and the paroxysm on Tuesday at four in the afternoon; while the paroxysm on Wednesday is at eight o'clock in the morning,—like the paroxysm on Monday; so that the paroxysms of Monday and Wednesday agree; whereas the paroxysm on Thursday is at four o'clock in the afternoon;—the same hour as the Tuesday paroxysm. Now this appears a *quotidian*, because it occurs every day; but it is, in reality, a *double tertian*; for it is as if the patient had a tertian which came on every Monday and Wednesday; and another which came on every Tuesday and Thursday; and, inasmuch as the paroxysms which occur every other day agree, it is called not "a *quotidian*", but "a *double tertian*" (in Latin, "tertiana duplex"). But it will sometimes happen, that there are two fits on the day of attack, and none on the following day. Supposing the disease comes on every other day (as, for instance, Monday and Wednesday), but that, on each of those days, there are two attacks; it is then called "a *duplicate* tertian" ("tertiana duplicata"). That is the difference between "tertiana *duplex*", and "tertiana *duplicata*."

Respecting the double tertian,—the one which comes on every Monday and Wednesday, for instance, and every Tuesday and Thursday, but at different hours,—we sometimes find scarcely any intermission between the

Monday's and the Tuesday's paroxysm; while the intermission between the Tuesday and Wednesday paroxysm is distinct enough; or, *vice versâ*, that the one is hardly over when the other begins; and it is then called "*semi*-tertian",—"*half*-tertian" (ἡμιτριταια). The paroxysms are brought so near, that it is almost remittent fever; and it is scarcely worth while to call it any thing else than "remittent." Though the interval between the attacks on the first and second day is very short, yet the intermission between the second and third is much longer. We may, however, not only have a *double* tertian;—one on Monday and one on Wednesday at a certain hour, and again on Tuesday and Thursday at another hour; but on Monday there may be two fits, and on Wednesday two fits; and then this is called "a *triple* tertian."

We may also have a "*quartana* duplex" ("double *quartan*");—there being an additional paroxysm on the first day of the intermission, at its own hour; and "a quartana *duplicata*" ("*duplicate* quartan");—two paroxysms on the day of attack; and also "a *tripled* quartan";—three paroxysms on the day of attack. The observations I have made, are sufficient for all practical purposes; and I only wish it to be remembered, that these extraordinary deviations do sometimes take place.

Duration of the Paroxysm.—A paroxysm of intermittent fever, including the three stages, is generally finished in eighteen hours. It is a rare occurrence for it to last longer than that period. Dr. Good, however, quotes an author, who stated that he saw a paroxysm which lasted exactly *one minute*. How the stages were divided I do not know. What was the severity of the cold stage, it is impossible to conceive; but I should think, that when each of these stages was over, the man might have doubted whether he had been ill or not. But authors may be quoted for any thing.

Time at which it Occurs.—The paroxysm of ague is said (like almost all fevers, indeed) more frequently to begin in the day than in the night. As a general rule it may be stated, that the paroxysms commence between eight o'clock in the morning, and the same hour in the evening. Of course there are numerous exceptions; but, in the majority of cases, the paroxysm begins in the day. It is mentioned by authors, that a quotidian usually has its paroxysms in the morning, a tertian at noon, and a quartan in the afternoon. I believe there is some truth in the observation, that a quartan generally begins late in the day; but tertians very frequently come on in the afternoon, quartans at noon, and quotidians in the evening. It is said, likewise, that a quotidian has the shortest *cold stage*, but the longest *paroxysm* altogether; that a tertian has a longer *cold stage*, but altogether a shorter paroxysm; whereas a quartan has a still longer *cold stage*, but nevertheless a shorter *paroxysm* than either of the others. But for these particulars there is no universal rule.

The Body sometimes only Partially Affected.—Some very curious cases of paroxysms affecting only a part of the body, have been recorded by authors entitled to credit. There is one case mentioned, in which a vertical half of the body suffered an attack of ague; and during the cold fit, the other half became convulsed. What is still more singular,—the same half was not always similarly affected, but the symptoms changed sides. There is likewise a case mentioned, where the paroxysms of ague affected one half of the body horizontally. In some cases it has only affected half the head; and Dr. Macculloch says that a paroxysm may affect one limb only. Now these facts are not at all insulated. They are perfectly analogous to many others which are occasionally observed in the human body. Epilepsy will sometimes affect only one half of the body; nay, sometimes it will affect

only one limb. Catalepsy will do the same; and paralysis does this so continually, that one of the established forms of palsy, is hemiplegia; and another is paraplegia. Dr. Abercrombie, in his work on the Pathology of the Brain [a], says that a friend of his, when in exercise, only sweats in a vertical half of the body;—that there is a line upon the forehead, perfectly distinguishing the sweating from the dry side; but that if he takes very violent exercise indeed, then the dry side is at last forced to perspire a little, like the other. In the work of Andral [b] (another modern writer), will be found instances in which sweating took place in one half of the body only. In some of these cases it was a vertical, and in others a horizontal half. We find a case mentioned by Dr. Falconer, in which a child became pale and emaciated in one half of the body only.

Changes in the Type.—Intermittent fevers, during their progress, frequently change their type. From tertian, they will frequently become quotidian; from quotidian, tertian; and from either of these, quartan; while from quartan, again, they will become either of the former. Sometimes they will change their type once; sometimes more than once; and sometimes they will continue changing,—so as it observe no rule at all; and then, as I have already said [c], they are called "erratic." Another variety is, that they will not change their types;—they will still remain quotidian, tertian, or quartan; but they will change the hour of their attack. Instead of beginning at the same hour, they will begin later and later, or the reverse; and sometimes they will begin with such irregularity, that a patient never knows when to expect them. Sometimes they will be very irregular at first, and then at last they will grow regular;—seeming only to make up their mind, after a time, how they shall go on. At other times, they will grow milder only. It is a general rule that the paroxysms grow later and later as they grow milder. As the paroxysms become more severe,—more intense, and the disease gets worse, they generally come on earlier and earlier; but when the paroxysm grows later and later, and at the same time milder and milder, it at last degenerates into nothing more than a little chilliness, a little heat, a little sweating, or a little of all combined. It is very common, at last, for the paroxysm to show itself only a little at a certain time of the day; or there is only a little sweating, or a little chilliness. These diseases occur chiefly in spring and autumn. Authors therefore frequently write of *vernal* and *autumnal* ague. The quartans usually take place in autumn;—that is to say, there are more quartans among *autumnal*, than among *vernal* agues.

Variety in the Paroxysms.—Although agues have generally these three stages, the paroxysms are sometimes imperfect, even before the disease has much declined. I have often seen and cured an ague, in which the cold stage took place, but was never succeeded either by the hot or sweating stage. Sometimes the hot stage alone will come on;—not being preceded by the cold stage. A paroxysm is generally terminated by the sweating stage; but sometimes there will be no sweating at all. We may have either of the three stages alone. This is worthy of remark; and it is an undoubted fact; for I have witnessed it, over and over again. Cullen says that the cold stage is necessary to the others. He considers that the cold stage excites the "vis medicatrix naturæ";—that, to get rid of the *cold* stage, nature bestirs herself,

[a] "Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord; by John Abercrombie, M.D."

[b] "Clinique Medicale, ou Choix d'Observations recueillies à l'Hopital de la Charité; par G. Andral." This work, which is a vast repository of valuable pathological facts, has recently been translated by Dr. Spillan.

[c] See Page 267.

and brings on the *hot*, and then the *sweating* stage. But this is a fallacy; for I know we may have the hot stage, without any cold preceding it; and that we may have the cold stage, without any subsequent hot stage. Sometimes there is no regular paroxysm at all; but patients with ague will have, at various periods, a general chilliness, with great depression of spirits;—so that they will cry, yawn, stretch, and often be even a little silly, and have a number of odd feelings. Now this state of things is well known by the lower orders; and is called by them, very significantly, "the *dumb* or *dead* ague";—an ague which is not at all lively, or does not speak or shew itself in an open and manly manner. It is, however, to be treated exactly like all other forms of the complaint.

I have mentioned, respecting the variety in the paroxysms, that sometimes there will be one stage alone without the others; but one author tells us that he saw all the stages reversed;—that the disease began with *sweating*; then the *hot* stage came on; and the paroxysm was closed by the *cold* stage. Before this disease is fully formed, the attack is sometimes preceded by headach, by pains in the nerves (neuralgia), by vomiting, by general indisposition; and all this may last for a longer or shorter time. These symptoms may cease on the appearance of the disease; or they may continue, more or less, when the affection is established. Even continued fever has preceded ague.

Duration of Ague.—The duration of ague is various. It may be ephemeral,—consisting of one paroxysm; or it may last for many years;—at least, it did so before we could cure it so effectually as we can now. One case is said to have lasted eight and forty years. Lommius, who wrote in beautiful Latin, mentions a case which lasted twenty years. One unfortunate fellow (Valescus of Tarenta) is said to have had it all his life. Dr. Gregory [a] said that he saw one case which had lasted four years. On the other hand, Dr. Mason Good [b] quotes Senac for a case, in which the disease destroyed life the moment it began. When it proves fatal, Sydenham says it is in the cold stage; because, when the hot stage comes on, nature is getting the better of the disease; and that a patient cannot die from it if nature be recovering, as is the case in the hot stage. But the truth is, that it *will* kill in the hot stage. In hotter climates than our own, there is great congestion of the internal parts of the head; and persons will fall into a state of coma, as they sometimes do here in the first stage. I have known some people have it every spring for many years. Although we have never seen people that have it regularly all the year round, yet most of us have seen individuals who have the disease regularly once a-year. Respecting its duration, however, quartans are said to last the longest. Tertians and quotidians are more like an acute disease; but the quartan, coming on after an intermission of two days, partakes more of the nature of a chronic affection; and being chronic in its *character*, so really it is chronic in its *duration*. Certainly it is the quartan that, in general, lasts longer than the others; and it is generally more difficult to cure. On the same principle, again, it is said that a tertian, left to itself, lasts longer than a quotidian.

It Affects every Period of Life.—Ague affects all ages. It is seen in young children even at the breast; and I had under my care, for this affection, a man about eighty years of age. It is said to affect children *earlier* than when at the breast;—to affect them before they are born. Cases are mentioned, not only in which the children had a paroxysm of ague the very

[a] Dr. James Gregory, author of the "Conspectus Medicinæ Theoreticæ."

[b] "Study of Medicine"; Class 3; Order 1; Genus 2; Species 5.

moment that they came into the world, but in which a child had the disease before it was born. In Dr. Russell's "History of Aleppo", there is an account of a woman who had a tertian ague. This woman was with child, and she shook every other day; but the child within her she felt shaking regularly on the day when she was disposed to be quiet. She shook, for example, on the Monday and Wednesday; but the little one shook on the Tuesday and Thursday;—so that *she* had *one* tertian, and the *child* had *another*. If it had not been for this diversity, she could not have ascertained that the fœtus had an ague, nor could the doctors. What farther proves that the child had a different ague from the mother, is that Peruvian bark was given to the latter, and that it cured both her and the child; but as the child was so much younger, I suppose the bark had more effect upon it; for it was cured one paroxysm before the mother. A gentleman informed me, that he saw a similar case at a dispensary in London. The woman came shaking with ague; and the child within her shook like herself, only at a different time. I suppose there is no doubt of the truth of the case related by Dr. Russell. There is no question about children having had the small-pox in the womb. Mr. Abernethy used to mention the case of a child that had the *disease*, though not the peculiar *symptom* of hooping-cough, before it was born. It was affected by the contagion; though, for want of breath, it could not hoop before birth; but it embraced the very earliest opportunity it had of doing so;—so that the first thing it did was to *hoop*, instead of *cry*.

It is liable to Return.—When this disease has once occurred, it is very liable to return, from common causes. Cold, wet, and (in this country) the east wind particularly, have a tendency to bring it back. Whether it will recur spontaneously, I do not know. Whether, without cold and moisture, and without an east wind, or some wind charged with malaria, it will return, I cannot say; but certainly, when a person has once laboured under it, frequently the slightest cause will bring it back. Dr. Gregory[a] saw two persons, in whom ague returned, from some common cause, after having been absent forty-seven years. Dr. Gregory also stated that it had been known to recur, after a lapse of years, at the very day and hour on which it originally began.

It Modifies the Character of other Affections.—The existence of this disease gives an intermittent, or remittent tendency, to many other affections that may be present. Suppose a person has a disease, and that he is then attacked by ague;—the first disease will have a tendency to blend with the ague; so that he will have remissions, if not *intermissions* of it. When ague prevails epidemically, though persons may be exempt from any other disease which they may have at that period, it will shew a tendency to an intermittent or remittent character. This, however, is chiefly seen in fever. When ague prevails, or persons are exposed to the cause of ague, continued fever has a tendency to put on the remittent form; and remittent fever appears to be a combination of continued and intermittent fever.

Complications of Ague.—Ague is very frequently followed by rheumatism. I am not acquainted with a more frequent occurrence, than that of ague being followed by severe rheumatic pains in the extremities, or in the head. Occasionally it will alternate with rheumatism; so that the rheumatism shall cease, and the ague return, and *vice versâ*. Dr. Gregory[a] used to mention, that he saw ague alternate with epistaxis; and in another case he saw it alternate with hæmaturia,—bleeding from the urinary passages;

[a] See Note to Page 270.

which bleeding, however, ceased at last; and then the ague returned, and was followed by paralysis. He used also to mention, that he saw two cases of ague continue four years; at the end of which they were cured by bark; but periodical delirium came on in its stead.

SECTION II.—COMPLICATIONS AND EFFECTS.

Local Inflammation.—Ague is very often attended by local inflammation; sometimes by inflammatory pains of the head; sometimes by inflammatory affections of the chest, and likewise of the abdomen;—particularly gastritis and hepatitis. In autumn, and in hot climates, it is the abdominal viscera that suffer the most severely; and ague is likewise very frequently attended (when there is no inflammation of these parts) with bilious vomiting and purging; and even by jaundice and dysentery. In some places (Zealand, for instance) Sir John Pringle mentions that ague is called "gall-fever." It is on account of the great irritation of the liver that takes place, and the abundant secretion of bile, that aguish diseases are thus called.

Congestion and Effusion.—After death during intermittent fever, we often find congestion and effusion in the head, chest, or abdomen. The mucous surface of the alimentary canal, is likewise in a state of great congestion; and the liver contains a large quantity of bile. When this disease proves fatal, it frequently does so by great internal congestion; whence there is fulness of all the blood-vessels of the head, chest, stomach, and intestines; and a large quantity of bile on the liver. When the disease has continued for a considerable time, we have various organic affections;—such as dropsies, and other diseases which I shall mention hereafter. But when a patient dies in a paroxysm, or dies after the disease has existed only for a short time, we find decided marks of internal congestion.

Enlargement of the Spleen.—The chronic form of the disease, is very frequently attended by other affections; and frequently, after ague has ceased, other diseases make their appearance. It is very common, for example, when ague has continued any time, for the spleen to become enlarged. So common is this, in some places, that the tumour is called (by the vulgar) "ague-cake." The tumour thus formed by the spleen, occupies the left hypochondrium; or, perhaps, the whole left half of the abdomen. Dr. Cleghorn, who wrote a very excellent work on the diseases of Minorca, mentions having seen a spleen, after ague, which weighed eighty ounces. Dr. Gregory[a] used to speak of one that weighed twelve pounds. We frequently see this enlargement of the spleen in the case of infants. I have seen many enormously large spleens, in infants who had been the subjects of ague. We frequently, likewise, see enlargement of the liver and jaundice. Enlargement, both of the spleen and the liver, is common; but particularly of the former. In the case of the spleen, the patient is for the most part pale;—he falls into a state of anæmia (bloodlessness); while, in the case of the liver, he becomes more or less jaundiced.

Ascites and Anasarca.—When this affection has existed for any length of time, it is common also to see ascites, as well as enlargement of the spleen. Very frequently there will be anasarca, *as well as* ascites; and not unfrequently, *without* any ascites, there will be anasarca; and these affections generally remain, for a longer or shorter time, after the ague has

[a] See Note to Page 270.

ceased. They will occasionally come on while the ague exists; and occasionally not till it has ceased; and, in the former case, they are all the worse for the continuance of the ague. It was formerly imagined, that these affections arose from the ague being stopped; but this I am convinced is a mistake. Persons will have them, who still have ague very violently; and these complaints are the worse for the ague. Patients will bear them much better if we cure the ague. The ague shatters the constitution; and renders it a more easy prey to any visceral disease that may exist. I do not believe these affections are the effect of ague. On the contrary, I am satisfied they are the result of the same cause which produces ague, and of which I shall presently speak; for I have seen people labour under enlargement of the liver, enlargement of the spleen, and dropsy of great intensity, who had but one fit of ague; and a fit which bore no proportion to the severity of these other complaints. It appears to me, that the same cause which produces the ague,—a poisonous exhalation,—produces likewise these various effects; and, indeed, they render the ague more obstinate. It is sometimes almost impossible, or quite so, to cure an ague while these affections exist; but if we remedy them as well as we can,—by mercury, bleeding, purging, and the usual remedies of chronic inflammation,—we shall frequently cure the ague without any trouble. If they arose from the ague being *suppressed*, we should not have them while the ague *continued*; and if they depended on the *ague*, and not on the *cause* of the ague, they ought to bear some proportion to its degree and continuance; but they appear to bear a proportion, in some measure, to the continuance and intensity of the *cause* of the ague. Still the continuance of ague, by debilitating the system, does make them worse.

Idiocy.—Another circumstance, mentioned by some authors as an effect of ague (or, perhaps I should say, of the *cause* of ague), is idiocy. The faculties of the mind frequently become impaired, by a long exposure to the cause of ague. Sydenham mentions a degree of idiocy, or (at least) of impairment of the mental faculties, which he calls "amentia quartana" ("quartan fatuity"). There can be no doubt that the continuance of ague *increases* such affections, by debilitating the constitution; but I do not believe that ague *gives rise* to them; but that they proceed from the same cause which produces ague.

Local Complications dependent on the Time of Year.—Vernal, or spring intermittents (those which make their attack between the winter and the summer-solstice) are chiefly attended by affections of the chest;—that being the period at which affections of the chest are most prevalent. The autumnal intermittents (those which take place between summer and the winter) are particularly attended by abdominal symptoms;—by inflammation, for instance; and somtimes by intense bilious vomiting, purging, and jaundice. At this time of the year, too, ague has a great tendency to become continued fever;—that is to say, the excitement is disposed, not to *cease*, but only to *remit*. When the autumnal intermittents prevail, we have as many remittent fevers as agues; and some of these become continued. This conjunction most probably arises from the fact, that the causes of these various local excitements, and also of continued fever, coexist with the cause of ague. Without any ague at all, we are all disposed to affections of the bowels, and of the stomach and liver, in hot seasons of the year; and if, therefore, the causes of ague are joined with the causes of these common affections, ague will, of course, be accompanied by these other diseases. Still it is possible that the cause of ague may be modified; so as to produce peculiar effects at this season.

Sometimes Stops other Diseases.—Sometimes ague, so far from being accompanied by other diseases, actually puts a stop to diseases which had previously existed. Dr. Gregory[a] used to mention, that he saw palpitation cured by ague; that the man lived afterwards for many years; and died free from the palpitation, under which he had suffered till the ague seized him. Dr. Fordyce mentions, that he has seen ague cure many diseases. In fact, ague has been thought so capital a thing, that some writers contend it never should be cured; and a proverb once prevailed that—

"An ague in spring,
Is fit for a king";—

not, however, for a *subject*, I think. Boerhaave says, in his Aphorisms[b], that it disposes to longevity, and clears the body from inveterate diseases. His words are,—"Cæterum (febres intermittentes) nisi malignæ, corpus ad longævitatem disponunt; et depurant ab inveteratis malis."[c]

Aggravates other Co-existent Diseases.—There is no doubt, however, that agues shatter the constitution. They shorten life; they may be speedily fatal; and if any other disease exist at the time, they for the most part aggravate it. Dr. Macculloch believes, that when they appear beneficial, it is generally not by curing other diseases, but merely by their assuming a regular type. Ague, as I mentioned before[d], is sometimes obscure,—does not declare itself fully; and is then called "*dumb* or *dead* ague"; and, in these circumstances, we sometimes have extraordinary symptoms, which will disappear if the ague come on in a regular, straightforward style. It is therefore mentioned by Dr. Macculloch, and appears very plausible, that when benefit appears to arise from ague, it is from the disease having existed previously, but in so strange a manner, as to produce all sorts of symptoms; and from its having all at once become regular. It cannot be one thing and another thing at the same time; but when it becomes regular, then, for the first time, a person thinks he has got an ague, and has lost some other disease.

Effects on the Adipose Tissue.—The continuance of ague usually causes emaciation of the body, unless it produce hepatic, or splenic disease, and dropsy; and then the body will look bloated; but still it is pale, and evidently greatly diseased. It is even said that (in some parts of Flanders, especially) ague has a tendency to produce obesity; and sometimes very rapidly; but I imagine that the fat cannot be what people call "*good* fat." There is a sort of bloated blubbery fatness; and when it is remarked that such a person has got fat, people will shake their head, and say—"It is not *good* fat."[e] It is said that this obesity will occur there, whether the disease has been acute or is chronic; and when there is no suspicion whatever of organic disease. It is said, too, that if the disease return there, or if the seasons be very unhealthy, and a patient becomes emaciated, the obesity returns when all this is over. Many fat Dutchmen live in places where malaria prevails; but still they do not look healthy. The ill effects of the disease are so manifest, that no one who has an ague, ought to be much displeased with the doctor for curing him of it. Oliver Cromwell[f], and James the First, are said to have died of ague, caught in London. Dr.

[a] See Note to Page 270.

[b] Aphorism, 754.

[c] "Intermittent fevers, unless of a malignant description, dispose the body to longevity, and clear it from obstinate disorders."

[d] See Page 270.

[e] See Dr. Macculloch's "Malaria"; Page 430.

[f] See Dr. Macculloch's "Malaria"; Page 4.

Caius says, that so fatal was ague in London, in the year 1558, that the living could hardly bury the dead. Bishop Burnett says, in his "History of the Reformation", that so universal was it in London, and so contagious (though that was a mistake), that it raged like the plague.[a] Sydenham and Morton both tell us, that from 1661 to 1665 it was the most fatal disease in London. In our unfortunate expedition to Walcheren, in no more than five weeks,—that is to say, during the last week of September, and the whole of October,—our effective force was reduced by ague, or by remittent fever,—aguish disease, to one-third; and ten thousand men died of what was called "Walcheren fever"; which was neither more nor less than an *aguish* fever.[b]

Does it Antagonize other Diseases?—If it should so happen that a much worse disease than ague is arrested by its occurrence, we might allow the latter to go on; but even then I should be inclined to stop the ague gradually; and to use, at the same time, the remedies calculated to remove the other disease. For example: ague, I suppose, is preferable to phthisis; and if a patient were actually in a state of consumption, and the consumptive symptoms ceased on the occurrence of ague, one might be disposed only to *mitigate* the ague, but not altogether to *cure* it. However, I never met with any of these cases. A very eminent man, Dr. Wells (one of my predecessors in St. Thomas's Hospital), fancied he had good ground for suspecting, that phthisis and ague were opposite;—so that where ague prevailed, there was no phthisis; and *vice versâ*. It really appears that there is something in this;—that ague does lessen the tendency to phthisis; but still the matter is not so important as Dr. Wells imagined. The opposition of one disease to the other, is nothing like what he fancied it to be. The question is argued by Dr. Southey, in a book on Consumption[c]; in which he has taken great pains to collect documents from aguish parts; and proves that there is phthisis enough in those parts. I have seen several persons die of phthisis, while they had more or less ague. Some have carried Dr. Wells's opinion so far, as to send a patient, who was half dead with phthisis, to stand in a ditch at night;—in order to catch an ague.

Effect on the Countenance.—One of the effects of ague is shewn in the countenance. The face in ague, and long after, is often very peculiar. It is of a dirty straw-colour; and is so well characterized, that it has been called "aguish face". The face is not yellow, nor of the colour of *clean* straw; but presents a sort of *dirty* straw-coloured look. Without the occurrence of ague, the mere residence in an aguish place gives the same hue;—so that it is the effect of the *cause* of ague.

SECTION III.—CAUSES.

a. Predisposing Causes.

Bad Health.—I shall now speak of the *causes* of ague; and, among the predisposing, must be first mentioned bad health. If a person be out of health in any respect, he is more likely to be affected by the causes of ague;—just as is the case with respect to all other diseases. A general weakness of body, independently of the presence of any particular disease, must have the same effect. High health, in general, is certainly one of the best safe-

[a] See Dr. Macculloch's "Malaria"; Page 128.

[b] It is said that ten thousand men were lost by Walcheren. How far the campaign itself was lost through the same cause, it is not needful to ask.—"*Malaria; by John Macculloch, M.D.*" *Page* 227.

[c] "Observations on Pulmonary Consumption; by Henry Herbert Southey, M.D."

guards against it. The father [a] of the late Dr. Gregory [b],—the latter was one of my preceptors,—used to mention, that when he was a student at Leyden,—for then, if persons wished to get a good medical education, they were obliged to go to the Continent,—there were twenty-four students who always dined together, and were very much in each other's society. Twenty-three of them regularly, every day, drank a bottle of claret each; but one confined himself to water. The twenty-three escaped; while the poor water-drinker caught an intense ague. This strikingly exemplifies the advantage of keeping up the vigour of the body, when persons live in an unhealthy situation. It was *claret* which they drank,—not *port*; but that was quite sufficient to keep up a degree of excitement of body, and strength of mind, which enabled them to resist the disease.

The good effects of wine, in keeping up the strength against this disease, are also shewn in the fact, that people find it indispensable in the marshy parts of France.[c] They cannot resist ague there, unless they drink wine. Sir John Pringle mentions, that wine and full diet are the best safeguards against it.[c] The Dutch are in the habit of exciting themselves, by taking spirits, before they go out in the morning [d]; and it is highly necessary,—exposed as they are to the exhalations of their putrid ditches.

Depression of Spirits.—Depression of spirits will have just the same effect as too low a scale of living. Any thing which lowers the body at large, will have the same effect;—whether it be over-exertion of the body, or of the brain or mind (whichever we choose to say); or the want of good food and clothing, or of pleasurable excitement of mind; or the presence of any thing which can depress the spirits. It is said, that the effects of the mind were seen at Walcheren; and probably they were;—owing to the following circumstance:—When the men arrived there, all full of the hope of military glory, they for some weeks continued healthy; but at last, when they saw that there was nothing to be done,—that the expedition would fail, they soon became the victims of disease. It is to be considered, however, that latterly they had much greater fatigue to go through; and the longer they remained there, the more they were exposed to the morbid cause of ague; but still, when they lost all mental excitement, by the failure of the hope of what is stupidly called "military glory", they nearly all fell victims to the disease.

Predisposition from Age or Sex.—Though all ages appear liable to the disease, infancy and extreme age are less liable to it, than the middle period of life. Certainly the greater number of persons whom I see labouring under ague, are neither infants, nor those much advanced in years. It is to be remembered, however, that persons in the extremes of age, are much less exposed to the *cause* of ague than others. Women too, less frequently have ague than men; but I should think this arises, not from the female constitution being less liable to it, but because (from spending a greater portion of time at home) females are less exposed than men to its cause. Sir Gilbert Blane states that, during the ten years he was physician to St. Thomas's Hospital, he had one hundred and ninety-two cases of ague; only thirty-three of which were in females.[e] I made an estimate of my cases

[a] The physician who wrote two very excellent works, distinguished by refined ideas and a high tone of moral sentiment, entitled,—"A Father's Legacy to his Daughters", and "The Duties of a Physician."

[b] See Note to Page 270.

[c] See Dr. Macculloch's "Malaria"; Page 283.

[d] See Dr. Macculloch's "Malaria"; Page 281.

[e] See his paper on "Intermittent Fevers", in the third volume of the "Medico-Chirurgical Transactions"; Page 32.

of ague at St. Thomas's, during a period of five years; and found that I had one hundred and forty-two cases, of which only twenty-three occurred in women.

Liability from going into an Aguish District.—It would appear that persons who have not been exposed to the cause of ague, are more liable to suffer, when by chance they are exposed; for those who have formerly lived among agues, if exposed at any subsequent period, will often escape, while the others suffer. Hence it is said that some farmers, in aguish parts, have made fortunes by marrying a succession of wives from healthy districts.[a] Coming fresh upon an aguish part, the wives have been taken hold of by the malaria; and a good, *kind* husband has been enabled to look out for a second, and a third, to *love*. However, although persons may become habituated to it (as they may to any thing else), yet it more or less injures the constitution;—so that those who live in aguish parts, unless they are well fed and in good spirits, suffer more or less. They seem to be gradually poisoned by the causes of ague; although these may not have been sufficient to excite ague itself.

b. Exciting Cause.

The *exciting* cause of ague,—the true indispensable cause of it, I believe to be an exhalation from decaying vegetable matter;—what is sometimes called "phyto-septic[b] matter", "vegeto-putrescent matter", "miasm"[c], "marsh-miasmata", or "malaria."[d] However, "*marsh-miasma*" is an improper expression; for though it will come from a marsh, we may have it without the existence of any marsh at all. It is said that the causes of ague were not known to Sydenham, or to Stahl; and that they were first assigned by an Italian author (Lancisi), in 1717. It is said that neither Boerhaave (who wrote in 1747), nor Baron van Swieten (who wrote a few years afterwards), was aware of the cause of ague. Dr. Cullen, however, from extensive reading, satisfied himself that there was but one real cause of ague; and that it was the exhalation which I have now mentioned. The ancients were quite aware that marshy districts were exceedingly unhealthy. The least acquaintance with the classics, will furnish us with lines enough to prove this.[e]

[a] Dr. Macculloch, in quoting this opinion, intimates that the practice is not confined to England, but extends to France:—"It has sometimes been known, that one man has married three, four, or even five wives;—the tale being told in Bresse, (if I am not mistaken,) of three brothers who had married (between them) fifteen women." See Pages 447 and 448 of his "Malaria."

[b] From φυτον, *a herb*; and σηπω, *to putrefy*.

[c] From μιαινω, *to infect*.

[d] The Italian name for an intermittent fever, which is endemic in the neighbourhood of Rome.

[e] By the testimonies of Solinus and Dionysius of Halicarnassus it is proved, that the first settlers [at Rome] were obliged to abandon the Palatine Mounts, in consequence of the pernicious exhalations of the Velabrum; and we are also informed by Columella, that the land near Tusculum, cultivated by Attilius Regulus, was pestilential.—We find, from Plutarch, that noted periods of sickness occurred in the time of Romulus, and in that of Numa; and Livy says that, in the short period of a hundred and seventy-three years, there occurred at Rome, or in the surrounding country, no less than nineteen distinct plagues; some of which lasted for two or three years.—Cato mentions places, where it was impossible to live on account of the badness of the air; Livy speaks of tertians and quartans; and Varro advises the proprietor of an unhealthy farm to sell it at any price; or, in case that was impracticable, to abandon it.—It is related, by historians, that armies were often obliged to quit their encampments near marshes, on account of diseases.—That the city and the country also were unhealthy, is a fact so very familiar, that it is superfluous to do more than remind the reader of the names of Strabo, Martial, Horace, Seneca, Galen, and others.—"*Malaria; by John Macculloch, M.D.*" *Pages* 169 *to* 173.

The reasons for ascribing aguish remittent or intermittent fevers, to these exhalations from vegetable matter in a state of decomposition, are the following:—1. The disease prevails in the neighbourhood of marshes. 2. It declines in proportion as marshes are drained. 3. It rarely appears in any one, who has not been evidently exposed to the exhalations of decomposing vegetable matter.[a] Every one has heard of the ague of the low countries,—of Flanders; every one has heard of the aguish fevers of the banks of the Ganges; every one has heard of the ague of the fens of Lincolnshire, the hundreds of Essex, and the lower parts of Kent. I mentioned[b] that the disease is not by any means confined to marshes. It springs up around marshes, where persons are exposed to their exhalations; but every spot which contains decomposing vegetable matter, may excite the disease. On this account, I should prefer the term "*malaria*" (which, indeed, is now generally used) to that of "*marsh-miasmata.*"

Moisture alone is Insufficient.—It is not mere moisture which produces the disease; for there is no ague, however wet the weather may be, till swampy land is approached, or exhalations arise from a swampy part. No drenching by rain, will produce it; unless a person has had ague before, or has been exposed to malaria. But when a person has once had ague, taking cold (whether there be moisture or not) may re-excite it; or may render the system susceptible of the effects of malaria, which it had resisted before. In the thick fogs on the banks of Newfoundland, people never experience ague. The waters there come from the gulf of Mexico; and are called "the gulf-stream". They are from six to ten degrees higher in temperature, than Newfoundland; in consequence of which the vapour which passes from the water, is immediately condensed. There is, therefore, a constant fog; so that the fishermen who reside on the great bank, are six months employed in fogs so great, that they can hardly see from one end of the ship to the other. But though they are thus constantly enveloped in moisture, they are never known to have the ague. There is more rain in the western, than in the eastern parts of England; and yet the inhabitants are not proportionately unhealthy. On the contrary, it is on the eastern side that ague particularly prevails;—as I shall mention hereafter. So much with respect to mere moisture.

Exhalations.—With regard to exhalations, I may mention that Minorca, though it has a rocky bottom, and no marshes, is nevertheless subject to ague; because, in different parts of the island, there are pools of stagnant water. Much vegetable decomposition takes place in the stagnant pools; and the island is in the same predicament as though it were marshy land. The soil of the Campagna of Rome, in the most fatal season, is dry; but then the Campagna is intersected with ditches and drains of water, quite sufficiently impregnated with vegetable matter to explain the aguish fevers of that country.[c] The fevers of Egypt begin with the subsidence of the Nile; and those of Bussorah with the subsidence of the Euphrates; and the Arabs, to revenge themselves upon the inhabitants, once[d] let loose the

[a] Dr. Fletcher attributes marsh-miasmata to exhalations, not from *decomposed*, but from *diseased*, vegetables. See the "London Medical and Surgical Journal", for June 3, 1837. (Volume 1, 1837-8; No. 9; Page 254.)

[b] See Page 277.

[c] See Dr. Macculloch's "Malaria"; Pages 84 and 184.

[d] In the year 1743. See Lind's "Essay on Diseases incidental to Europeans in Hot Climates"; Part 1; Chapter 3; Section 3. (Second Edition; Page 110, compared with Page 128.) The following additional circumstances are there mentioned:—"The stagnating and putrefying water in the adjacent country, and the great quantity of dead and corrupted fish at that time lying

waters, and thereby produced a disease which destroyed fourteen thousand persons.[a] In Artois, in Flanders, the south and south-west winds come over swamps; and though the part itself is not swampy, they bring aguish complaints to it; but as soon as the wind sets in from the sea, and from the north, these aguish complaints all disappear.[b] These north winds, which do not come over swamps, are accompanied by very dense and durable fogs; but no ague occurs from them. The same is the case in many parts of France and the Mediterranean. In 1528, the French army, in attempting Naples, was reduced from twenty-eight thousand to four thousand men;—simply from choosing an injudicious encampment near the Baiæ.[c] Infinite is the mortality occasioned in this way, by ignorant or careless generals, from encamping an army near a marsh; and by governments, from permitting marshy lands to continue in the neighbourhood of cities. The instance of Walcheren, must ever be a disgrace to the government of this country. "There was no reason apparent", says Dr. Macculloch[d], "for perpetuating Calcutta; when, almost from the very hour of its foundation, by Charnock, its destructive situation had been demonstrated. That Holland should have persisted in inhabiting that Batavia, which it had studied to render more poisonous than nature had already done, by the model of its own pestiferous forefather, is a problem which Holland must be allowed to explain, as it best can."

Conditions on which Putrefaction depends.—But although moisture is not the *cause* of ague, yet moisture is indispensable to the decomposition of vegetable matter; and to the disengagement of the miasma. Decomposition requires a certain degree of moisture; and if we dry any thing thoroughly, whether it be a vegetable or an animal production, we prevent decomposition. A certain degree of moisture is necessary for the fermentation and putrefaction of vegetable matter; which fermentation and putrefaction give rise to the exhalations that produce ague. Thus, it is in a moderate swamp that dry weather may put a stop to the disease;—namely, by putting a stop to putrefaction. We also see why, in extremely wet situations, there is often no ague;—because too much fluid also impedes putrefaction; but this wet, by dry weather, may be reduced to just sufficient swampiness for vegetable decomposition to take place, and malaria to be produced. Just as dryness would prevent decomposition, so will extreme wetness and moisture. If the matter which is to be decomposed, be diffused in a very large quantity of water, the putrefaction ceases, or is not evident; so that some places which, while very wet, were healthy, have been made unhealthy by being dried just sufficiently for putrefaction to go on vigorously; and, again, other parts which were dry, and which never gave out any exhalations, have been caused to do so, by a certain degree of moisture falling upon them. Thus, according to situation, the same additional moisture may produce an ill, or a salutary effect. High grounds, therefore, may suffer from the same cause which removes all unhealthiness from *low* grounds. A certain degree of rain falling upon *high* ground, will not all remain there, but will roll down. Still it has moistened the parts sufficiently for decomposition to take place above; whereas, when it comes on the *low* ground, and there collects, it may be so abundant as to dilute all the vegetable matter,

upon the shore, polluted the whole atmosphere.—Not above two or three of the Europeans who were settled there, escaped with life."

[a] See Pages 196 and 197 of Dr. Macculloch's "Malaria."

[b] See Dr. Macculloch's "Malaria"; Page 273.

[c] See Dr. Macculloch's "Malaria"; Page 227.

[d] At Page 219 of his "Malaria."

and prevent it from putrefying; and may so put a stop to the unhealthiness of the part. In this way an aguish fever, whether intermittent or remittent,—for I intend to include both when I say "*aguish fever*",—has been put a stop to by inundating a swamp; and, on the other hand, inundation has moistened a dry part sufficiently for exhalations to take place.

Very Dry or very Wet Seasons check Fever.—By recollecting this, we may explain a number of circumstances, which otherwise would appear contradictory. A river, by breaking loose over a marsh, has sometimes prevented it from being any longer the source of noxious exhalations. Where there was a marsh before, it has produced a sort of lake.[a] In Batavia, for example, the rainy season is comparatively healthy; because the rivers and canals are then plentifully supplied with water, which flows on rapidly; and all the marshes are inundated. But in the months of July, August, and September, the waters are nearly evaporated; and fever is then much more malignant than at any other period. On the western coast of Africa, and in some of the West India islands, especially Barbadoes, fevers are rare during the long continuance of dry weather. There is not much water there, and what there is, is evaporated in dry weather; so that the vegetable matter becomes too dry for putrefaction. Fevers, on the western coast of Africa, are observed to be arrested in long *drought*; whereas, in Batavia, they cease during the *rainy* season. At Charles Town, in South America, (which is a swampy situation,) bilious fevers prevail in hot summer weather; but in 1752 there was very intense heat, and universal health prevailed. The thermometer was 98°, even in the shade; the air was glowing; all vegetation was parched up; and decomposition was put a stop to by the intense heat. In summer, fevers frequently prevailed in certain parts, on account of the rivers diminishing to a great amount. All rivers, of course, diminish in summer; but some lose a very considerable portion of their depth; or rather, we should say, of their breadth. The lake Bivière, in Sicily, loses two-thirds of its dimensions in summer; the lake Cagliari, in Sardinia, loses much; and so does the Caspian Sea.[b] Of course, the sides of a river are always more or less dry; but in summer a great portion becomes half-dry. There is just sufficient moisture for decomposition to take place; and therefore ague prevails when the rivers are shallow.

The Goodwin Sands.—A change in the course of a river, may drain a marsh completely; and in that way a part has become healthy, which before was exceedingly unhealthy. Sometimes the very reverse has taken place. By breaking over dry land, it has caused sufficient moisture for putrefaction to go on. The sea has done the same. It has sometimes produced the greatest unhealthiness in a neighbourhood, by making its way upon the country, and producing a permanent swamp; whereas, in other cases, it has produced something more than a swamp;—it has deposited such a body of water, that no exhalations could be given out, although before they were emitted in great abundance.[c] The Goodwin Sands are an instance of a cured marsh, though the land is lost.[d] An immense deposit of sand has filled up the marsh. The retiring of the sea will frequently

[a] See Dr. Macculloch's "Malaria"; Page 200.

[b] See Dr. Macculloch's "Malaria"; Page 193.

[c] See Dr. Macculloch's "Malaria"; Page 204.

[d] The loss of the Goodwin lands, by inundation, proved the remedy (expensive as it was) for a wide tract of poisonous marsh. —"*Malaria; by John Macculloch, M.D.*" *Page* 204.

cause agues; by leaving a marsh only, where the part was previously deluged.

The Lake of Wallenstadt.—As every river carries down a quantity of solid materials, so every river has a tendency to fill up its bed. It becomes more or less filled with solid matter, coming down from high land. A river may be completely filled up; so that the banks must be raised, or the country will become inundated. A marsh will be produced; and great unhealthiness take place. This is frequently remedied, for a time, by embanking a river; so that it shall still be confined within its proper bounds. I say "for a time" only; because the higher the river becomes[a], the more slowly it runs, and the less it drains the country; till at last it is useless.[b] But in some countries people are prejudiced, or careless; and parts which were exceedingly healthy, become the seats of the most dreadful disease. There is an instance in Switzerland, of a part becoming very unhealthy to all around. Aguish fevers extend from the lake of Wallenstadt, over a great district, as far as Zurich. A river there (the Linth) pours its water into another river (the Mag); and that again into the lake. The Mag became stopped up, through neglect; and the neighbourhood all round, a few years ago, became one of the most pestilential districts in Switzerland;—six thousand acres being thus converted into a marsh. At last, the authorities had their attention forced to it; and it was remedied simply by turning the Linth into the lake, instead of allowing it to empty itself into the Mag; and by widening and deepening the Mag. The lake, being a deep spot, receives all that comes down from the mountains; and the whole has now a free course. The obstinacy of the people—in living in the midst of a pestilence, when they had it in their power to remedy it—is hardly to be conceived; but it is no less true. I could give many illustrations; but they all come to this point;—that a certain degree of moisture is necessary to the disengagement of malaria; that if we diminish the moisture, we diminish the malaria in one case, and increase it another; and that if we increase the moisture, we may also produce either of these effects. Thus it is that, according to situation, circumstances the most opposite will have the same effect; and circumstances which are exactly the *same*, will have the most *opposite* effect.

Temperature necessary for Putrefaction.—But a certain degree of moisture, is not all that is necessary;—there must also be a certain degree of temperature. We can preserve any thing from decomposition, by an exceedingly low temperature; and by an exceedingly *high* temperature, we produce such changes that no decomposition can take place. We know that if meat be spoiling, we have only to cook it, and the putrefactive process is immediately arrested; and so it is with respect to the putrefaction of vegetable matter. A certain degree only of temperature is proper. If the temperature be increased, then we may have extreme decomposition, and disengagement of malaria;—so that while the cold weather lasts, the people will be comparatively healthy; but when the warm weather arrives, the decomposition is such that the most fatal fevers prevail. Hence it is that aguish diseases are far more severe in hot countries, than they are in ours; and that they are far more severe in autumn, than at any other period. This, at least, is one reason; but there is another. In hot countries, and in hot seasons, there is far more vegetable matter to decompose. This is certainly to be taken into the account; but when we consider that an

[a] The Po is now, over a large tract, literally running on the summit of a wall.—"*Malaria; by John Macculloch, M.D.*" *Page* 379.

[b] See Dr. Macculloch's "Malaria"; Pages 198 and 199.

increase of heat produces a great increase of decomposition, we also see that fever must greatly be ascribed to the facility with which decomposition goes on in a warm temperature. A low temperature, however, may be short of that which is sufficient to stop the disengagement of malaria; and, therefore, if a country be very unhealthy, and very swampy, there will in cold weather be aguish diseases. The cold is not such as to stop putrefaction; and the land is so moist, as to produce a very considerable disengagement. The reason that ague prevails so much in the spring, is that the soil, which was caked and dried by the cold of winter, is now moistened; and the temperature of the weather has increased. The cake has consequently been broken up; and therefore we have vegetable exhalations in abundance. The vegetable matter, which was left on the ground the preceding autumn, becomes decomposed by the increased temperature. The reason that ague is so fatal in the *autumn*, is that the summer has produced a fresh stock of vegetable matter. The surface of the earth is covered by vegetable matter; it is in great part dying, and lies upon the ground to rot; the rain comes in the hot period; and—what with the heat, the moisture, and the dead vegetable matter—exhalations take place. The great abundance of the vegetable matter to be decomposed, together with the heat, renders the autumnal fevers far more severe, and far more numerous, than the vernal.

The effect of moisture has frequently been seen, in a striking way, when rain has begun suddenly after a dry season. When a quantity of vegetable matter has been lying upon the earth, and has become caked, a sudden rain has been attended, on many occasions, by the most fatal diseases. From the moistening of the vegetable matter, putrefaction has instantly taken place; and exhalations in abundance have been emitted. Again: the reason that, when the autumn is over, these fevers cease, is that the greater part of the vegetable matter has been decomposed; and the temperature of the atmosphere falls; and therefore not only is there less matter to putrefy, but the temperature is not sufficient for putrefaction to go on with vigour.

Pasture-Lands.—Pasture-lands, from being constantly moist, are very aguish; and yet, on breaking them up and cultivating them, they are infinitely more so[a]; and this from the same reasons that I have now mentioned. All pasture-lands must be unhealthy; for they are all moist;—and they cannot be good if not moist; for the grass will not grow without moisture. But when broken up, they become more unhealthy. Previously, only *portions* died; but, when the lands are broken up, nearly all the vegetable matter is killed, and rushes into putrefaction;—so that it is always found, that the breaking up of pasture-lands is attended by far more disease, than existed before the land was so broken up. It may be a fact, however, that malaria is let loose from the earth by breaking it up. It is said that, in many countries, on the breaking up of the surface of the earth, these fevers are sure to prevail. In the West Indies, for instance, it is said that this process has been known, for two centuries, to be exceedingly dangerous. Cassan mentions that fevers, like the plague, will take place on land being broken up;—so that labourers will sometimes die on the spot, if they remain there all night; whereas no harm arises if they be not broken up. Volney, the traveller, mentions this as an invariable observation in America.[b]

Clearing of Woods.—It is found also,—and the fact is precisely similar,

[a] See Dr. Macculloch's "Malaria"; Pages 111 and 112.

[b] See Dr. Macculloch's "Malaria"; Page 112.

—that on clearing away woods, the disease especially prevails. A quantity of malaria is let loose from the forest, when the woods are cleared; and—more than that—a quantity of vegetable matter necessarily lies on the surface of the earth; which, although kept moist enough for decomposition, is prevented from decaying much, from the inability of the sun to penetrate to it; but, on clearing the wood, the heat of the sun is admitted to the surface, where the vegetable matter is lying; and it then falls into a state of rapid decomposition.[a] Hence it is found that the clearing of woods is always a dangerous process; and it may be so from two circumstances;—first, the malaria which is pent up in the woods is let loose; and, secondly, the sun has access to the vegetable matter which lies on the surface, and effects its decomposition. Besides, much vegetable matter must be killed by the process. It is said that the same effect will take place in Italy, if certain bushes be cut down.[b] Whatever malaria may be in them, has then an opportunity to escape; and fever is sure to prevail. The removal of woods has frequently been injurious, in another point of view;—by removing a protection. Some villages have been free from ague, while a wood existed between them and a marsh; but on cutting down the wood, they have become from that moment exceedingly unhealthy;—the wood having served the purpose of a screen.[c] Some have imagined that it was the knowledge of this circumstance,—of this advantage of woods,—that caused them to be so venerated, and held so sacred in ancient times.

Stagnant Water.—It has been said that stagnant water alone will produce ague, without any vegetable matter being in it; but we are to remember that this stagnant water will putrefy; which it certainly would not, unless it contained animal or vegetable matter. Water itself—pure oxygen and hydrogen—cannot undergo putrefaction; but soft water will putrefy; and, as that is the case, it must contain dead vegetable matter. If stagnant water, therefore,—although nothing can be seen in it,—does produce ague, we may explain the occurrence by supposing that it contains vegetable matter. It is well known that the Thames water, however good it may look, when put into casks will putrefy; and it is said that the decay of the interior surface of the cask, is quite sufficient to explain this;—that if pure water be put into a cask, yet the wood of the cask—being vegetable matter, and being next the water—becomes more or less acted upon by the water, and more or less undergoes the process of putrefaction, and so affords malaria.[d] It is on account of this liability of the wood to be destroyed, that casks are always charred within; by which they are enabled to resist the putrefactive process.

Any portion of water (however small the collection) containing decayed vegetable matter, is sufficient to cause intermittent fever. Many places, therefore, which have only a small pond, or a small lake, produce disease. Many places, no doubt, are suffered to give ague, and aguish diseases, from circumstances which are entirely within control. It is said that an inveterate ague was produced by the canal at Versailles, though it was little larger than a fish-pond.[e] Monfalcon quotes an instance of a fish-pond at Chantilly, which was remarkable for its pestiferous character.[f] Many country

[a] See Dr. Macculloch's "Malaria"; Page 44.

[b] See Dr. Macculloch's "Malaria"; Pages 267 and 268.

[c] See Dr. Macculloch's "Malaria"; Pages 43, 44, 248, and 249.

[d] See Dr. Macculloch's "Malaria"; Page 143.

[e] See Dr. Macculloch's "Malaria"; Page 100.

[f] He [Monfalcon] refers pointedly to the artificial water of Chantilly, as the source of frequent and serious epidemics.—"*Malaria; by John Macculloch, M.D.*" *Page* 100.

residences (there can be no question) have been made unhealthy, from the custom of ornamenting them with woods, and little lakes of stagnant water; —" pièces d'eau d'agrément ", as the French call them ;—" lacs artificiels."[a] Edinburgh is now any thing but favourable to ague ; but there was formerly in it a lake, called " the North Loch ", which was famous for it.[b] Agues prevailed in that district till the spot was drained ; but now no agues are there at all. When I say " ague ", I mean fevers of an aguish character,— whether remittent or intermittent ; and many diseases of this description are unquestionably mistaken, every day, for real typhus. In order to the existence of ague, the situation need not be low, nor need there be a marsh. At whatever height water be hemmed in, of course vegetable decay may take place ;—just as though it were in a low situation.

Clayey and Retentive Soils.—Clayey soils are the most favourable for these fevers, on account of the clay retaining the moisture; whereas gravelly soils let it escape.[c] It might be imagined, perhaps, that the Delta of the Nile would be a great source of ague. Ague (Sir James McGrigor says) is not unknown in Lower Egypt ; but it is only seen sporadically. The reason of this is, that there is no stagnation of water ;—notwithstanding the existence of so much vegetable matter as is brought down to the Delta. In fact, there is so much agitation, as to have the same effect as too much water ; so that putrefaction does not take place. Strabo remarks the healthiness of Lower Egypt ; and ascribes it to this cause. On the other hand, ague will continually occur in spots where there is little more than a pool, or a puddle ; but then the water is completely stationary. Even a ship may contain a source of malaria. I believe the fevers of ships, are very often *remittent* fevers ; but are mistaken for *typhus*. They have often arisen entirely from the bilge water. Captain Smith says, he never knew fever in any of his ships, during a long service in the Mediterranean ; and Captains Parry, Cook, and Sir Henry Baynton, all succeeded in preserving the health of their crews. They all had the holds of their vessels washed out daily, by means of plugs, till the water came out perfectly clear ; so that no accumulation of filth could take place ;—no accumulation of vegetable matter. This fact may be contrasted with one relative to the Powerful, a seventy-four gun ship ; the crew of which, on their voyage from the East Indies, were nearly all disabled by fever ; and the cause was found to be merely the ballast, which consisted of moist and putrid mud. Ships laden with sugar have the greatest mortality ; and sugar is a vegetable matter. In fact, the most unhealthy cargo that a ship can carry, is sugar.[d]

Moats and Ditches.—The castle of Flamandville, in Normandy, is situated high ; but an endemic prevails around, in consequence of a mere moat, containing a quantity of vegetable matter, which gives forth pestiferous effluvia. A family, resident at the place for a length of time, was at last exterminated ; but, before that, they underwent a loss both of mental and of corporeal power. The same thing has been observed in the neighbourhood of many castles. The besieged and the besieging have both suffered, when the baronial castles were attacked ; and the source of all the disease, was the moat surrounding the castle. The sentries were the first attacked.[e] Down to the middle of the last century, one-third of the inhabitants at

[a] See Monfalcon's opinion, recorded at Page 99 of Dr. Macculloch's " Malaria."

[b] See Dr. Macculloch's " Malaria "; Page 191.

[c] See Dr. Macculloch's " Malaria "; Page 20.

[d] See Dr. Macculloch's " Malaria "; Pages 146 to 148.

[e] See Dr. Macculloch's " Malaria "; Pages 89 to 92.

Bourg en Bresse were incapacitated; in consequence of the ditches, around the fortifications, containing a quantity of decayed vegetable matter. At Havre de Grace the soldiers were once known to be giddy, and to experience violent headach, five minutes after they had approached the ditches; and then they had violent fever.[a] I saw several cases of ague in London, arising from the moat around the Tower. A stupid negligence, with regard to the moat, prevailed for a long time; a great accumulation of filth took place; and I continually saw patients with ague, from that part of London. The first case I met with, was that of a lady;—a relative of a medical gentleman in the neighbourhood; and, not having been in the country, she could not imagine how she had contracted the ague. At last she told me, that she was in the habit of taking exercise on the ramparts of the Tower; and the circumstance of the moat, of which I had read so much in books, immediately occurred to my mind. I inquired whether it was in a filthy condition; and learned that it was so; but that the authorities would not clean it out. There was a difference of opinion as to which department it belonged to; and some medical men (laughingly) said, that it could not be supposed they should press the subject; because it brought "grist to the mill." I believe, however, that (in consequence of the representations of the profession) it has been cleansed.

Harbours, moats, and mill-dams, have all been sources of ague. In a mill-dam the stream is rapid; but the sides may be flat and wet.[b] Flax-grounds have frequently been proved to have given origin to the same disease; in consequence of the flax lying upon the ground, in a state of decay. In Italy and Germany, fevers frequently prevail in the neighbourhood of flax-grounds; and there are instances of ague in dry, sandy, high places, owing to the hemp being dried there; and the fevers regularly cease, when the season for drying hemp is over. Indigo-manufactories have also been the sources of this disease.[c] The inundation of a cellar, has frequently caused these fevers to prevail in a family; and the passage of a drain under a house, has frequently caused the inhabitants to continue the victims of fever;—that is to say, the house has been rendered unhealthy; and all the people residing in it, have been more or less attacked with fever, from time to time. Nay, the removal of stores has frequently been productive of fever.[d] The water, under the stores, has been impregnated with vegetable matter, in a state of putrefaction. The removal of the stores has let loose the exhalations, which were pent up beneath them; and the men employed in removing them, have been known to suffer an attack of fever.

High Susceptibility of Some Persons.—When we consider the peculiar susceptibilities of different individuals to the effects of morbid causes, we shall not be surprised that persons will occasionally catch an ague, from the most trivial exposure to malaria. We know that some persons are singularly liable to be affected by particular causes. Many persons, on approaching a hay-field, will be seized with asthma; particularly if the grass be sweet-scented. I believe it is not the hay which produces the affection, but the flower of the grass;—so that they are attacked if they approach fields at the time they are in flower; which is at the period of hay-making. It is said to be not at all uncommon, for persons to be so affected from

[a] See Dr. Macculloch's "Malaria"; Page 93.

[b] See Dr. Macculloch's "Malaria"; Page 102.

[c] See Dr. Macculloch's "Malaria"; Pages 140 to 142.

[d] See Dr. Macculloch's "Malaria"; Pages 88 and 89.

ipecacuanha. Some persons have been seized with asthma, from ipecacuanha being powdered in the house; nay, it is said that some persons have been seized with it, merely from a box of ipecacuanha-lozenges being in the same room. At any rate, a trivial exposure to this drug, frequently produces the disease. We must have seen persons thrown into a violent salivation, from a grain of calomel; nay, I have seen it arise from the application of a little red-precipitate-ointment [a], or mercurial ointment, to a sore leg. From these various circumstances, we must suppose that there are some people, who are peculiarly susceptible of the effects of malaria; and therefore I can imagine sporadic cases of ague to take place, from a person merely passing through a market, in which decayed cabbage-leaves may be lying. We all know that there is more or less putridity in these vegetable remains;—they continually emit a noxious smell; and I can conceive that, even in a most healthy town, we may thus have a cause of ague. Ague is sometimes ascribable to very common and trifling causes, without at all invalidating our general conclusions. A very slight collection of decayed vegetable matter may be supposed sufficient to produce ague, in a person extraordinarily disposed to it; and therefore, when we cannot account for the existence of the affection from the person having been near a swamp, it is very possible that the case may be one of extreme susceptibility;—that a minute quantity of putrid vegetable matter, has been near the patient; or that minute malarious exhalations have been wafted to him. It is to be remembered, that these miasmata will extend to a very great distance; and that, in very aguish seasons, places which are usually healthy, and not situated near much stagnant water, frequently become unhealthy. Dr. Macculloch's works are the best on this subject. They consist of two volumes on Marsh-Fever and Neuralgia [b]; and one volume on Malaria.[c] It is his opinion,—and also that of several Italian physicians, and able military men,—that a single inspiration of malaria, may be quite sufficient to cause disease.[d] If all this be the case (and there is no reason to doubt it), we are not by any means to reject the belief that the disease always rises from such exhalations, merely because we can hardly tell how a particular individual, in certain circumstances, may have been exposed to them.

Distance to which Malaria may extend from its Source.—As to the distance to which malaria will extend, it is said that, in Italy, the ill effects of stagnant water are known to extend three miles;—that they have reached from the lake Agnano, as far as the convent of Camaldoli, which is situated on a high hill.[e] Lancisi (who first referred this disease to marsh-miasmata) says, that as thirty ladies and gentlemen were making an excursion of pleasure up the Tiber, the wind suddenly shifted to the south,—coming over the Pontine marshes; and twenty-nine were instantly taken ill;—only one escaping. They were all well before; but the wind coming over the Pontine marshes was impregnated with malaria; and twenty-nine were instantly affected by it. Dr. Lind, of Haslar Hospital, (who wrote on the Diseases of Hot Climates,) says that when Commodore Long's squadron lay off the mouth of the Tiber, two vessels that were close to the

[a] Unguentum Hydrargyri Nitrico-Oxydi.

[b] "Essay on the Remittent and Intermittent Diseases; including Marsh-Fever and Neuralgia; by John Macculloch, M.D."

[c] "Malaria: an Essay on the Production and Propagation of this Poison. By John Macculloch, M.D."

[d] It is matter of observation, that a minute's exposure to Malaria,—a single inspiration, probably, is sufficient to excite it fever; and, very notoriously, to re-excite in those who are subject to that morbi sensibility, derived from former or habitu fevers.—"*Malaria; by John Macculloc M.D.*" *Pages* 53 *and* 54.

[e] See Dr. Macculloch's "Malaria" Pages 241 and 242.

hore were affected; while the rest, lying a little farther off, escaped. The ifference of half a cable's length from the shore, has caused vessels to uffer or escape; yet Sir Gilbert Blane says that, in the West Indies, (and e heard the same respecting the channel leading to Calcutta,) the malaria as observed to reach a distance of three thousand feet, and more. In ealand, the distance (he believes) is far less;—owing to the comparative ildness of the malaria, and also of the temperature. It is the opinion of any authors, that the hotter the climate, the farther does the malaria ex- end;—that if the quantity of vegetable matter be great, and the heat in- nse, it produces its effects at a very considerable distance; but that in old climates, the vegetable matter and heat being less, the exhalations are ilder in their nature, and less copious; and therefore it is supposed by ir Gilbert Blane (who had great experience), that in Zealand the distance far less, than in many other parts. He says that, at the time of the Valcheren fever, no persons on board ship were seized with the disease hich was prevailing on shore; although the channel between Beveland nd Flushing was only six thousand feet wide, and some of the ships lay earer to one shore than the half of that distance. It is the opinion of any, that the malaria will not extend to any great distance. Sir Gilbert entions, that when the ships watered at Rockford, he found that if they nchored so near the shore as to smell the land,—the smell of land-air eing sometimes very perceptible at sea,—they were affected; but if they emained only two cables' length from the spot where they smelt the alaria, no inconvenience was experienced. It is said by Lind that, at ensacola [a], a regiment lost a hundred and twenty men, and eleven out of welve officers' wives who landed; but the whole crew of a man of war, hich was lying one mile from the shore, remained perfectly healthy.[b] How- ver, Dr. Macculloch believes that malaria may be conveyed to an indefinite istance.[c] He has investigated this subject more than any one else; but as carried his views further, perhaps, than most other persons will think stifiable. He is convinced [d] that it is conveyed from the banks of the hames, over the hills of Kent; even to a distance of some miles from the oast.[e] He argues [f] in the first place, analogically, that dogs will smell the and long before it is visible; and, on the other hand, that the sea may be melt [g] very far inland;—that whales or sharks may be smelt, both power- ally and offensively, as far as the spouting of the animal is visible from the mast-head; and therefore he says [h], that if these things can reach such a istance, and odours produce such an effect, so may malaria or vegetable xhalations. He mentions [i], that fogs and clouds go to an immense distance; —that malaria easily unites with fogs and clouds; and therefore he

[a] In North America.

[b] This occurred in the year 1765. See ind's "Essay on Diseases incidental to uropeans in Hot Climates"; Part 2; hapter 1; Section 2. (Second Edition; age 169.)

[c] See his remarks on the "Propagation f Malaria" (forming Chapter 7 of his Vork); particularly Pages 308 to 336.

[d] He states that conviction at Page 309 f his "Malaria."

[e] From any known and often very limited ot, this poison will proceed (through the ir, or on the winds) to distances of three r four miles;—exciting as much virulence as in its native marsh. This—to quote a familiar domestic example, out of hundreds that might be adduced—occurs on the hills of Kent, far from the marshes of Erith, Northfleet, or Gravesend.—"*Malaria; by John Macculloch, M.D.*" *Page* 54.

[f] At Page 310 of his "Malaria."

[g] The smell of the sea is, in reality, the smell from fish.—"*Malaria*; *by John Macculloch, M.D.*" *Page* 310.

[h] At Pages 309 and 310 of his "Malaria."

[i] At Pages 310 and 311 of his "Malaria."

concludes, that as far as these will go, so far may the malaria extend. Moreover he asserts [a], as a fact, that he has found records in ships' books, of malaria having produced fever at a distance of five or six miles or more from shore; and that the danger was instantly made sensible by the smell; —so that the ship's crew would go below, or weigh anchor and run to sea. He says [b] it is well known, that points in the coasts of Suffolk and Norfolk, and the eastern coast of Scotland, have ague; though there is no local source of malaria for many miles; and that there are some points where there is no source of malaria, for even a greater distance than that; and therefore he contends [c] that it must be brought from Holland, and the northern shores of the Continent.

Influence of Easterly Winds.—The effect of the east wind, in causing and renewing aguish diseases, is well known; but it can no more be the simple air itself, than pure water (oxygen and hydrogen) can produce ague. Wind, if pure, can no more be poisonous than pure water [d]; and therefore the noxious property must be, as in the case of water, *contained* in it. Now the east wind is perfectly innocuous, in the regions which it reaches after having passed over healthy countries; and, *vice versâ*, other winds are as unhealthy in some parts of the world, as the east wind is here;—that is, where those winds come over a marshy district; exactly as our east winds do. This is another argument adopted by Dr. Macculloch.[e] He says [f],—still pursuing his argument,—that land under the trade-winds, and ships in the equatorial seas, escape; and that St. Helena, being so much exposed to the east wind, ought never to be free from ague; whereas that is not the case. If the east wind blows over a frozen continent, or simply blows across the sea, (though of course, in its passage, it must imbibe moisture,) it is found to do no harm. In order to be injurious, it must blow over land where there is vegetable matter and moisture. For this reason, in one-half of the globe, the east wind is exceedingly injurious from the month of March to the month of October. [g] In French Flanders, the south and south-west winds do the same harm, as the east wind in other countries.[h] The east wind in summer is dry.[i] Hence it has less conducting power; and thus, though we get ague from the Dutch ditches in *spring* [k], we do not get their remittent fevers of *autumn*. The east wind is so dry at that time, that it will not conduct the malaria; for a certain degree of moisture is as necessary for its conveyance, as for its production.

To shew the healthiness of the east wind, where it does not pass over a marshy district, I may mention that it is the salutary breeze of the burning

[a] At Page 314 of his "Malaria." In addition to this general assertion, he gives the following specific instance; in which, however, the distance is rather less, than in the case referred to in the text:—"In one case of a healthy ship and crew, anchored at least four miles from the shore, a sudden change of wind brought out the smell of the land; on which orders were immediately given for weighing the anchor; while, even before the cable-chain could be cleared, most of the men working at it (who were the only ones first permitted on deck), were seized with a disease, which proved the fatal cholera to the greatest number." ("Malaria"; Pages 314 and 315.)

[b] At Page 317 of his "Malaria."

[c] At Pages 317 and 318 of his "Malaria."

[d] See Page 318 of Dr. Macculloch "Malaria."

[e] For this argument, see Pages 316 to 336 of his "Malaria."

[f] At Page 319 of his "Malaria."

[g] See Page 320 of Dr. Macculloch "Malaria."

[h] See Page 321 of Dr. Macculloch "Malaria."

[i] It is burning and dry in the Sahara and even in our own English July.—"*Malaria*; *by John Macculloch, M.D.*" Page 336.

[k] See Dr. Macculloch's "Malaria" Page 331.

islands of Western America; while many parts of France, Germany, Poland, and Russia, never feel its injurious effects.[a] Dr. Macculloch says[b], that although "the east wind, after sweeping the burning sands of Africa, makes the side of Sardinia which is exposed to it a desert, and in Minorca will not suffer an orange-leaf to protrude beyond a garden-wall, it is before the *east* wind that Mount Edgcumbe roots its splendid trees even into the sea;—not daring to shew a leaf to the *western* ones; while in Southampton river it is precisely the reverse."

The Harmattan.—The *east* wind, from its excessive heat and dryness, or from its coldness and moisture, may be injurious in other ways than in producing intermittent fever. The Harmattan[c] will not produce ague; but it is excessively hot and dry[d], and therefore an injurious wind. Again: all experience an unpleasant feeling from the east wind in spring;—not by its producing ague, but by its being excessively cold, and excessively moist.

Elevated Situations exposed to the Influence of Malaria.—Distant parts suffer more if they be hilly than if flat; and frequently the immediate neighbourhood of a marsh will escape in some measure, while a village or a town at some distance, if it be situated on a hill, suffers exceedingly. This fact seems to be capable of explanation, from the circumstance of hills attracting from the clouds their moisture, and every thing united with it. Malaria is conducted by moisture, and moves with the clouds; and the clouds, being attracted to the sides of a hill, deposit their moisture and every thing else they contain; and thus a hilly part may suffer much, although it is situated at a great distance from a marsh. I mentioned[e] that the inmates of the convent of Camaldoli, which is situated three miles from the lake Agnano, suffer from ague. It stands upon a high hill. At Malta, the malaria produced under a cliff, never affects the spot itself; but produces direful consequences on a village situated above it.[f] At Weymouth (in our own country), it is said that "the back-water" rarely affects the immediate inhabitants; while those at a distance suffer. At St. Austle, in Cornwall, the disease prevails from some marshes at St. Blaisey. At Erith there is less ague in general, than could be expected; but houses that are situated high above it, often suffer very severely.

Influence of Currents.—Sometimes a distant part will suffer, not from clouds conveying the moisture, but from currents of air. The locality of a part may be such, that a current will proceed in some particular direction. If currents pass over a swamp, the part exposed to them will necessarily suffer; and if there be a peculiarity in a current, it will affect a part which, *à priori*, would not be expected to suffer. Captain Smith, in his "Sta-

[a] See Dr. Macculloch's "Malaria"; Pages 334 and 335.

[b] At Pages 334, 335, and 336 of his "Malaria."

[c] A prevailing wind on the coast of Africa, between Cape Verd and Cape Lopez, in the months of December, January, and February. It is a particularly dry wind,—from passing over the burning deserts of Africa; so much so, that, in a very short time, the leaves of plants become dry and crisp, and the skin of human beings dry and chapped, the nose and lips sore, the fauces arid, and the perspiration acrid; yet it is not pestilential; but, on the contrary, puts an end to epidemic diseases."—*Dr. Hooper's "Medical Dictionary"; Seventh Edition; Article "Harmattan."*

[d] See Dr. Macculloch's "Malaria"; Pages 320 and 331.

[e] See Page 286.

[f] According to Dr. Macculloch, the malaria sometimes leads to the abandonment of this village. For this circumstance, and for the facts stated in the text respecting Weymouth, Erith, St. Austle, and St. Blaisey, see Pages 242 and 243 of his "Malaria."

tistical Table of Sicily", mentions seventy-six unhealthy towns and villages; and, out of that number, thirty-five are situated on hills or declivities, and at a great distance from a marsh. When the wind blows from the south, being a warm wind, it has a tendency to ascend; and it is supposed that the southern wind—blowing over a marsh, and tending upwards by its temperature—affects high towns; while the colder northern wind does not affect those houses situated on the other side of the swamps, though placed equally high.[a] We can easily conceive of a swamp, and towns on each side. When the wind blows *south* it will ascend, and high houses will suffer; whereas, if it blow *north*, it will not ascend to a house of the same elevation, but will remain near the earth; and in that way the house will suffer very little, or not at all. Hence we must take into account a number of circumstances, when ague prevails in districts, where there is no marsh in the immediate neighbourhood.

Partial Influence of Malaria in some Districts.—In the prevalence of this disease, however, there are singularities, which cannot be explained;—at least many, perhaps, will not be satisfied with the explanation that is given. It is said, that on the high road to Chatham and Feversham,—comprising a distance of twenty miles,—the effect of malaria is only noticed on one side of the road.[b] The injurious lands which afford the malaria, are situated about a mile off; but it is only detached houses on one side of a level road, that suffer. It is to be remembered, however, that the dews will spread in a similar way;—that they will spread to a particular spot, or stop at a certain bush. Every one may notice the same circumstance, in the case of a hoar-frost. Now, as far as these will extend, so may malaria; and they will explain the singularity of such an occurrence, in some instances. Dr. Bancroft was credibly informed, that only one side of a particular street in Rome, was affected by ague or aguish diseases; and Baglivi says, that the healthy spots of Rome are separated from the unhealthy by a wonderfully short distance. A similar circumstance is observed in Cadiz; and in many American states. In the latter, however, the reason is perfectly evident;—some streets are exceedingly low; and are built in districts near which there is a quantity of stagnant water.

Lower Strata of Air generally Most Dangerous.—It is in consequence either of the weight of these pestiferous exhalations, or of their uniting with moisture, and producing their effect when the moisture is deposited, that the lowest spots are generally the most dangerous; and this also accounts for these exhalations being most dangerous at night; for it may be laid down as a general rule, that malaria is most dangerous in a low situation, and in the night. It is on the ground, and near the lowest parts of a house, that moisture is deposited; and, that being the case, the exhalations of malaria will be let loose there; and what is lowest will suffer most. Again: in the night the cold is greater than in the day; and, from the cold being greater, moisture is deposited, and with the moisture malaria. Hence we have, in general, a sufficient explanation for the two facts I have just stated.

I could give you plenty of instances of the influence of difference in elevation, in causing a liability to ague. In the barracks of Spanish Town, Jamaica, there were three cases of fever in the *lower* story, for one in the

[a] See Dr. Macculloch's "Malaria"; Page 244.

[b] The ague is unknown on the right side.—"*Malaria; by John Macculloch, M.D.*" *Page* 261.

upper.[a] Sir Gilbert Blane says he was informed, by a medical man, that in 1781, at St. Lucia, one regiment, situated on the *top* of a hill, lost two hundred and seventy-one men, from intermittent and remittent fever; another regiment, on the *sides* of the hill, lost three hundred and eighteen; and a third, which stayed at the *bottom* of the hill, lost four hundred and eighty-six. The hill was called "Morne Fortuné"; and was situated eight hundred and seventy-two feet above the level of the sea. At Walcheren, the natives knew that those who slept in the upper stories, were far less liable to disease than those in the lower; and that if they caught ague, it was much milder. Sir Gilbert Blane also says he was informed, by Dr. Ferguson, that at St. Domingo two-thirds more were taken ill on the *ground* floor than on the *upper* floor. In Italy the difference is so great, that an *erect* is known to be more safe, than a *sitting* or a *lying* posture. Although this is a general rule, however, yet there are exceptions to it. In some parts of Norfolk, danger is confined to the *upper* stories[b]; but in those places there must be a particular current, which wafts the malaria in that direction.

Malaria most potent at Night.—The great danger of night is always strikingly illustrated. Dr. Lind says[c] that, in 1766, when the ship Phœnix lay at anchor for twenty-seven days at St. Thomas's, two hundred and eighty men, constituting nearly all the ship's company, went on shore, in parties of twenty or thirty, and rambled about the island; but none of those who did not remain on shore at night suffered; while none of those who slept on shore escaped sickness, and only three survived. Dr. Lind mentions[d] that, at Batavia, a boat belonging to "the Medway", was actually manned three times;—every one having perished; and simply from the men having to attend duty on shore, every night. It is found, that a cold night after a hot day is much the worst. During the heat of the day, there is more disengagement of malaria; and consequently, when night comes on, there is far more to be precipitated. Cold and wet are always most operative after heat. It is thought by some, that in Italy evening is more dangerous than night; and that there is no hazard after nine or ten o'clock at night. If this be a fact, I presume it arises from the whole quantity of malaria being by that time deposited.[e] The effect of night, however, must be ascribed in some measure to mere sleep. It is right to take every thing into consideration; and all morbid causes act more powerfully in sleep, than in the waking state.[f] Sleeping on damp ground at night is injurious;—not merely because the person has lain upon the ground, nor simply because he has lain there during the night; but because he has lain on the lowest spot, at a time when there is more malaria than in the day-time, and when the body is less capable of resisting it than in the day.

Malaria Precipitated with Rain.—Lind[g] and Mungo Park[h] were con-

[a] See Dr. Macculloch's "Malaria"; Page 265.

[b] See Dr. Macculloch's "Malaria"; Page 266.

[c] In his "Essay on Diseases incidental to Europeans in Hot Climates"; Part 2; Chapter 2; Section 5. (Second Edition; Pages 235 to 239.)

[d] In his "Essay on Diseases incidental to Europeans in Hot Climates"; Part 1; Chapter 4; Section 3. (Second Edition; Page 148.) The circumstance occurred in the year 1764; as will be seen by referring to the Essay just mentioned; Part 1; Chapter 3; Section 3. (Second Edition; Page 98.)

[e] See Dr. Macculloch's "Malaria"; Pages 277 and 278.

[f] See Dr. Macculloch's "Malaria"; Pages 280 and 281.

[g] Lind says that, even in England, a rainy season will produce remittents and intermittents, in the healthiest districts, or where malaria is unknown.—"*Malaria; by John Macculloch, M.D.*"; *Page* 277.

[h] Respecting the production of remittent

vinced, that malaria was precipitated with the rain; and in this way they noticed, frequently, that rain was unhealthy. Park says that, on one occasion, the rain had not begun more than three minutes, before many soldiers seemed drunk, and fell asleep; while others vomited; and he mentions that, in a storm, he himself felt disposed to sleep; and could not help it, although he was on damp, and therefore dangerous, ground. Dr. Lind says [a], that the most unhealthy rains in Guinea, are those which occur first in the wet season; (which looks as if malaria were precipitated in the rain;) that in forty-eight hours, the rain rotted their shoes; and that when the clothes they had on were hung up to dry in the sun, they became, in a few hours, full of maggots;—shewing, probably, that much injurious matter was contained in the moisture, and deposited with the rain. As the rain falls more and more, there is generally less and less unhealthiness. This may be ascribed to two circumstances;—in the first place, to the quantity of malaria deposited by the first rain; and, secondly, to the continued rain which falls upon the earth;—producing so much moisture, that vegetable decomposition will not so easily go on. Hence, again, disease increases when the moisture declines.

The power of moisture to dissolve these exhalations, is rendered exceedingly probable from the fact, that a stench arises from pools and privies in damp weather. Every thing that affords an offensive smell, becomes worse in wet weather; and therefore the exhalations that produce ague, will also probably rise far more in wet weather, than in dry. The effect of moisture is sufficiently seen in the increase of illness.

Does Sea-Water prevent Malaria?—It has been thought, by some, that a mixture of salt water with fresh prevents this injurious decomposition. [b] However, this is a mistake; for salt marshes, which are principally situated in the south, will give rise to ague in summer. For instance: around the Dol, in Normandy, where there is a salt marsh, scarcely an inhabitant escapes ague. [c] Very often there is a severe intermittent fever in Holland, after an inundation of the sea; and even when a place is well washed,—as Heron Bay, for instance, and the district around Reculver [d],—aguish fevers frequently prevail. [e] On the other hand, it has been contended, [f] that a certain portion of sea-water *augments* the prevalence of this miasma. This would be not at all to be wondered at; because it is a mere hypothesis that salt water prevents it. Sea-weed, being vegetable matter, has actually been the source of fevers of this description.

Influence of Different Plants and Soils in the Production of Malaria.—It is very probable that certain plants, and certain soils, are more favourable to the production of malaria than others; for sometimes there is malaria in

fever, there is an assertion in which there may (or rather *must*) be a fallacy involved. According to the testimony of African travellers, and of Park in particular, it is produced immediately on the fall of rains;—as if the mere contact of the rain itself was the cause.—"*Malaria; by John Macculloch, M.D.*" *Page* 158.

[a] In his "Essay on the Diseases incidental to Europeans in Hot Climates"; Part 1; Chapter 2; Section 2. (Second Edition; Page 47 and 48.) The following additional particulars are there recorded:—"They (the first rains) stain clothes more than other rain; and, soon after their commencement, the ground, even in places formerly dry and parched, swarms with frogs. At this time, skins quickly generate large worms; and it is remarked that the fowls, which greedily prey on other insects, refuse to feed on these."

[b] It is a common popular conviction, that salt marshes are innocent.—"*Malaria; by John Macculloch, M.D.*"; *Page* 35.

[c] See Page 36 of Dr. Macculloch's "Malaria."

[d] Near Margate.

[e] See Page 39 of Dr. Macculloch's "Malaria."

[f] By many French and Italian writers, alluded to by Dr. Macculloch, at Page 37 of his "Malaria."

spots where we should not suspect it;—where the grass looks fresh and green; and where no signs of decomposition are observed; whereas, in other parts, where there is a degree of decomposition, persons are perfectly safe. A friend of mine, who was travelling in Syria, saw a spot of grass fresh and green, though rather moist; and he intended to pitch his tent there for the night. But he was warned by some of the people of the country; who rode in haste to him; and implored him, as he valued his life and the lives of his retinue, not to pitch his tent there. He could not conceive why; and they told him that whoever remained on that spot at night, was sure to be seized with severe fever. There was nothing in the appearance of the grass, that could lead him to suspect any thing of the kind; but, of course, the lower portions were constantly dying and decomposing. It is, as I have just said, the opinion of many, that certain soils, and certain varieties of vegetable matter, are peculiarly favourable to the production of this malaria. Such would appear to be the fact, and very possibly is so; but whether this is to be attributed to the nature of the soil, or to the existence of certain plants, rather than of others, I do not know. Some believe, that the different kinds of ague arise from a difference in the vegetable matter. It is said, for instance, that tertians particularly prevail in Germany; that in Italy quotidians are most frequently seen; that in Hungary fevers of this description are particularly attended with petechiæ; and the exhalations of the Pontine marshes, are said to produce fevers with short intermissions. Holland is remarkable for producing all sorts of fever; —quotidians, tertians, quartans, and every other variety. In Spain, Africa, and America, these fevers are remarkable for being attended with black vomit, and with yellowness of the skin. In some parts of Italy, these fevers are particularly attended by apoplexy; and in many parts they are particularly followed, or accompanied, by neuralgia. In India and Africa, the *liver* chiefly suffers; at Walcheren the *spleen*. Even parts not distant from each other, are sometimes thus distinguished.[a] It thus appears that there are many peculiarities, according to situation; but whether this is to be explained by a variety in the malaria, I do not know.

Peat-Bog.—There is one description of bog, which does not produce malaria;—namely, peat-bog. But here there is no putrefaction;—decomposition having taken place in a peculiar manner. The vegetable matter becomes carbonized; and there is not sufficient heat for putrefaction to occur. But it is said that peat-moss, when in a certain latitude and on a certain level, can putrefy; and then, I believe, ague does prevail. That peat-bog does not putrefy, is shewn by a fact stated on good authority; namely, that animal matter thrown into it will not putrefy; but it is said that where peat-moss is placed in situations where it is warmer, and upon a proper level for moisture, it will putrefy and produce ague;—just as other kinds of vegetable matter will do.[b]

Animal Matter does not produce Malaria.—Now that it is *vegetable*, and not *animal* matter, which produces ague, is proved by this circumstance;—that no person has this disease from being exposed to the most intense animal exhalations. Thousands of carcases are annually employed in many manufactories; as, for example, in manufactories of sal ammoniac; and yet no person is known to contract an ague from them. Indeed, so far from it, that the most crowded places generally escape intermittent fevers. That part of Rome inhabited by the Jews, and called "the *Judaicum*", is full of

[a] See Dr. Macculloch's "Malaria"; Pages 425 and 426.

[b] Dr. Macculloch has entered into this question respecting peat, in his "Malaria"; Pages 61 to 66.

animal filth; but it escapes ague; while the elegant streets in the neighbourhood, suffer from it very severely.[a]

Influence of Fire and Smoke in preventing Ague.—Fire and smoke (especially tobacco-smoke) appear to keep away ague.[b] Malaria not being the produce of dead *animal* matter, or effluvia arising from living bodies, but of *vegetable* exhalations, the more men and animals are crowded together, the less access is there for the malaria; and it is generally supposed that the addition of smoke, of every description, has a great tendency to prevent it; and therefore those who live in the most smoky, crowded, dirty places, are situated in the most favourable manner with respect to ague. It was once imagined, however, that the smoke of coal was particularly injurious; and therefore it was made a capital offence to burn coal in London; and forges were only allowed in the vicinity. Sir Gilbert Blane mentions that, in the Tower, there is a document relating to a person who was executed in the time of Edward the First, for burning coal in London[c]; though it has since been considered to be a great promoter of health. Perhaps smoke—whether of coal, of wood, or of tobacco—may act by merely taking the place of the exhalations, and preventing them more or less from entering. It may be, however, that they act by their warmth. Napoleon, when with his army in Italy, was in the habit of employing fires, to a great extent, to keep away malaria; and he did it with great success.[d] But here the heat must have been useful, by dissipating moisture and cold. Dr. Lind mentions[e], that when the Edgar ship of war was off the coast of Guinea, in 1765, the crew were very sickly, and many of them died from fevers of this description; but in the crew of a sloop of war which always accompanied her, very few were ill, and none died. In the latter there was a fire for cooking, on the same deck where the men lay, and which filled with smoke the spot where they slept; whereas in the Edgar, from the particular arrangement of the vessel, there was no smoke whatever between the decks. Here were two ships off a country which afforded a vast quantity of malaria. The crew of the one remained healthy; and that of the other became diseased, in the way I have stated; although the only difference between them was, that in the former the part where the men slept was constantly, or almost constantly, filled with smoke.

Ague not Contagious.—It appears quite certain, that intermittent and remittent fevers are not contagious; though formerly ague was considered to be so. Dr. Fordyce, who was almost one of our own day, says (both from his own knowledge, and a reference to the opinion of others) that ague is contagious. Dr. Cleghorn, in his work on the Diseases of Minorca[f], says the same. Dr. Wells, a colleague of Dr. Fordyce at St. Thomas's Hospital, accounts for the opinions of the latter by remarking, that he (Dr. Fordyce) fancied, that *continued* and *intermittent* fevers were mere varieties of the same disease; and as it appeared, in those days, that continued fever was contagious, so he was obliged to maintain that *ague* was contagious. Dr. Cleghorn's mistake is supposed to have arisen from

[a] See Dr. Macculloch's "Malaria"; Page 292.

[b] See Dr. Macculloch's "Malaria"; Page 281.

[c] This is mentioned by Sir Gilbert Blane on the authority of Mr. Astle, Keeper of the Records in the Tower, in the fourth volume of the Medico-Chirurgical Transactions, Page 101.

[d] See Dr. Macculloch's "Malaria"; Page 286.

[e] At Page 150 (Second Edition) of his "Essay on Diseases incidental to Europeans in Hot Climates." (Part 1; Chapter 4; Section 3.)

[f] "Observations on the Epidemical Diseases of Minorca, from the year 1744 to 1749; by George Cleghorn, M.D."

his having observed, that most of those who were about the sick, in Minorca, had the disease;—forgetting that it did not arise in consequence of emanations from the sick, but from the situation in which they were placed. It is no proof whatever that a disease is contagious, that it is caught from going to see a person labouring under it; for he may be in the very spot where he contracted it, from local circumstances; and in going to him, we go to the spot which has given *him* the disease; and which may therefore give it to *us*. In order to prove that a disease is contagious, there should be a sufficient number of instances of persons going from the place where they contracted the disease, to a healthy part; and there giving it to others. There is no reason whatever to suppose that agues are contagious; though, formerly, not only were *they* supposed to be contagious, but even *scurvy* was also pronounced to be communicable to others.[a]

Chemical and Physical Qualities of Malaria.—The chemical nature of malaria, or marsh-miasmata, is unknown. It is not carburetted hydrogen; and no known chemical substance has the same effect. The air of marshes is said not to differ chemically from the air of any other part, with respect to its quantity of oxygen. There is no reason to suppose that it is a deficiency of oxygen, or an excess of carbon, or the presence of carburetted hydrogen, that renders the air pestiferous in this case.[b] It is said by De Lisle, that malaria has no smell. Thus much, however, is known;—these exhalations may be suspended by aqueous vapour. Indeed, it is said that they never rise but with some lighter body;—that they require to become so suspended, in order to rise at all. Being, however, suspended by aqueous vapour, they are even more deleterious than contagions; for, like contagion, a momentary application is sufficient, in many cases, to produce the disease; and, unlike contagion, they may be wafted, and produce their effect at a very great distance; whereas contagion spreads but a very short way, and after a certain distance is destroyed. Malaria, like other gaseous bodies, very easily finds a barrier; so that, in Italy, a gauze veil is said to be efficacious in preventing its effects upon the human body.[c] On this point I can only repeat what I have read.

[Many attempts have been made to arrive at a knowledge of the physical qualities of this agent. Moschati and Broschi examined the atmosphere—the former of some very insalubrious rice-fields, the latter of an unhealthy spot in the papal states; from which examination it appeared, that the vitiated air contained albuminous flocculi, somewhat viscid in appearance, but the nature of which was not understood; and that it possessed a certain weight;—as it did not appear to rise in the atmosphere, unless mingled with it by currents of air. All that is valuable on the constitution of the atmosphere of those places where ague is prevalent,

[a] Dr. Brown ("Cyclopædia of Practical Medicine"), from the result of cases which have fallen under his observation, still entertains a suspicion of its contagious nature; and, in confirmation of this opinion, he adduces the following case, related by Bailly:—"A lady arrived in Paris with an intermittent fever, which she had contracted in the country, in a marshy situation. This fever was accompanied by violent vomitings, and other serious symptoms; which displayed themselves at every paroxysm, and forced me to give bark. Scarcely was she cured, when her husband, *who had never quitted Paris*, but who had had the imprudence not to keep himself apart from her during her illness, was struck with the same symptoms, and in a manner altogether similar."

[b] The accused gases have been carbonic acid, azote, hydro-carburetted gas, hydro-phosphuretted gas, hydro-sulphuretted gas, and even ammonia;—to say nothing of a yet undiscovered compound of azote and oxygen, called "septon."—"*Malaria; by John Macculloch, M.D.*" *Page* 421.

[c] Dr. Macculloch's "Malaria"; Page 299.

may be summed up from the results of the extensive investigations made by M. Julia:—1. The air of these several situations contains the same principles, and in the same proportions, as the purest air of the most healthy situations. 2. Marsh-air contains a principle which eludes the test of the most delicate chemical reagents. 3. Though the nature of the noxious vapour is unknown, there is reason to believe that its pernicious effects depend on a form of vegetable and animal substance in a state of decay, or on a solution of these substances in air, or on the gases resulting from their decomposition. 4. Experiment has not yet demonstrated in marsh-air the existence of azotic gas, carburetted hydrogen, ammoniacal gas, or any of the gaseous products of decomposition; and if they are present in this vapour, their quantity is too small to be appreciated. Whatever its constitution or essence may be, it at any rate appears evident, that in order to its production there must be present a certain quantity of moisture, vegetable or animal matter in a partial state of decomposition, and a degree of temperature which cannot be termed "cold"; for we see that it prevails in districts where such conditions obtain;—in the extended estuaries of rivers; in swamps which pass, under the exhaling influence of the sun, into a comparative state of dryness; on the banks of rivers subject to floodings; and on low, flat sea-shores.[a]]

Period of Incubation.—If these exhalations be very strong, they may kill instantly. Many allow that fever may begin in half an hour after exposure. Occasionally the exhalations have been so intense, that labourers, in France and Italy, in breaking up the ground, have died on the spot. Other persons have been seized with giddiness, and some have even died on looking into a ditch, or a drain, around which aguish fevers prevailed. Persons who have been scarcely exposed to the deleterious exhalations, have been immediately seized with vertigo, vomiting, and syncope; and from that moment have had regular intermittent, or remittent fever. But usually their effect does not occur till a certain period has elapsed. In South Carolina it is said, that eight or ten days is the shortest time which elapses, between exposure and the appearance of the disease. The reason for so long an interval may be, that there is less heat there than in many other parts. Dr. Wells believes, that the autumnal agues of that country do not appear till spring;—that is to say, the agues seen in spring, are the result of exposure in the preceding autumn. He founds his opinion on the fact, that strangers visit South Carolina in the spring, with perfect impunity. Dr. Lind mentions having seen these fevers take place the very morning after exposure. Dr. Bancroft gives an instance of the disease occurring instantly; and then other cases, which did not take place for many (even for nine) months. Dr. Bancroft likewise ascribes the agues of spring to the previous autumn; because he has seen persons seized with ague, after they have returned to England from a warmer climate, where they had been exposed to miasmata; and they have experienced the disease at too early a period in the year, for it to have arisen from malaria at home. Probably, the earliness of the period at which ague occurs, is in proportion to the intensity of the heat, and to the quantity of moist vegetable matter. It is certainly very common, in England, for harvesters who have worked in aguish districts, and have been exposed to the exhalations in autumn, not to be affected till the east wind blows, in the following spring. I have seen very many cases of persons, who have left an aguish part in perfect health, and have remained so for some time,—even for

[a] "Library of Medicine"; Volume I; Page 233.

months; when by chance getting wet through, or being exposed to a cold damp wind, they have been seized with ague. Dr. Macculloch doubts these long intervals[a]; but I have seen them in too many instances, to entertain the least doubt whatever.

Insusceptibility from Long Exposure.—By habit, persons become rather insusceptible of the effects of these exhalations; by habit, they cease to have ague when exposed to malaria; or, if they do have it, it assumes a very mild character. This is very commonly observed, in what are called "the *pernicious* districts" of Italy, France, and Sicily; in which districts those persons, chiefly, are susceptible of its operation, in whom glandular disease has been induced. To show the effects of habit, I may mention, that General Monnet (a French officer) found that, in a malarious situation in Walcheren, there was only one-half the sickness in a regiment during the *second* year, that there had been during the *first*; and that during the *third* year his men remained at the place, there was no sickness whatever. The inhabitants of one marshy district, when they go to another, suffer less than strangers;—less than persons who go to a marshy district, from a place that was perfectly healthy. A physician[b] in my parish[c] used to relate a story, from his own knowledge, of a party going up the Thames; of which party only one lady caught an ague. She had always lived in Edinburgh;—a high, dry, healthy spot; while all the rest of the party were inhabitants of a malarious place.

Yet many persons, who have not been previously exposed to malaria, escape it as well as the Dutch, who have been accustomed to it. The Dutch, who live in the midst of it, will not allow it to be unhealthy;—exactly as a person of filthy habits, believes himself to be as clean as is necessary. Persons, although well-informed on these matters, will frequently, when they come to an unhealthy place, be obstinate, and act the part of mules; and many such have suffered for it. We find it stated in Captain Clapperton's "Travels"[d], that the Captain himself, Mr. Pearce, Dr. Morrison, and Mr. Houlton (a surgeon), while on an expedition in Africa, lay all night on the banks of a creek, when there was no occasion for it; and the next night they lay in a market-place, though there were houses enough for them to have entered. The following day, Captain Clapperton was seized with fever; Dr. Morrison was seized in two days more; Captain Pearce the next day. Lander, their servant, was seized next; Mr. Pearce and Dr. Morrison died soon; and Mr. Houlton and Captain Clapperton died ultimately. They were all warned of the dangers of thus exposing themselves. Every day affords instances of this awful obstinacy;—this total disregard of human life. Because the Dutch are obliged to have dykes and ditches in their own country, they have surrounded themselves with them, where there is not the least occasion, in the East Indies[e];—merely, I suppose, to be like their brother frogs at home.

But it is said, that one unhealthy place does not, by any means, *always*

[a] I know not if physicians have fairly observed, that it may be later than twenty-four hours from the exposure to the cause. —"*Essay on Remittent and Intermittent Diseases; by John Macculloch, M.D.*" *Volume* 1; *Page* 237.

[b] Dr. James, father of G. P. R. James, Esq., the Novelist.

[c] Hanover Square, London.

[d] "Journal of a Second Expedition into the Interior of Africa; from the Bight of Benin, to Soccatoo. By the latter Commander Clapperton, R.N. To which is added the Journal of Richard Lander."

[e] See Lind's "Essay on Diseases incidental to Europeans in Hot Climates"; Part 1; Chapter 3; Section 3. (Second Edition; Page 96.)

give indemnity to an individual who goes to another; and that a place to season an individual perfectly for another, must be situated between the tropics, and not have a cold winter. It is found, for example, that Gibraltar will not season a person for the West Indies; but then Gibraltar is not situated between the tropics. Such a seasoning as would render a person altogether insusceptible of the disease, can only be obtained between the tropics; where we can conceive malaria to be produced in the most intense degree. It is also to be remembered, that when a person has once had ague, he is very liable to a return of it from a slight cause;—such as from the blowing of a cold, wet, east wind; or from getting wet through; or from being, in any way, thrown out of health. He is rendered liable to have the disease renewed from slight causes; but altogether he is much less sensible to the influence of malaria.

Evil Effects of Malaria on the General Health.—Whether persons, however, have had ague or not, if they be constantly exposed to malaria, the constitution is impaired. They acquire a dull heavy look, and are bloated; or they are emaciated, shrivelled, pale, sallow, and weak. Sir Gilbert Blane says, that the people residing at Walcheren were far less subject to aguish affections, than strangers; but that they all looked sickly. Yet these Dutchmen would not allow that their climate could be unhealthy; and when they saw one-half of the English sick, through their noxious climate, they would not allow that it arose from the filthy ditches; but ascribed it to errors of diet, and the bad habits of the English. The liver and spleen are much disposed to become diseased; and dropsy to supervene. In the worst valleys of Switzerland, poor persons are shrivelled; young persons look old; and middle-aged persons appear in the greatest state of decrepitude. In these valleys, there is always a great quantity of malaria pent up. Indeed, so great is the injury produced by malaria, that whereas the average of human life in England is fifty years, in Holland it is only twenty-five. In some parts of France, which are very pestiferous through the malaria, the greatest average age is twenty-two; while in some it is only twenty and eighteen[a]; and in others it is only ten. In some parts of Africa, and the East and West Indies, the average is as low as this.

[The following passage from Dr. Macculloch's book on Malaria, depicts in fearful colours the effects of malaria on the physical, moral, and intellectual qualities of the body:—

"There is nothing in these pernicious countries more striking to a cursory traveller, than the appearance of age which occurs at a very early period of life. Even the children are frequently wrinkled; and, in France, in perhaps all the worst districts, a young woman, almost even before twenty, has the aspect of fifty; while, in men, the age of forty is equivalent to sixty in healthier countries,—both in appearance and vigour;—the very few who live to fifty, appearing to have arrived at the protracted term of fourscore. Of personal beauty in females, there appears to be little trace at any time; but whatever may have existed is rarely prolonged beyond seventeen. And the expression of countenance keeps pace with all else;—being that of unhappiness, stupidity, and apathy: an habitual melancholy which nothing can rouse, and an insensibility to almost every thing which operates on the feelings of mankind in general. A slow and languid speech, a similar languor in the walk and in all the actions, in-

[a] See Dr. Macculloch's "Malaria"; Page 6.

dicate equally the condition of the mind and of the body, in these wretched countries.

" The condition of the mental faculties, whether intellectual or moral, is scarcely less remarkable, while it is more interesting; and if there should appear any exaggeration as to some particulars, or should any special fact, as asserted, depend on collateral causes of another nature, the general bearing of the whole, as related of Italy and France, has been confirmed too often by remarks of a similar nature, made in America and elsewhere by very competent observers, to leave any doubt as to the leading circumstances.

" That apathy which was just noticed as expressed in the physiognomy, is a character which influences the whole conduct of these degraded and unfortunate beings;—often proceeding to such a degree, that they are scarcely elevated above the beasts, in point of feeling. Seeking solitude, shunning society and amusements alike, without affections, without interest in any thing, they make no exertions to better their condition;—not even to avoid the sources of danger which surround them, or to take the most common precautions that are pointed out; while, attached to the soil (from habit or indolence rather than from regard), they will not be convinced of its nature or dangers;—fatalists in practice, and even in belief; and refusing to admit that there is any other lot in life than that which is their own.

" That the general intellectual faculties are degraded, is a universal remark; while, in many places, and very notedly in the Maremma of Tuscany, it is observed that absolute idiotism is common. This circumstance might naturally be expected, from physiological considerations connected with the general influence which malaria exerts on the body. And that this condition is even propagated, seems fully proved;—so that a universal degeneracy of both mind and body, appears to be the certain lot of those races, which a combination of unfortunate circumstances has placed in countries, that seem to have been intended rather for the habitations of reptiles and insects, than for those of man." [a]]

Affects the Lower Animals.—It is said that, in very unhealthy places, even brutes are known to suffer.[b] Dr. Macculloch says he heard that a dog, at Guernsey, had a tertian ague[c]; but whether this is correct, I will not pretend to say. He adds[d] that epizootic[e] diseases frequently prevail at the same time with marsh-fevers; and that, in St. Domingo, the dogs are always the first affected.[f]

Malaria is the constant scourge of the earth;—not the *occasional*, but the *constant* scourge. It produces not only fevers, but (very frequently) dysentery[g], cholera[g], and sometimes neuralgia[h]; and it causes an intermittent or remittent character to be given to other diseases. Even when it causes

[a] " Malaria; by John Macculloch, M. D." Pages 432 to 435.

[b] See Dr. Macculloch's " Malaria "; Page 454.

[c] The animal was submitted, for examination, to the surgeons of Guernsey; and, as the disease continued for some years,—the cold paroxysm always taking place at three o'clock,—there was ample opportunity of verification.—" *Malaria; by John Macculloch, M. D.*" *Pages* 460 *and* 461.

[d] At Page 455 of his " Malaria ";—quoting the opinion from Lancisi, Bailly, and others.

[e] From επι, *upon*; and ζωον, *an animal.*

[f] See Page 460 of his " Malaria."

[g] See Dr. Macculloch's " Marsh-Fever and Neuralgia "; Volume 1; Chapter 5; Pages 216 to 234.

[h] The whole of the Second Volume of Dr. Macculloch's " Marsh-Fever and Neuralgia ", is devoted to a consideration of Neuralgia in general, and its different varieties.

no positive disease, it undermines the health. Malaria abounds to a frightful extent in Greece, Italy, France, America, Asia, and Africa.[a] We know nothing of it here, compared with the violence of its ravages in those parts.

Extent of its Ravages in England.—It was once far more injurious in this country than it is now; but, from the energy and industry of the English character, such extraordinary improvements have been made in every thing to promote the well-being of man, that nothing abroad can be compared with our advantages. Southwark was once an entire swamp; and at Westminster there is a toll-gate, called the "Marsh-Gate";—from being situated in a place where formerly (and not very long ago) there was a marsh. From the improvements that have been made, however, ague is now comparatively rare in London. It prevailed to a great extent before the fire of London, in 1666; but from that time the place was better drained;—so that the fire did good. Before the fire, ague raged like a plague. Between 1667 and 1692, no less than two thousand persons died in London of dysentery[b];—arising, no doubt, from the same cause as ague. So great, however, has been the reduction, that in 1728 there were only forty-four deaths from ague; in 1730, only sixteen; and in the bills of mortality for the first ten years of the present century, there are recorded only four deaths from ague. Within the last five or six years, agues have increased through the country, and in London; and this may be easily explained. They have not increased to what they were formerly; but still there has been an increase. Sydenham says that they disappeared in London from 1674 to 1678; and they disappeared in Plymouth (Huxham says[c]) from 1755 to 1760. They were absent from Portsmouth for three or four years. They returned again in London epidemically in 1751, 1753, and 1754. Sydenham says that they returned again from 1677 to 1688; and they also prevailed at the beginning of the last century. These are all accidental occurrences. It has been said by Dr. M'Michael, of the Middlesex Hospital, that during the few years that ague prevailed so much, the average heat was greater than when it disappeared. The heat being greater, of course there was more vegetable decomposition. To show the increase of late, I may mention that in 1823 I had but eight cases of ague; in 1824, I had fourteen cases; in 1825, fifteen cases; in 1826, forty-four cases; in 1827, fifty-three cases. The number then declined; so that in 1828 I had but twenty-seven cases; and in 1829 I had only eight. If we had accurate accounts, we should perhaps find that when ague increased in former times, the average heat was higher than usual;—just as it has been observed to be by Dr. M'Michael, during the last few years that ague has become prevalent again.

It gives to Other Diseases an Intermittent Type.—Persons who have once had ague, or who have it upon them, are much disposed to exhibit a more or less aguish form of any other disease under which they may labour;—that is to say, when a person is the subject of ague, it is very common for diseases to become more or less intermittent; and this is especially noticed in aguish countries. Rheumatism, ophthalmia, vomiting, and purging, may all be intermittent, and even periodical. However, it is quite certain that, independently of malaria, many diseases will become intermittent. Insanity is sometimes intermittent. I have seen a person mad once a-year, or once

[a] See Page 36 of Dr. Macculloch's "Malaria."

[b] See Dr. Macculloch's "Malaria"; Page 128.

[c] "Observationes de Aére et Morbis Epidemicis Plymuthi factæ." ("Observations, made at Plymouth, on Air and Epidemic Diseases.")

in three years. Palsy is likewise occasionally intermittent; and in one case I saw it periodical. It came at a particular hour in the day; but the patient had had ague, many years before. Dr. Macculloch, however, ascribes a vast number of diseases to malaria[a]; but I think there cannot be a doubt in any one's mind but his own, that he has carried his ideas to an extravagant pitch. He has done great good by attracting the attention of persons to malaria, more than it was before; and his writings are very powerful and learned; but I think no one can read his publications without perceiving, that he had one idea constantly before him.[b] That idea was *malaria*; and he ascribes infinitely more to it than reason can justify. But although I am satisfied of the extravagant length to which he pursues his ideas, yet I am equally satisfied that too often we do not ascribe diseases to malaria, when they really arise from that source. We frequently meet with sporadic cases even of ague, which cannot be easily traced to malaria; but I have no doubt that, if we could ascertain all the circumstances, we should find that the individual has a striking tendency to it; and has been exposed to malaria by passing through a market, or some other place, in which there was vegetable matter in a state of decay. It is also to be remembered, that though the influence of malaria is so great, yet cold and wet, and other causes of debility, will induce ague, without the reapplication of malaria, when a person has once had it. Sometimes, too, when malaria has been applied, the disease does not occur till such circumstances as these have taken place. I mentioned[c], in my introductory remarks, that the *predisposing* will sometimes become the *exciting* cause. The exciting cause of ague is (unquestionably) malaria; but sometimes it will only act as a *predisposing* cause; for it will lie dormant in the system till the person gets wet through;—in which case the latter is really the exciting cause. From all the circumstances, I am convinced that many cases are aguish, where there is no suspicion of their true nature.

c. Proximate Cause.

The proximate cause of ague—the real essence of that state which is always present when the symptoms occur—is unknown. We can say, with certainty, that it is a peculiar state; for a person, in the intermission of ague, is perfectly well. There is frequently no disease to be found, whether inflammatory or otherwise, of any particular organ. Again: ague frequently cannot be removed by antiphlogistic measures; though occa-

[a] These diseases are ague, dysentery, cholera, headach, vertigo, tic-douloureux, rheumatism of the face, neuralgic ophthalmia, neuralgic affections of all parts of the body, dyspepsia, and derangements of the liver and spleen. See Dr. Macculloch's Volumes on "Marsh-Fever and Neuralgia"; and Chapter 10 of his "Malaria" (Pages 419 to 427). At the end of the former work, there is a systematically arranged table of the various diseases said to be produced by the poison in question.

[b] If the sword has slain its thousands, malaria has slain its tens of thousands. It is disease, not the field of action, which digs the grave of armies; it is malaria by which the burning spirit, fitted for better things, is quenched, and in the coward's bed of death. This is the destroying angel,—the real pestilence which walks at noonday; and to which all the other causes of mortality are but as feeble auxiliaries in the work of destruction. This is malaria;—the neglected subject to which I am desirous of calling attention; in order that, by this attention, its powers may be diminished: malaria, from which even ourselves, here in England, are not free; though, from ignorance, unaware of it; or, from unwillingness to receive conviction, shutting our eyes to the truth.—"*Malaria; by John Macculloch, M.D.*" *Pages* 8 *and* 9.

[c] See Page 34.

sionally it certainly may; as well as by any thing, in fact, which makes an impression on the system. Again: inflammatory diseases are not cured by sulphate of quinine, and remedies of that description. The disease *may* be inflammatory, and often *is* so; and requires antiphlogistic measures; but its *essence* is not inflammatory;—at least I know no proof of it. It may be inflammatory; but there must be something more than inflammation.

Curative Influence of certain Remedies.—It is impossible to say how it is cured by the measures which are specifics in the disease;—as, for instance, bark. It cannot be by curing inflammation; neither can it be by irritating the stomach. Some have affirmed that bark only acts by irritating the stomach; but if that were the case, brandy and cayenne-pepper would do just as well; and so would corrosive sublimate. Nor can I conceive that specifics operate by strengthening the patient. We might give a person full diet, and take care that he has regular exercise, and improve his strength in every way we can; yet we should not cure his ague; whereas a few grains of quinine[a],—a quantity too small to strengthen the body directly,—continually puts a stop to it. I cannot pretend to say how it is that remedies act in curing the disease; but of this I am satisfied, that it is not what people pretend it to be. The remedies do not cure it, as people allege, by strengthening, or by stimulating, or by any similar operation. We can only say there is a peculiar state; and that remedies cure it by a peculiar operation. This is, I acknowledge, saying nothing; but, at any rate, it is not advancing unfounded hypotheses; and fancying ourselves wise, when we are really ignorant. Arsenic, which cures ague very well, is not a tonic. It will debilitate the body, cause it to tremble, and depress the powers of the system; and yet a small quantity will stop the disease. Why a remedy of this sort is called a tonic, I do not know.

State of the Blood.—[In those fevers which arise from marsh-miasmata or contagion, it is an opinion held by Dr. Stevens, and supported at great length in his work on the blood, that a diseased condition of that fluid is the first in the train of symptoms which occur, and the immediate cause of those which follow. "The blood itself", says Dr. Stevens, "is both black and diseased, even before the attack. During the cold stage, it is very dark. When first drawn, it has a peculiar smell; and it coagulates, almost invariably, without any crust. There are black spots on the surface of the crassamentum; the coagulum is so soft, it can easily be separated by the fingers; and, during its formation, a large quantity of the black colouring matter falls to the bottom of the cup. In the hot stage, it becomes more red; and, in some cases, it is even florid for a time; but, during the remission, it is darker in colour than healthy blood, and decidedly diseased in all its properties. In milder cases, the blood which is drawn may coagulate without a crust on the surface; but in the more severe forms of this affection, when the blood was drawn at an advanced period of the disease, a part of the albumen coagulated on the surface of the fibrin, and formed a diseased mass, which in appearance had a greater resemblance to oatmeal-gruel, than to healthy blood. The serum which separated was also diseased; it had a brownish colour, and in some cases an oily appearance; which is never met with in the clear serum of healthy blood."[b]]

Cause of Intermittence.—[Intermittence, so far as we yet know, is an unexplained pathological fact. Among the various hypotheses that have been offered on the subject, the most ingenious and inductive in its nature,

[a] From "quinquina", the name given by the French to Peruvian Bark.

[b] "Cyclopædia of Anatomy and Physiology"; Volume 1; Page 424.

is that which has been proposed by M. Bailly. He first observes that, in situations and seasons in which intermittents affect the human species epidemically, epizootics reign among the lower animals; but, however their symptoms may vary in other respects, in one point they all agree,—that of being strictly continued;—intermittence being never observed in the diseases of brutes. He then points to the mode in which the various actions of life are performed in man and the lower animals. During the whole of their existence, the lower animals preserve, in all the operations of life, the same horizontal position; and, consequently, the heart, abdominal viscera, and brain, retain the same relative position to each other; but man, on the contrary, changes from the vertical to the horizontal position, and consequently each *nycthemeron*[a] (period of one day and night) presents a succession of sanguineous congestions, which are felt according as he is in the erect or horizontal posture, and according as the viscera change their relative position. These varying congestions constitute the physiological condition of most healthy persons; but, argues M. Bailly, every pathological or morbid state is only the exaggeration of a physiological or natural one. The sanguineous congestion of the digestive organs, displays itself in a degree which may be considered morbid in females or other delicate persons; who are either sick on first assuming the erect posture in the morning, or feel a total inaptitude for any occupation till they have taken food; and is well illustrated by that febricula, first described by Roederer and Wagler, which may be said to constitute the habitual state of many literary and other sedentary men. M. Bailly attributes this disorder to gastro-enteritic irritation, produced by the erect position acting on a delicate and sensitive frame; and considers that the horizontal posture diminishes it;—so that if the patient remain so long in this posture as to bring this irritation to the lowest point, the functions of the skin are then restored, and the indisposition is removed temporarily by a crisis. MM. Roederer and Wagler have observed, that nothing tends so much to the production of intermittent fever in this delicate class of persons, as the suppression of these morning perspirations. What has been described above, which is in some degree pathological, is but an excess of what exists in all individuals, and intermittent fever is but a further grade of such an excess; or, as Bailly expresses it, is the exaggeration of that assemblage of organic acts, which completes a nycthemeron; and which takes place in the following manner:—1. Morning congestion of the stomach and intestines. 2. Augmentation of the different nervous influences which it produces throughout the system; and which, according to the particular disposition of the individual, gives rise to one set of nervous symptoms rather than another; or which excites that part of the nervous system which penetrates all our organs, accompanied by blood-vessels, when intermittent fever takes place. 3. Cessation of this congestion by the horizontal posture.

The chief objections to this very ingenious hypothesis are:—1. It is based on the assumption that the cause of ague exists in the alimentary canal; which, in the present state of our knowledge, is doubtful. 2. While it provides an explanation for the occurrence of quotidian ague, tertians and quartans are still unexplained; which are considerable lacunæ in the hypothesis.[b]]

[a] From νυξ, νυκτος, *night*; and ἡμερα, *day*.

[b] "Cyclopædia of Practical Medicine"; Volume 2; Pages 232 and 233.

SECTION IV.—DIAGNOSIS AND PROGNOSIS.

The affections from which it is necessary to distinguish intermittent fever, are hectic, remittent fever, suppuration, stricture, and retention of urine.

Hectic.—In the diagnosis, we sometimes have a little difficulty in distinguishing ague from hectic. Hectic is a disease which continues for a length of time; and so may ague. It is called "hectic", from being placed in the habit (ἕξις);—being a *continued* disease; that is to say, lasting for a length of time. It also resembles ague in another respect;—it is more or less intermittent. In hectic, however, the rigors are irregular. All the stages, too, are irregular;—one comes before the other, without any sort of order. After a time, in hectic, there are no rigors;—nothing but sweating, constant feverishness, and a quick pulse; and this feverishness is excited by taking food, and by the slightest quantity of nourishment. There is generally profuse sweating on dropping asleep;—the moment the patient drops asleep, some part of the body is in a sweat. In ague, when the sweating is over, the person is comparatively well; but in hectic, so far from being better, the patient feels weaker. In hectic, there is a red patch on the face, the palms of the hands, and the soles of the feet; the tongue is moist, and generally red. In the urine there is not the lateritious, red, brick-dust sediment of fever; but a pink deposit. In hectic, there is not the exposure to the cause of ague; and there is not the aguish face;—that peculiar cast of countenance, which is so often seen in ague. In hectic, there is frequently a local disease;—suppuration in some part of the body; and there is an exacerbation at night, and frequently at noon. No one of these symptoms alone, will enable us to distinguish the disease; because ague is sometimes irregular,—recurs at no certain time; and is, perhaps, even almost *remittent*; so that we may have to make the distinction between *intermittent* and *remittent* fever. In ague, we may sometimes have profuse sweating, and little else. It is therefore necessary, in making a diagnosis, to take all these circumstances into consideration; and, by so doing, we shall (in ninety-nine cases out of a hundred) be correct.

Ague and Hectic together.—Now and then, however, there may be a little difficulty. Sometimes ague and hectic occur together. I have seen hectic in a person labouring under phthisis;—where there were rigors, increased heat, and sweating, from ague; and increased heat and sweating from the suppuration; so that really the case was one of difficulty. There was at the same time the aguish face; so that it would have been difficult to make the distinction between the diseases, had I not known there was suppuration in the lungs. The aguish face, and the circumstance of having been exposed to the cause of ague, shewed that probably ague was present; but the suppuration also shewed that hectic fever was present. If we take pains with our cases, we can rarely be deceived. Now and then there will be a difficulty; but that will occur in instances where the hectic fever is attended by great rigors; or where, on the other hand, ague is assuming a *remittent*, rather than an *intermittent* character; and the patient has a local affection.

Nervous Debility.—We must also remember that rigors will occur without ague or hectic. Many persons, from mere nervous debility, will experience rigors;—they will not be able to do their business, and their teeth will chatter, merely from depression of mind.

Stricture.—Again: persons with a stricture are subject to rigors. Some persons always have rigors when a bougie is passed; and without that,

simply from a stricture in the urethra, many will experience the same. If we find the rigors come on suddenly, and there is a stricture in the urethra, we ought to doubt whether there is ague. When rigors occur from stricture, or some other disease of the urethra, there is generally no heat or sweating. Neither is there the aguish countenance; nor can we ascertain that the individual has been exposed to malaria. If, however, there should still be a doubt, after all our inquiries, it is best in all cases to give the remedies for ague. If they be properly managed, they can do no harm;—at any rate the sulphate of quinine can do none.

The diagnosis of *intermittent* from *remittent* fever, is an easy matter. It is a mere circumstance of degree. If there be a *perfect* intermission, we call it "ague"; if it be *imperfect*, we call it "remittent fever."

Suppuration.—[The danger of an error in diagnosis is still greater, when deep-seated and undetected suppuration has taken place. The paroxysms of fever are such as, for a time, to impose on the most experienced. In cases of intermittent fever, therefore, it is well to examine for visceral disease, especially in districts little liable to ague; and to bear in mind that, even in the midst of endemic ague, we may have cases resembling intermittent fever, though, in fact, of a totally different nature.[a]]

Prognosis.—The prognosis in ague, in this country, is almost always favourable. We may almost always promise a speedy cure. If there be conjoined with the ague a local structural disease, of course that part of the prognosis must stand on its own foundation; but the ague itself we may generally cure. If its type be quartan, we cannot promise so speedy a cure, as if it be tertian or quotidian; and I believe we are placed under the same restrictions, if the disease be autumnal and not vernal. An autumnal ague does not yield so readily as a vernal ague; and, indeed, the latter usually yields so easily, that it often ceases spontaneously, after a few paroxysms;—some think after seven. It generally ceases when the warm weather comes in; and will frequently do so on a person changing his residence. It is the ague of *spring*, and not of *autumn*, that is "fit for a king."[b] There is a contrary proverb for *autumnal* ague:—

> "Febris autumnalis
> Est longa aut lethalis."[c]

In hot climates, and even in England, many *intermittent* fevers become *remittent*; and from being remittent they will become *continued*, unless vigorous measures are adopted; and may prove rapidly fatal, by congestion of the head, thorax, or abdomen. It is in hot countries, and in hot weather in this country, that we have to give a guarded prognosis. In hot countries it is common for patients to die early in the attack;—in consequence of the enormous congestion which occurs in the head, chest, or abdomen. Now and then this may be the case here, from some peculiarity in an epidemic. We have always to consider, therefore, in giving a prognosis, whether there is any peculiar form of ague present; and if that be the case, and if it be a form that is sometimes fatal, our prognosis must be more or less guarded; although, without that, we should give the usual prognosis. We have no idea, in this country, of what aguish fever, remittent or intermittent, is in hot climates. In Italy, they are called "*pernicious* fevers"; for as soon as a person is seized, he may fall into a comatose state, from which he never recovers; and, on inspection after death, the greatest degree of congestion

[a] "Principles of the Theory and Practice of Medicine; by Marshall Hall, M.D." Page 134.

[b] See Page 274.

[c] "An autumnal fever is either long continued or fatal."

is found in the lungs and head, and also in the abdominal viscera. In this country, however, we may almost always promise, not only a *cure*, but a *speedy* cure; and that by means not at all severe;—"tuto, cito, et jucunde."[a]

SECTION V.—TREATMENT.

The means which we employ for the purpose of curing intermittent fever, may be divided into those which are had recourse to in the *intermission* of the disease, and those which are employed during the *paroxysm*. With regard to the latter, the greater number of them are adopted rather with a view to the temporary *alleviation*, than to the *cure* of the affection; and I need not say that they must be very different, according to the stage in which they are employed.

a. During the Paroxysm.

Cold Stage. Warmth.—In the *cold* stage, common sense would point out that there should be plenty of covering, and warm drinks; and some have recourse to the warm-bath. It would, however, I conceive, be better to employ dry heat; for warm air may be easily and instantly conveyed to a patient when in bed, by having something under the clothes to raise them, and a tube continued from above a spirit-lamp. Thus we surround the patient with hot air, in any quantity we please, and of any temperature. Something like an inverted funnel is placed near the bed, with a spirit lamp under it; a tube goes from the extremity of this funnel-shaped body, and is conveyed under the bed-clothes; so that the air is dispersed throughout the bed. The degree of heat may be regulated, by altering the proximity of the lamp to the funnel. This will be found to be by far the best mode of applying heat externally[b]; and on this account, particularly;—that when we employ vapour, the patient, for the most part, must be in a sitting posture; or at any rate must be taken out of bed, and more or less exposed after the bath. But, in extreme exhaustion, it is a material thing to avoid all this, and to keep the person horizontal; and by using the contrivance I have mentioned, we need not take him out of bed, or remove him from the horizontal posture. Heat may thus be employed, to an extent sufficient thoroughly to warm the surface; and friction, especially to the extremities, may be had recourse to at the same time;—just as grooms rub shivering horses on the legs, and even on the ears. If it be right to apply heat, during the intensity of the cold stage of intermittent fever, I imagine that this contrivance will be found much better, than a bath either of hot water or of vapour.

Warm Drinks.—Warm liquids, of course, appear to be indicated; but we should guard against administering real stimulants. It is very well to apply caloric by means of hot liquids; but by giving stimuli (such as brandy and wine) we incur the risk of doing more than was intended;—of increasing the subsequent hot stage; of inducing delirium; and causing congestion and inflammation of the head, and internal organs. I should there-

[a] Asclepiades officium esse medici dicit, ut tuto, ut celeriter, ut jucunde curet. —*Celsus; Liber* 3; *Caput* 4. ("Asclepiades lays it down, as the duty of a physician, that he should effect a cure safely, speedily, and pleasantly.")

[b] In the Cholera-Hospital at Edinburgh, every bed was furnished with a hollow "tin mattress" (as it was called); which could, at any time, be filled with steam, by means of a pipe which communicated with a boiler.

fore give hot diluents, or at the utmost hot *spiced* diluents; rather than alcohol, or things which are in themselves *real* and *permanent* stimulants.

Bleeding in the Cold Stage.—A remedy has lately been recommended, which one could not *à priori* imagine to be proper; but in favour of which there is very strong testimony. I allude to the abstraction of blood. The best information upon this subject, is to be found in Dr. Mackintosh's "Practice of Physic."[a] I believe he is the gentleman who first advised, and put in practice, this mode of treatment. In the cold stage of fever, the circulation is greatly deranged. The internal parts are in a state of congestion; the head, lungs, heart, and all the organs the veins of which go to form the "vena portæ", as well as that vein itself, and its divisions, are in a state of extreme turgescence; and, by removing a certain quantity of blood, we unquestionably diminish this load. We give ease to nature; and it is found that the loss even of a small quantity of blood, relieves more or less the general uneasiness of the patient. I mentioned[b] that, in hot countries,—where they have what are called "*pernicious* fevers",—it is very common for those fevers to be attended by such a degree of congestion, as we rarely see in this country;—congestion which speedily proves fatal; and it must therefore be a very great point, in hot countries, to bleed as early as possible. Dr. Mackintosh mentions, that the cold stage is shortened by this practice; that the hot stage is either prevented, or diminished in violence and duration; and that many cases are entirely cured. A report on this subject by Dr. Stokes, will be found in the "Edinburgh Medical and Surgical Journal", for January, 1829.[c] It is not altogether favourable. He says that venesection is more or less useless, and more or less injurious, in different respects. He says it is beneficial in removing the local symptoms,—in removing the symptoms of congestion about the chest and abdomen;—which is just what we should imagine. But (he says) he was always compelled to exhibit quinine sooner or later; and he adds,—as a reason for limiting venesection to those cases where there is coma or inflammation,—that a friend has informed him of some patients, so treated, who never recovered. There can be no doubt, I think, that the practice is not so injurious as one would (perhaps) imagine beforehand; but that, on the contrary, it frequently does a great deal of good; for it removes the local symptoms, frequently shortens the complaint, and sometimes cures it. As far as I can understand, it is, for the most part, rather a means of *alleviation*, than of *cure*; but I have no doubt that, in many cases abroad, where the congestion is extreme, it is imperiously necessary. I have never myself had recourse to it; and therefore cannot speak of it, except as a matter of opinion. I put the testimony of others together, and infer for myself; but I have no facts to give. I have never seen a case of ague, which I thought required such treatment. I never saw a case which I could not cure by the sulphate of quinine; and knowing this, and not seeing any violent local symptoms during the cold stage, to make such treatment necessary, of course I have never employed it.

Speaking of venesection in general, and not of the cold stage in particular, Dr. Lind says that he, and two others, had each three patients with ague. Each bled his three patients; and each lost one.[d] This, however,

[a] "Principles of Pathology and Practice of Physic. By John Mackintosh, M.D." Fourth Edition. See also two papers published by him, in Volumes 27, Page 260, and 28, Page 276, of the "Edinburgh Medical and Surgical Journal."

[b] See Page 305.

[c] Volume 31; Page 1.

[d] "Essay on Diseases incidental to Europeans in Hot Climates; with an Appendix concerning Intermittent Fevers."

is saying very little, unless we knew the particulars of the cases. Dr. Mackintosh says that it is always safe, often shortens, and sometimes cures; but, finding that I can always remedy the affection by the sulphate of quinine, in some quantity or other, I have not thought it right to take away blood, and thus impair the powers of the patient. There can be no doubt, however, that it is a remedy to which it is our duty to have recourse, if we find great symptoms of congestion; and if we fear that the next attack will prove fatal.

Opium in the Cold Stage.—Opium is found both to shorten and to alleviate the cold stage. I have given it with very great success. The best authors tell us, that a full dose of opium certainly shortens this stage, and always alleviates it; but still, if I found great congestion of the head, or of other parts, I would certainly order bleeding, in preference to opium. A tourniquet[a] has sometimes been applied to an extremity, for the purpose of producing early excitement. One would conceive that, by this means, internal congestion must be increased. If we compress the femoral[b] or brachial[c] artery, there must be a larger quantity of blood thrown upon other parts; and if such a remedy does good, it must be by producing such a load, as will stir up nature to attempt its removal;—so that the body will be hurried out of the cold stage, more quickly than it would otherwise have been.

Hot Stage. — When the *hot* stage comes, we have to give cool drinks; to take off some of the clothes; and to employ, if it be necessary and advisable, the tepid-bath; or warm affusion, or warm ablution. There would, I should think, be no harm in *cold* affusion, or *cold* ablution; neither should I hesitate to bleed in the hot stage, if there were any congestion, or any inflammation. A cure has now and then been effected in the hot stage, by a person jumping into a pond (which is a cold-bath); but I believe this is rather a dangerous practice. Opium, in this stage, has likewise been found of use. Dr. Lind says that he found opium useful in the hot stage; both in shortening its duration, and mitigating its violence. It would appear, then, that venesection is admissible in the *cold* stage, as well as in the *hot*; and that opium does good in both stages.

Sweating Stage.—When the *sweating* stage has arrived, all is going on well, and the paroxysm is nearly at an end; and then (if the patient chooses) we give him warm diluents; and put on more clothes than in the hot stage, because he is gradually cooling. We must not allow a draught to blow upon him; but we may attempt to lessen the duration of the sweating stage (which will sometimes run on for many hours) by diminishing the quantity of clothes, and cooling him gradually. We must be very cautious, however. In the *hot* stage there is no danger, I presume, from tepid ablution; but in the *sweating* stage we must be more on our guard. In this stage narcotics, and every thing that debilitates, would be wrong. Nature is now exhausted, and wants repose; and to lower her still more, must be not only injurious but unnecessary; because health is about to be restored, and things are now nearly at a conclusion. If the patient be exceedingly faint, stimulants may be given; but before we exhibit them, we must take care to observe whether local congestion, or inflammation, may not be present.

[a] From the French "tourner", *to turn.*
[b] From "femur, femoris", *the thigh.*
[c] From βραχιων, *the arm.*

b. During the Intermission.

The great means, however, for curing the disease, (unless venesection be considered a very important means,) are certainly to be employed in the *intermission*. By the term "*intermission*", we mean the period between the paroxysms; while by "*interval*", we mean the period of the paroxysm and the period of intermission together. The two chief remedies, in the cure of this disease, are bark and arsenic.

History of Bark as a Remedy for Ague.—Nothing is more instructive, in pointing out the impropriety of hastily deciding against a medicine, than the history of bark. Peruvian bark was first brought from South America in the year 1632; but the mode in which its efficacy was discovered, has not been well ascertained. So highly, however, was it thought of at first, that in the year 1658, sixty florins[a] were given for twenty doses. It was then made a nostrum of, as all good medicines are; till at length many regular practitioners wrote against it; and such was the prejudice excited, that, about thirty years afterwards, several hundred pounds' weight of it lay at Piura, unable to find a purchaser. An alderman died, while using it to cure his ague; and it was therefore immediately asserted, that he was killed by it. Oliver Cromwell, who (as I before stated[b]) had an ague, was not allowed to take bark; and consequently died of the affection. The prejudice against it continued to extend, and great violence was manifested. Sydenham, however, though at first opposed to it, gave it boldly; and warmly advocated its employment. Violent medical altercations took place;—far greater than any which now occur; and those who employed it were called "murderers", and were stigmatized as being unfit to practise. Sydenham gave it in larger doses than his contemporaries; and exhibited it, not during the paroxysm, but in the intermission. Now there can be no doubt that it may do harm during the paroxysm; for it may overload the stomach, and increase congestion, if given in large quantities. Sydenham, therefore, introduced a great improvement, by giving it in the intermission; and he improved its efficacy by giving it in large doses. The efficacy of many medicines is not properly ascertained, in consequence of their not being given in sufficiently large doses. Many persons will exhibit a medicine; and, if it does not appear to answer, relinquish it immediately;—without determining whether it will really do good or not. Sydenham—by giving larger doses than his contemporaries, by exhibiting it between the paroxysms, and by gradually increasing the dose—found that it deserved all the praise which had been bestowed upon it.

Dose of Bark.—When it does not cure the disease as rapidly as we could wish, it should be given in the largest dose that the patient will bear. A drachm or two drachms every two hours, is frequently necessary to cure the affection. Dr. Gregory[c] used to tell us he was informed by a practitioner, that a friend of his, in the delirium of ague, took from three to four ounces of bark; and not only did no ill effect ensue, but he was cured from that moment. It ought to be given finely powdered; because, if it be not, a very small quantity only will come in contact with the stomach and intestines; and its full virtue is not obtained.

Varieties of Bark.—There are three kinds of Peruvian bark;—the yellow, the pale, and the red.[d] The latter is preferred by many, as being the

[a] Presuming that the *Spanish* florin is meant, this sum will amount to about thirteen pounds sterling.

[b] See Page 274.

[c] See Note to Page 270.

[d] Ascribed to "Cinchona *Cordifolia*", "Cinchona *Lancifolia*", and "Cinchona *Oblongifolia*", respectively. But although

most powerful; but although the most powerful, it is not so well borne by the stomach. Dr. Chapman (of New York) [a], Dr. Sanders (who practised at Guy's Hospital) [b], Dr. Rigby (of Norwich) [c], and Dr. Skeete [d], all wrote on the red bark; and extolled it as being more efficacious than the others.

Mode of administering Bark.—Milk is one of the best vehicles in which bark can be given. Some give the powder in decoction, and some give it as an electuary; and it may be given thoroughly mixed with any syrup or sweet substance, and then diffused in some liquid,—so as to be drunk. Sometimes it disagrees with the stomach; and therefore it is necessary to add something to it. Many persons, from pure bark, experience nausea, and perhaps vomiting; while, in some, it occasions purging. In all such cases, a few drops of tincture of opium, will frequently enable the stomach and intestines to bear it. If it be only the stomach which is disturbed, an effervescing draught will answer the purpose; and so will prussic acid. A small quantity of prussic acid, given at intervals in the course of the day, will enable the stomach to bear bark, and many other things, very well. But if the intestines be deranged at the same time, opium is probably one of the best things; because neither an effervescing draught, nor prussic acid, will lessen the purging. We may sometimes bring a patient to bear bark by degrees;—giving him small doses, and increasing them. In the case of children, it may be given in the form of clysters; and some persons have been cured, it is said, by its external application;—by having it tied, in fine muslin, or fine linen, on different parts of the body. I recollect hearing Sir Henry Halford say that, when he was a child, he had ague; of which he was cured by wearing a jacket of bark. A double jacket was filled with powdered bark; and put next his skin.

Active Principles of Bark.—It is now ascertained that the power of Peruvian bark resides in two substances, called "*quinina*" and "*cinchonina*" [e]; and of these two the former is chiefly used; and that in the form

the Pharmacopœias of London, Edinburgh, and Dublin, all agree in this respect, Dr. Duncan observes that there is no satisfactory evidence of their being right;—"on the contrary, it is almost certain that, with regard to some of the species, they are wrong." Some highly instructive observations on this subject, distinguished by all his usual acumen, and never-tiring patience of investigation, will be found in his "Edinburgh New Dispensatory"; Pages 372 to 387 (twelfth edition). A very complete account of the different kinds of Cinchona Bark, is given by Mr. Pereira; whose Lectures on Pharmacology, unrivalled for extent and accuracy, were inserted in the "London Medical Gazette" (Volumes 17 to 20); and were afterwards published in a separate form. Those who consult the interesting lectures of Dr. Sigmond, published in the "Lancet" for 1836–7 and 1837–8, will see what the graces of a polished style, and illustrations collected from every department of literature, can do for a subject usually considered so dry and unattractive as Materia Medica.

[a] "Discourses on the Elements of Therapeutics, and Materia Medica."

[b] "Observations on the Superior Efficacy of the Red Peruvian Bark, in the cure of Agues and other Fevers."

[c] "Essay on the Use of the Red Peruvian Bark in the Cure of Intermittents."

[d] "Experiments and Observations on Quilled and Red Peruvian Bark."

[e] All the additional alkaline bodies have so lately come to light, that their names are not yet settled. The French terminate their appellations in "*ine*"; as, for example, "morphine", "brucine", "strychnine", &c.; but, for the sake of uniformity with the names of the old alkalies, the termination should be "*a*"; and it seems to me most eligible to adopt the French appellations, with the change of the final *e* into *a*;—for example, "morphina", "brucina", "strychnina", &c. Some have proposed to designate "quinina", "quina" or "kina"; but the latter, at least, is too similar to the word "*kino*", and would, besides, lead any one to suppose the substance it denotes must be the basis of kinic acid;—another instance, I may remark, of objectionable nomenclature; from the circumstance of a very different article being termed "kino." "Cinchonina" is, by some, called "cinchonia"; but the word is evidently too similar to "*cinchona*"; and the same observation applies to the word "*hyoscyama*"; which would easily be mis-

of sulphate. It is found by chemists, that both these substances abound most in the red bark; and we therefore see how it is that the red bark was supposed, by many, to be the most efficacious of the three kinds. Quinina is said to abound most in the yellow bark,—the "cinchona *cordifolia*"; and the cinchonina in the pale bark,—the "cinchona *lancifolia*." I have given the quinina, both simple and in the form of sulphate; and have cured ague with it very well; but I have never employed the cinchonina.[a]

taken for "*hyoscyamus*"; and the objection must be still stronger if the alkalies "cinchonina" and "hyoscyamina" should ever be prescribed. The uniform termination in "*ina*", would be very distinctive.—*Dr. Elliotson, in the "Medico-Chirurgical Transactions"; Volume* 12; *Pages* 546 *and* 547.

[a] Among the energetic substances which the industry and sagacity of continental chemists have extracted from various articles of the Materia Medica, and upon which the peculiar properties of these articles appear to depend, none (I believe) have hitherto [1823] been turned to any medical purpose in their separate state, except hydrocyanic acid, iodine, morphina, emetina, and some of those which are furnished by cinchona. An account of the properties of strychnia, veratrina, hyoscyamina, and other alkaline substances procured from vegetable narcotics, is to be found, not in works upon the practice of medicine, but in Orfila's treatise on poisons, or in similar writings of experimental physiologists. Hydrocyanic acid has been investigated (as a medicine) both here and abroad, and deserves a place in our Pharmacopœia; although destitute of the high pretensions which were at first injudiciously proclaimed. Of the powers of iodine in bronchocele, we have abundant testimony: I have seen sufficient to satisfy myself; and they would seem equally great in certain other structural diseases. Very little has been written upon the medical virtues of morphina; but it is much employed, in combination with acetic acid, by some eminent physicians, instead of opium; and both it and emetina, as well as hydrocyanic acid, have a place in the "Codex Medicamentarius" of Paris. The curative powers of quinina have been highly extolled in French publications; but I am not aware that any thing has yet [1823] appeared in this country upon the subject; and it is for the purpose of beginning to supply this deficiency, that I do myself the honour of offering the present communication to the [Medical and Chirurgical] Society.

Of the three substances discovered in cinchona,—the alcali "quinina" (found in "cinchona cordifolia", and more abundantly in the "oblongifolia"), the alcali "cinchonina" (found in "cinchona lancifolia", and also more abundantly in the "oblongifolia"), and kinic acid (found in combination with lime in all three species, and also with quinina in the "cordifolia", with cinchonina in the "lancifolia", and with both quinina and cinchonina in the "oblongifolia"),—the two alcalies only, if I mistake not, have been tried as remedies; and of them the cinchonina appears to have been but once exhibited. Dr. Chomel once prescribed the sulphate of cinchonina in intermittent fever. Six grains mitigated the paroxysms; twenty put a stop to them.

The quinina, in the state of sulphate, is very extensively employed in France; and many relations of its efficacy have been published, in the journals of that country.

In the common run of cases in which we prescribe cinchona, its efficacy is not particularly striking; as we generally employ at the same time nutritious food, perhaps wine and porter, and every thing calculated to strengthen. My general experience of simple quinina as a tonic, is the same as of the sulphate; but I have never observed derangement of the stomach induced by doses of the impure preparation I employed, so large as ten grains, given every six hours. I beg not to be misunderstood as recommending simple quinina, in preference to the sulphate. My object is merely to illustrate the virtues of the substance, whether simple or combined. I may here state, that although none of my friends have yet employed simple quinina, several have prescribed the sulphate; and all with the most satisfactory results. Every case of intermittent fever has presently yielded to it, and in some the bark had previously failed.

It has been apprehended, that the alcalies of cinchona may be analogous to those of narcotics; and their exhibition, consequently, not altogether free from danger. But the fear is groundless. I have used many ounces of both quinina and its sulphate; have frequently given them every day for some weeks; and, even when the quantity of the sulphate or of the impure quinina was a scruple in the twenty-four hours, have never observed the slightest unpleasant effect. Yet there can be no question, that an excessive quantity of so intense a tonic and bitter may disturb. Accordingly, ten grains of the sulphate (at a dose) occasioned vomiting, in the three only instances in which I carried the medicine to that extent. An instance has been related to me of a gentleman experiencing

Mode of Administering Quinina.—Quinina is best given in a fluid state; and there should be a slight addition of sulphuric acid; by means of which a super-sulphate is made. Sulphate of quinina is not very soluble; but, by adding one drop of sulphuric acid to every grain of sulphate of quinina, we

nausea and headach from a dose of ten grains, taken without advice; and another in which five grains, repeated every three hours for six times, caused a degree of uneasiness; and Dr. Magendie says, that when practitioners have gone considerably beyond ten grains, in the twenty-four hours, the patient has sometimes experienced a high degree of excitement, and of cerebral disturbance. But quantities that can disagree, are not required. Five grains of the sulphate, every six hours, is the largest dose that can be necessary; and many cases of intermittent fever have been cured with three, two, and even one grain, every six hours.

I would always continue the medicine, whether using the sulphate or simple quinina, for about a week after the ague has ceased; because I have heard of relapses, where it had been omitted immediately that the disease gave way.

It is very true that quinina and cinchonina cannot strictly be called "*new* medicines"; because they exist (one or both) in cinchona, which we have all been prescribing. We are in the situation of M. Jourdain, in Molière's "*Bourgeois Gentilhomme*" (Act 2, Scene 6), who had been speaking prose all his life without knowing it; and we might address the chemists, to whose labours we are so deeply indebted, in language similar to that of the worthy man, on receiving the information from his Maitre de Philosophie.—"Par ma foi, il y a plus de quarante ans que je dis la prose, sans que j'en susse rien; et je vous suis le plus obligé du monde, de m'avoir appris cela." ("By my faith, I have been speaking prose for more than forty years, without being aware of it; and I am under the greatest possible obligations to you, for having taught me the fact.")

The powder of bark requires, generally, to be "thrown in" (according to the apt expression of old practitioners) in pretty large quantities, before the disease is removed; and not unfrequently it fails. But, with respect to quinina and its sulphate, a small quantity is sufficient. The patient has only to take a pill; and is spared the annoyance of swallowing any of the mass of inert powder, which remains after the extraction of quinina; and which frequently (whatever may be the disease) so disgusts him, or so oppresses his stomach, and deranges his system at large, that bark cannot be borne in efficient quantity, or even borne at all; and (what is particularly interesting) we find, that they succeed when bark has failed;—that they cure cases of intermittent fever which have resisted bark, although perfectly well borne, and freely administered.—*Dr. Elliotson, in the "Medico-Chirurgical Transactions"; Volume* 12; *Pages* 543 *to* 564.

Since the appearance [in the "Medico-Chirurgical Transactions] of the paper upon quinina, [of which paper the preceding part of this note is the substance,] I have attended nearly a hundred and fifty cases of ague, and have treated them all with the sulphate. Many were combined with so much inflammation (in the abdomen, chest, or head), as to require venesection;—some being combined with dropsy; and some with a chronic disease of the lungs or liver; but all were cured. Having never seen it augment any inflammation that may be present, or interfere with antiphlogistic measures, I have always given it in all circumstances; and have simultaneously adopted any other measures, that might be demanded by other symptoms. Some cases, and those were generally quartans, would not yield to less than five grains every four hours; but this quantity has never failed, after having been exhibited a week or ten days. Like mercury in syphilis, I have frequently seen its use followed by a relapse, when not continued for a proper length of time after the disease. It cannot be a matter of surprise, that a fresh exposure to the causes of ague, will renew it after a cure;—precisely as happens with syphilis, after the successful exhibition of mercury. In London, the disease may in general be arrested *immediately*, by the exhibition of ten grains at once, just before or after the paroxysm.

Dr. Horne found the bark much more successful *after* than *before* the paroxysm; and this is my experience with quinina. I am convinced, that the best practice is first to give ten grains as soon as the paroxysm is over. This almost always (the exceptions are generally quartans) prevents the paroxysm next expected; and, if repeated daily at the same hour, often cures the disease. But as ten grains, given in any number of doses in the twenty-four hours, are frequently insufficient to conquer it, and half a drachm may be required, it is sometimes necessary, in addition to these ten grains after the fit, to make the whole quantity in the twenty-four hours amount to a scruple or half a drachm;—by small doses also, every six or eight hours.—*Dr. Elliotson, in the "Medico-Chirurgical Transactions"; Volume* 13; *Pages* 464 *to* 466.

have a super-sulphate, which is sufficiently soluble. It goes farther, I should imagine, when given in this form; but, on account of its taste, and for the comfort of the patient, we often give it in a solid form. If it be exhibited in a pill, its bitterness is not tasted.

Dose of Quinina.—A few grains, every eight hours, will generally cure the complaint. Some give a grain or two, every two hours; and say it answers very well; but others give a larger quantity, at more distant intervals. Either way is very good; but if the stomach reject it, certainly it would be better to give only a grain or two every two hours throughout the twenty-four, rather than a large quantity at once. I have found it the most efficacious mode, to give a large dose immediately after the paroxysm. It is very good to give it *before* the paroxysm; but I think, of the two, more effect is produced by giving it as soon as the paroxysm is over. For the most part, we put a stop to it directly, by giving ten or twelve grains as soon as the paroxysm is over; but we do not usually *cure* the disease;—we only *suspend* it. To effect a cure, we must generally give a larger quantity in the course of the twenty-four hours; and for some time. When we first had sulphate of quinina, I was generally able to cure the disease with two or three grains, two or three times a-day; but that does not generally happen to me now; and therefore I cannot but believe, that this medicine is exceedingly adulterated. I continually have to give people twenty or thirty grains, in the twenty-four hours, before I can cure the complaint.

Large Doses sometimes Necessary.—No general rule can be laid down respecting the quantity required. Some persons may be cured by a few grains; and some will require a very large quantity. In February, 1829, I had a patient labouring under quartan ague, which did not yield to less than forty-five grains, in the twenty-four hours. I thought that a very considerable quantity; but in the ensuing October, on my return from the Continent, I found a patient in my wards who, by direction of Dr. Roots, was taking a scruple every eight hours, together with ten minims of Liquor Potassæ Arsenitis. This man, like the former, had a quartan ague; and was no better, notwithstanding he took this large quantity. However, as it did not disagree with him, and as I never failed in curing the complaint, I determined that if it *could* be cured it *should*; and I gave the remedy (as Dr. Roots would no doubt have done, had he continued to treat the case) every *six* hours, instead of *eight*; and he was then cured directly. That was the largest quantity that I have ever been obliged to give; but it was indispensable in this case.

Time for administering Quinina.—I should certainly advise a large dose to be given (such as twelve or fifteen grains, in some cases; but eight or ten, in general) immediately after the fit, to *suspend* the disease at once; and then to give a small quantity repeated at intervals during the twenty-four hours, for the purpose of *curing* the disease. In the first case we knock it down at once, which is a material point; because every paroxysm shatters the patient, and is a period of great suffering; and therefore I would stop it immediately. But we shall not always stop it *permanently*, unless we give a larger quantity in the twenty-four hours; and continue it for some time. I am in the habit of giving ten grains, as a medium dose, immediately after the paroxysm; and then five grains every six or eight hours, whether the disease comes back or not.

Its Employment must not Cease too Soon.—It is necessary to continue the medicine for some time, after the disease appears to be cured; for if it be left off directly, the disease, in all probability, will return. It is just the

same in the cure of syphilis; if we leave off mercury as soon as the sore is healed, or the pain has ceased, the symptoms will possibly return. Although ague, therefore, appears to be quite arrested, it is necessary to continue the remedy for two or three weeks afterwards, in order to make sure of the cure.

Administration of Quinina during the Paroxysm.—The remedy may be given with perfect safety even during the paroxysm, when the pyrexia is present, and even though there may be local inflammation; but I should conceive that it is a waste of a good thing, to give it during the paroxysm. At that period the system is in such an unnatural state, that all agents are resisted; and a dose of quinina, that produces a good effect during the intermission, will produce no effect during the paroxysm. Medicines are all resisted, more or less, when we are in an unnatural state. It is found to be more efficacious during the intermission; and sufficient may then be given to cure the disease. I do not know that it is *injurious* to give it during the paroxysm; but it is certainly *wasteful.*

When attended by Local Inflammation.—I have frequently had occasion to give it, notwithstanding there was local inflammation. My object was to cure both diseases; and while I was curing the local affection by bleeding and other means, I stopped the ague with quinina; and never saw any harm done by it. When I first employed this remedy, many years ago, I had a patient with ague, who shivered every other day; and had then intense heat and sweating; but during the intermission he was always hot, always had a very quick pulse, and was always thirsty. He had continued fever, with the addition of a tertian ague; or he would have been said by some to have remittent fever. I did not then know a great deal about the remedy; but I gave it him at regular hours, day and night; and he became perfectly cured. Notwithstanding the great feverishness, no inconvenience arose. The case is published in the twelfth volume of the "Medico-Chirurgical Transactions"[a]; along with several others of which I made a report to the profession, before the remedy was much known in

[a] A poor man, named Charles Hunt, was conveyed to me on the morning of Monday, September the first [1823]; and with difficulty was supported into the house. He said that he had laboured under ague at Cowes, in the Isle of Wight, twenty years ago; but was attacked, a fortnight since, with violent vomiting and pyrexia; for which, at the suggestion of some friend, he drank large quantities of cold water;—that in a few days, a severe tertian commenced, without any alteration of the other symptoms; and that he had experienced four paroxysms, every successive one invading an hour earlier, and each of the three stages lasting nearly three hours. I found him excessively hot and thirsty; vomiting every thing he swallowed; with a feeble, rapid pulse; and so weak as to have fallen three times that morning, in walking through a yard belonging to his house. Five grains of the sulphate every six hours, in the form of pill, were ordered. The medicine was not procured that day; and, in the evening, he had a paroxysm an hour earlier than the preceding, and more violent than any. The next day (Tuesday), he began its use; and on Wednesday, to his great delight, he experienced no paroxysm, but merely a chilliness for about ten minutes, followed by neither heat nor sweating. On Friday, I found him much stronger, much cooler, with little thirst, with his pulse greatly reduced, and able to retain every sort of food;—not having vomited since the first dose of the remedy. I write this on Monday, September the eighth; and he tells me, to-day, that he has had not the slightest paroxysm, and that he feels perfectly well. Indeed, he walked to my house,—a distance of three miles; and purposed walking home again. This case is particularly striking, not merely as an illustration of the cure of the disease, but from the circumstance of the violent vomiting and pyrexia—which were constantly present, and would have deterred any one from exhibiting bark in the first instance—yielding completely to the remedy.—*Dr. Elliotson, in the "Medico-Chirurgical Transactions"; Volume* 12; *Pages* 560 *and* 561.

this country.[a] I have continually seen quinina cure the disease, when bark was given in as large a quantity as could be borne; and likewise arsenic; and both had failed. I have also known it stop vomiting. When

[a] As soon as the two alcalies of cinchona were discovered, M. Pelletier sent a quantity to Dr. Magendie; who administered them to dogs in large doses, without nausea, vomiting, or other apparent result. The indefatigable and acute physiologist then injected into the veins of these animals from two to ten grains of the sulphate and of the acetate of quinina and cinchonina, in solution; but with no more effect. Satisfied of the innocence of the substances, he ordered the sulphate of quinina to several scrofulous children affected with ulcers; and, in a fortnight, the most decided benefit was obtained. He mentions, in particular, one child, four years of age, who had scarcely been able to move for ten months, was constantly crying, and ate nothing; but, at the end of six weeks, after taking two grains of the sulphate daily, it acquired a good appetite, became cheerful, walked well, and would not readily have been recognised. In the same paper he states, that a phthisical patient derived considerable benefit from the medicine.

M. Pelletier furnished Dr. Chomel, also of La Charité, with a large quantity of the sulphates; and the following was the result of the exhibition of the sulphate of quinina, in thirteen cases of intermittent fever. Ten were cured;—five by the first doses, five by the second; in two the paroxysms were merely mitigated, and in one no sensible effect was produced. In the three unsuccessful cases, the cinchona itself equally failed. The medicine was taken, dissolved in water, on an empty stomach, before the accession of the paroxysm; and the whole quantity was generally six or eight grains, but twice this amount when necessary.

In September and October, 1820, M. Double tried the sulphate of quinina in six cases of intermittent fever. In the first, the disease never returned after the exhibition of three grains three times in the interval; smaller doses were subsequently continued for some time. In the second, which occurred in a child, one grain night and morning retarded and deranged the course of the first paroxysm, and a second never took place. The medicine was given for some days, in gradually diminished doses; and the patient recovered her strength, and a healthy state of her digestive organs. The third case occurred in a young female; and was cured with two grains night and morning. The fever, which was quotidian, instantly lost its intensity, and ceased after the third day; and the patient's health improved in a way that could not have been expected. The fourth was a tertian; four grains were taken twice in the interval; the next paroxysm was of the slightest description, and no other was experienced; the medicine was continued some time. The fifth and sixth cases were equally decisive. M. Double prescribed it in a variety of diseases, which are usually treated with cinchona; and for the most part, he says, with satisfactory results.

Instances of the equally successful exhibition of the sulphate of quinina, by MM. Villermé, Magendie, Talbot, and Dupré, are also recorded.

M. Piedagnel has published a case of violent periodic pain of the supra-orbitar nerve, entirely cured by the administration of ten grains of the sulphate, during one of the daily intermissions, and a repetition of the same doses in the following twelve hours; with the view of greater security. M. Dupré relates a case of violent periodic pain of the infra-orbitar nerve, that subsided after the exhibition of twenty-four grains, in small doses, during two intermissions; and one of remittent sciatica, which yielded very speedily. Two instances of periodic pain of the facial nerve, treated (with equal success) by M. Ribes, will be found in the same pages. M. Dupré likewise gives us a case of typhus, in which a rapid amendment took place, after the use of the sulphate of quinina was commenced.

I ordered it, largely and perseveringly, in one case of irregularly intermittent, and in one of remittent, pain of the face; but without advantage. Like M. Dupré, I employed it in a case of typhus; and with eminent advantage. On the nineteenth of June [1823], a poor Irish-woman, half starved and flooding, was brought into St. Thomas's Hospital, labouring under severe typhus. She was supported by plenty of beef-tea and milk; the epigastrium, forehead, and occiput were blistered; and Hydrargyrum cum Cretâ was prescribed, in doses of one scruple, and sometimes two scruples every six hours, till the mouth grew sore. The delirium and stupor were entirely subdued, and the tongue became clear and moist; but the debility increased hourly. The face became ghastly, and the body sunk lower in the bed. I ordered three, and soon five grains of sulphate of quinina, to be given every six hours; and the diet to remain as before. A striking amendment was observed the next day; and she speedily recovered. After being convalescent some time, the medicine was omitted; but, when I thought of discharg-

a person with ague has been exceedingly troubled with vomiting,—with great irritability of stomach, I have known it put a stop to the irritability as well as to the ague. Still it is to be remembered, that now and then

ing her, she suddenly relapsed into extreme prostration of strength, passed her urine and fæces again involuntarily, and grew delirious; but the tongue remained clean and moist. The two blisters to the head were repeated, and the sulphate ordered as before;—milk and beef-tea, *ad libitum*, continuing to be her diet. The amendment was not so sudden; but, from the first day of recurring to the medicine, the debility ceased to increase. In a few days, she clearly gained strength; and was soon convalescent. After taking the full diet of the house, and a pint of porter daily, for two or three weeks, she was discharged,—perfectly strong and well.

The three following are all the cases of intermittent fever in which I have yet [July 8, 1823] prescribed it; and they corroborate the assertions of the French. They, as well as the rest which I shall detail, occurred in St. Thomas's Hospital. The medicine was given in the form of pills. 1. Elizabeth Taylor came under my care, as an out-patient, on the nineteenth of September last [1822]. She had laboured under intermittent fever nearly a twelvemonth, in Gloucestershire, when thirteen years of age; and had experienced a solitary paroxysm occasionally: and once so severe a return, as to confine her two months in St. Thomas's Hospital. The disease had now regularly recurred, in the quartan type, for six months. I prescribed five grains of the sulphate of quinina every six hours. On the tenth day (September 28) I saw her again; and learnt that a paroxysm took place on the first regular day, (namely, the twenty-first of the month,) but without any cold stage; that the hot stage was very mild; and that the disease had not subsequently returned. The same prescription was continued. On the eighteenth day (October 6) she informed me, that there still had been no return; and I continued the prescription. She never applied again;—remaining, no doubt, perfectly well.

2. The second case was that of an Irishman, named Hugh Kaney; who was admitted into the hospital on the twenty-seventh of March. He laboured under tertian for five days. I prescribed five grains of the sulphate of quinina every six hours. A paroxysm took place on the day after his admission; but, although he remained in the hospital until the eighth of May, he never experienced another. The medicine was continued, in the same quantity, till the twenty-second of April.

3. The third case proved more refractory; but the disease was instantly influenced by the medicine, and removed in little more than a fortnight. Robert Tindall was admitted into the hospital on the twenty-seventh of March; having laboured under tertian for a month. I prescribed five grains of the sulphate of quinina every six hours. On the sixth day (April 1), I found that the paroxysms had returned regularly, but less severely, and at a later hour; on the tenth (April 5), that they were still milder, and on the thirteenth (April 8), that they had become much milder. On the fifteenth (April 10), the paroxysm was severer than it had lately been; but on the nineteenth (April 14), it returned very mildly, and for the last time. The same quantity of medicine was continued till the twenty-sixth day (April 22); and he left the hospital on the forty-ninth (May 15), without the least return of the disorder. I have reason to believe, that the medicine which this man took was of inferior quality.

1. I first prescribed the quinina itself, on the 29th of November [1822], for a woman named Martha Pallow, who had been affected with quotidian for a fortnight; the paroxysms always commencing at four o'clock in the morning. Five grains every six hours were ordered. She visited me again on the seventh of December (the next day for seeing out-patients); and said she had experienced no paroxysm since the seventh day (December 4). The medicine was continued in the same doses; but she never applied again: and probably, therefore, remained in good health.

2. William Johnson was admitted into the hospital January 23 [1823];—having laboured under tertian for ten weeks. He was ordered the same doses, at the same intervals. A paroxysm occurred on the day of his admission, but more mildly than before; and he had no other up to the eighth day (January 27); when he left the house of his own accord.

3. Edward Cupon had tertian in Norfolk, twelve years ago; was now a surgical patient in the hospital, and desired my assistance on the fourth of February [1823], on account of a quotidian, which had existed three weeks.—The same prescription.—On the fifth day (February 8) I found that he had experienced no paroxysm, but merely a coldness of the loins, legs, and feet, at the customary time of the paroxysm. On the eighth day (February 11) he said, that even the coldness had ceased to take place; and, up to the first of May, he remained free from the disease.

it disagrees with the stomach. Now and then it produces vomiting and gastrodynia[a]; —just as bark will do; and, more frequently still, it will also purge. When the stomach is disordered by it,—whether it be thrown into spasmodic pain, or vomiting be occasioned,—we may give aromatics, or opium, or (which is far the best) prussic acid. If there be mere pain, an effervescing draught will not be of any use; though it might be serviceable if there were nausea and vomiting.

4. Francis Douglas had been afflicted with intermittent fever, irregularly, for eighteen months;—at first daily for six weeks, in the West Indies. Since that time he had made a voyage to China; and for five months had no paroxysm. One attacked him on the second of February last [1823], in the morning, one on the sixth in the evening; and one on the eighth, (the day on which I first prescribed for him,) at noon. He complained of a degree of shivering every day. The same prescription was written for him. He had no paroxysm from the day he commenced the use of the medicine, till the eighth (February 15); and then none till the fourteenth (February 21). No other occurred during his residence in the hospital.

5. Daniel Duff was admitted on the thirteenth of February;—having laboured under quotidian a fortnight.—The same prescription.—A paroxysm took place on the two first days after his admission; but they were slight, and the second was slighter than the first. Up to the twenty-seventh of the month he had no return, and was then discharged.

6. Edward Perry, ill a twelvemonth with tertian, was admitted February 13 [1823]. He had laboured under the disease in Wiltshire, thirty-six years ago; but never since that period till the present time.—The same prescription.—The paroxysms at once became slighter, and recurred but twice after the use of the medicine.

7. John Ferguson, affected with tertian for three weeks, was admitted on the eighth of March.—The same prescription.—No paroxysm took place after the use of the medicine was begun.

8. An old woman, of the name of Traylen, had laboured under quartan for ten weeks. She had been subject to it for many years; but always previously stopped the paroxysms, by a smaller quantity of cinchona than failed the last spring [1823]. The same doses of quinina were followed by an immediate cessation of the disease; and, though three months have elapsed, it has not recurred.

9. Daniel Carthy was admitted on the twenty-ninth of May [1823], on account of tertian. He had the same prescription as the rest. The only paroxysm that took place, was the day after his admission; and he was discharged at his own desire, at the end of three weeks.

10. Bryan Summers was admitted on the same day as Carthy, on account of a tertian, caught at Tilbury Fort. The same prescription was given to him. A paroxysm occurred immediately after his admission; but it was not succeeded by another. A chilliness of the legs came on every other day, for some little time; but this gradually decreased, and he was discharged at the end of three weeks.

The following case, furnished me by my friend and colleague, Dr. Roots, is exceedingly worthy of detail;—as affording an instance of the immediate success of the sulphate, after the failure of both bark and arsenic:—"Mrs. Sullivan was admitted into St. Pancras Infirmary on the seventh of May [1823]; after having suffered under tertian for nearly a month. She took the Liquor Arsenicalis [Liquor Arsenitis Potassæ] from the eighth of May to the twenty-third; and every two or three days rhubarb and calomel, without any advantage. From the twenty-third of May to the sixth of June, she took cinchona in drachm doses, every six hours, with the decoction and tincture;—containing, at times, the rhubarb and calomel. As the paroxysms still returned at the regular period, the cinchona was discontinued, and the Liquor Arsenicalis resumed, in doses of nine minims every six hours; which she took from the sixth of June to the twentieth. On the thirtieth, finding the paroxysms still return at the usual period, I ordered her five grains of the sulphate of quinina, in a pill, every six hours. She took twelve doses;—never having any return of the paroxysm after the first dose; and was discharged on the second of July." It is right to mention that, the day prior to the sulphate of quinina being ordered, she was allowed a pint of porter daily. Dr. Roots, I may add, has hitherto [July 8, 1823] employed the medicine but once since; and says, in his letter to me,—"In another case of quartan, the sulphate was given in doses of two grains every six hours; and was equally successful."—*Dr. Elliotson, in the "Medico-Chirurgical Transactions"; Volume* 12; *Pages* 546 *to* 561.

[a] From γαστηρ, *the stomach*; and οδυνη, *pain*.

Failure of Quinina from Gastric Irritation.—The power of quinina is one of the most extraordinary facts in medicine; and always reminds me of the lines in Virgil,—

"Hæc certamina tanta
Pulveris exigui jactu compressa quiescunt." [a]

It is said to have failed sometimes; and that bark has then cured the affection;—just as, in many cases, I have seen it *successful*, when bark had *failed*. When this has happened, it has been (I imagine) from its disagreeing with the stomach; so that a sufficient quantity could not be taken. Cases have occurred to me, in which the stomach became so irritated, from the intensity of the medicine, that the patient rejected it; and could not take it in sufficient quantity; whereas bark, being far less intense, could be borne; and was taken in such a quantity as cured the disease. I had a case exactly of this description, in the lady who caught an ague from walking on the ramparts of the Tower.[b] A very small dose of sulphate of quinina produced most excruciating pain at the stomach; and she could not persevere with the medicine. Bark was substituted for it; was borne very well; and cured the disease. Whether, if she had taken tincture of opium, or prussic acid (in proper quantity) the quinina could then have been borne, I do not know; but I think it probable that it might; and that it would then have cured her. I think Andral mentions the circumstance of quinina having failed, and of bark subsequently curing the disease. I do not know the particulars of his cases; but I imagine that such a circumstance as this, could only arise from the medicine irritating the stomach,—so that it was not taken in a sufficiently large quantity; because it has all the virtue of the bark, and in far greater intensity.

Other Barks in Ague.—Many other barks, however, cure the disease. The bark of willow, the alcaloid principle of the willow-bark (salicina[c]), swietenia[d], all astringents of the vegetable kingdom, and more especially a combination of both (such as calumba[e] with galls), will cure the affection. A combination of these, is found to be more powerful than either of them taken separately; and those barks which contain both a natural bitter and an astringent, are those which answer best. It is said, with respect to these, that they have sometimes cured the disease, after Peruvian bark has failed; and various other combinations of bitters and astringents, have done the same. Piperine will cure ague.

Arsenite of Potassa.—Next to sulphate of quinina or bark, however, certainly comes arsenic. The solution of arsenite of potassa, is what is commonly used; in doses of from two to ten, or twelve drops, or more, two or three times a day. It is best to give this remedy in a very gradual mode; and I never begin with more than two or three drops, three times a day;—gradually increasing it. I have seen ague cease from the first day it was given, although the disease had continued for a length of time; but frequently a longer period is required, for its successful exhibition. The largest dose required, I believe, is from twelve to fifteen drops, three times a day; or as frequently as is necessary. I never had occasion to go beyond that; nor should I like to do so. I need not say that, on account

[a] "On a light powder being thrown, the contests (though violent) cease."—"*Georgics*"; *Book* 4; *Lines* 86 *and* 87.
The allusion is to the effect of a little dust, thrown on bees engaged in battle.

[b] See Page 285.

[c] From "salix, salicis", *the willow.*

[d] So named from *Van Swieten.*

[e] So named from Colomba, in Ceylon, whence it is obtained.

of its virtues in this disease, it has been made a nostrum of;—exactly as was the case with bark. What is called "Tasteless Ague-Drop", is a preparation of arsenic.

Mode of Administering Arsenic.—It is always best not to give this medicine on an empty stomach. When giving an acrid matter,—such as iodine, the bichloride of mercury, or antimony,—with a view, not to nauseate, but merely to produce diaphoresis, it is by far the best practice to exhibit it after food has been taken. It is evident that any thing acrid, coming into direct contact with the mucous membrane of the stomach, is more likely to irritate it, than if food had been first taken;—so as to cause it to be applied to the stomach partially and gradually. Whenever Peruvian bark or sulphate of quinina irritates the stomach, it is best to try whether it will not be borne when given after meals. But in the case of arsenic, we should make it a rule never to give it before breakfast. Persons are continually nauseated, and will even vomit if they take it before breakfast; whereas *after* breakfast they may bear it very well. When it produces nausea or vomiting, a little tincture of opium is indispensable; indeed it is well, in general, to combine a little tincture of opium with every dose of arsenic.

Ill Effects of Arsenic.—The ill effects of arsenic are symptoms of gastritis. The slightest symptom is nausea; the next is vomiting; then pain of the stomach, and heat there; tenderness on pressure; and heat extending up the throat. Arsenic has a tendency to excite gastritis, even when not taken into the stomach. I knew an instance of a person being seized with gastritis, and thrown into the greatest danger, simply from having arsenic applied to a sore of the leg. One of the first effects of arsenic, is to irritate the stomach; and the irritation soon arises to the pitch of inflammation; but it will also produce other effects. Singularly enough, it occasions soreness and redness of the tarsi; redness and heat of the fingers; soreness of the throat; and œdema of some part of the body. Very frequently, when patients have been taking arsenic, I have seen the face swell; and sometimes the lower extremities. Sometimes it is one part, and sometimes another; but most frequently it is the face. Frequently, too, there is heat of the system. When this local inflammation of the stomach, throat, or face, takes place, the whole body will become more or less excited;—so that we have general pyrexia. In this case, it is necessary to omit the medicine immediately;—not to lower the dose, but to omit the medicine altogether; and the symptoms generally decline; though it may be necessary to apply leeches freely at the pit of the stomach, or to bleed. I never, but once, saw any harm ensue; and in that case the remedy had been carried on very injudiciously. If, while giving arsenic, we look carefully at the patient's face, and ask about his throat, and also respecting the state of the stomach,—as to whether there is pain, tenderness, nausea, heat, or vomiting,—I believe no harm can arise.

Arsenious Acid.—It is asserted, but I cannot say from experience whether it is correct, that when Liquor Potassæ Arsenitis has failed, pure arsenic has succeeded;—that is to say, what is called "arsenic" in commerce, has succeeded; when its combination with potassa, according to the directions in the Pharmacopœia[a], has failed. It is said that about the

[a] The mention of the Pharmacopœia, gives us an opportunity of recommending to the attention of our readers—"Diagrams, explanatory of the Chemical Decompositions of the London Pharmacopœia, and of the various Processes used in Medical Che-

sixteenth of a grain may be given, three or four times a day; that the eighth of a grain can seldom be borne; but that the sixteenth of a grain succeeds very well. This is stated by Dr. Macculloch, in his first volume on "Marsh Fever"[a]; but I never exhibited it. Many other minerals, which are astringents, will cure cases of this disease;—sulphate of zinc, oxide of zinc, sulphate of copper, and alum. Muriate of ammonia is likewise said to have a power over the disease; and it is thought by many, at least abroad, that it heightens the power of bark. Carbonate of potass is supposed to possess some virtue. A combination of some of these things is thought to be best; but no doubt sulphate of zinc, and sulphate of copper, will frequently cure the disease.

Opium, Sudorifics, and Emetics.—As a full dose of sulphate of quinina, or a full dose of bark, is found more useful immediately before the paroxysm, than at other periods of intermission (except immediately after it is over), so various other remedies have been employed at this period. These have been of various kinds;—sometimes medicinal; and sometimes calculated only to make an impression on the mind. Immediately before the beginning of a paroxysm, a large dose of opium has sometimes prevented it from coming on violently. Sudorifics and emetics have been employed for the same purpose. Mental emotion has been excited at the moment with a similar view; so that a child has been flogged out of his ague, or frightened out of it by threats. He has been threatened with a good thrashing, if his ague came on; and there can be no doubt that this has cured his complaint. Sometimes by exciting disgust,—by insisting that a person should swallow spiders and cobwebs, the paroxysm has been prevented. Some persons, however, imagine that the latter really possess a power in preventing the disease. I have no personal knowledge of the virtue of spiders and cobwebs; but Dr. Chapman's work on Materia Medica[b], contains a very strong testimony in favour of the soothing effects of cobweb. He mentions that it will procure sleep in fever, and tranquillize the system, when all other things have failed. I know that many persons

mistry; by Thomas Harper Whitaker." The plan adopted in these Diagrams, is that invented by Dr. David Boswell Reid (see his "Elements of Practical Chemistry"); and is far superior to any other in perspicuity. We may also mention a kindred work, the title of which is of too unprofessional a character to accord with our taste:—"Sparks from the Wheel of a Man wot Grinds. A Light on the Pharmacopœia." Both these works are published by Butler, Medical Bookseller, St. Thomas's Street, Southwark.

[a] In as far as it does fail, there is reason to think that the fault is very often in the remedy itself; and I cannot concede that the well-known combination of this substance (or, rather of its primary acid), with potash,—commonly called "Fowler's Solution",—is the proper mode of using it. It is certain, at least, that when this has failed, the same substance (or the common arsenic of the shops) in powder, has often succeeded, and even immediately. Of this the sixteenth part of a grain is equivalent to the common dose of the solution, and is capable of being repeated three or four times in the day; while it is conveniently divided by means of white sugar; which also aids in reducing it to that fineness of powder, which cannot be too perfect. With respect to the superiority of arsenic in substance to its neutral salt, [arsenite of potash,] I may quote the experience of a friend, who—residing in a district where "tic douloureux" is extremely common, and where the solution seldom succeeded—now reports to me; that he finds the powder almost infallible;—giving it without the least inconvenience to the extent of one-twelfth of a grain for a dose; and finding that its utmost limit is one-eighth; which, however, can seldom be endured; though he has administered one-sixth, without further evil consequences than griping.—"*Essay on Remittent and Intermittent Diseases; including (generically) Marsh-Fever and Neuralgia. By John Macculloch, M.D.*" *Volume* 1; *Pages* 452 *and* 453.

[b] See Note to Page 310.

declare that it has a sort of sedative quality; and there is no reason why it should not; but, in the cure of ague, it has been employed merely with a view of exciting disgust; and has succeeded. These effects might be produced at any time during the intermission; but it is immediately before the paroxysm that disgust, or fright, or violent emotion of mind, is most likely to be of use.

Great Value of Bark and Quinina.—The great remedies for the disease, however, are quinina and arsenic;—all other means being more or less uncertain, except perhaps salicine. I never think now of employing any thing but quinina; though, in particular circumstances, I might be induced to order venesection. These two medicines (quinina and arsenic) are also equally good in other complaints of an intermittent, though not aguish, character. In intermittent rheumatism and neuralgia, they are among the best remedies. It is a singular circumstance; but, even in intermittent vomiting, arsenic has been known to effect a cure. In the volume of the "Transactions of the London Medical Society" for 1817[a], there is a paper by Dr. Adams, on periodical vomiting, coming on at certain intervals; which was cured by what would, in many cases, have *produced* vomiting;—a small quantity of arsenic. Whenever complaints assume an intermittent form, whether they be aguish or not, the sulphate of quinina, and arsenic, are among the best remedies. If either of these failed separately, I should not hesitate to give them both together. I have failed with arsenic, but not with quinina. Whenever a case was obstinate, I increased the dose to the largest quantity the stomach would bear.

Is it Dangerous to Stop an Ague?—It was formerly imagined that ague was too good a thing to be cured;—that it was very wrong to stop it. At any rate, many contended that it ought not to be stopped, till the patient had gone through a certain preparation. I have astonished many persons (who, when abroad, were accustomed to see some preparation employed before the remedies for ague were given) by stopping the disease immediately. I never saw any harm done by it; though if there be any local affection of the head, chest, or abdomen, we must take care to attend to that at the same time. If there be any congestion of the head, lungs, or abdomen, it may be necessary to bleed, to purge, and to use all the remedies for such a state as that; for if we do not, it is possible that the circumstance of stopping the ague at once, may be useless. If we do every thing indicated by the local affection, I am quite satisfied there will be no danger in stopping the ague. I never did harm by it in a single case. I never lost a patient from ague; notwithstanding that I gave sulphate of quinina when local inflammation was present. Arsenic, I need not say, may be very improper when the inflammation which is present affects the stomach; and in the case of gastritis, possibly neither arsenic nor quinina can be borne; and we do not remedy the morbid condition, till we adopt either local or general bleeding.

So far from the stoppage of the ague doing any harm, I have found any local disease that might be present, removed the more easily; for every attack of ague of course disturbs the circulation, renders it more irregular, and is likely to throw a greater load of blood upon those organs which are already in a state of congestion. At any rate, ague always makes bad worse. I have always considered that I have treated local complaints more successfully, by having stopped the ague. Sydenham says—"Cure the ague first, and then you will easily cure the dropsy; which otherwise

[a] Volume 1; Part 2; Page 89.

might be impossible." I never saw any chronic complaints ensue, on stopping ague. I believe they do not arise from the ague; but are, like ague itself, the result of malaria; and I know that, for many of them, one of the best remedies is sulphate of quinina, bark, or arsenic. I have seen many cases of dropsy vanish, on the exhibition of sulphate of quinina, without any thing being conjoined with it. If we stop the ague, all those effects which are ascribed to it, whether they be acute or chronic, are cured more safely. Still it is possible that ague sometimes may not give way, till we have remedied the local mischief. It is said that, now and then, ague will not yield to any thing, till we make use of local bleeding. Many say they have met with cases, where bark would not cure the disease, till they made the patient's mouth sore. I never met with a case of that description; but still it is so asserted. If what is said be correct, such a practice must be adopted; but I should, nevertheless, in such a case, go on with the quinina, while I was giving the mercury, or making use of local means.

Prevention of Ague.—With regard to the *prevention* of ague, the great point is to drain the country, and to prevent all accumulations of dead vegetable substance;—in order to prevent, as much as possible, exhalations from putrefied vegetable matter. When land cannot be drained, occasional inundations may be necessary;—in order to throw more water upon it than is compatible with vegetable decomposition. With regard to individuals who must be exposed to ague, the best mode of preventing it is to live as well as possible; to have good food; a certain portion of wine or beer; and never to expose themselves to malaria with empty stomachs. Persons so situated, ought always to take something before they go out of doors; and where malaria is very intense, spirits may be found necessary. Smoking is an excellent preventive, in damp places. I mentioned[a] that when Napoleon was in Italy, he found the advantage of keeping up good fires, in preventing disease. When persons are obliged to live in a house where there is malaria around, it is best to sleep as high as possible;—rather to condescend to sleep in a garret, than to aspire at sleeping in the best apartments; and it is of great importance to avoid going out at night, or very early in the morning. It is said that a gauze-veil around the head, when persons must be exposed, is likewise of use. It might be highly beneficial for a person exposed to malaria, to take sulphate of quinina.

[a] See Page 294.

CHAPTER V.

CONTINUED FEVER.

Definition.—The same constitutional symptoms which occur in any intense local inflammation, are those which, generally speaking, characterize continued fever. There is quickness of pulse, increased heat, and diminution of the secretions. From the latter circumstance we have thirst, dryness of the skin, scanty and high-coloured urine, and costiveness. There is usually restlessness and watchfulness. At first, as at the beginning of inflammation, and as in intermittent fever, there are the opposite symptoms of chilliness (even amounting to rigors), coldness, paleness, and smallness of the pulse; but these, in general, last only for a time. Andral, according to some observations which he made at Paris, in 1822, on two hundred and twenty-nine cases of fever, says that chilliness rarely occurs on the first two or three days. However, I have been attentive to this circumstance; and I know that people in London, at the very *beginning* of continued fever, do frequently complain—more frequently than not—of chilliness; and of those symptoms which are analogous to the first stage of intermittent fever. If, however, these symptoms do take place,—rigors, chilliness, and smallness of the pulse,—they usually last but for a short time. They soon yield to symptoms of excitement; and these symptoms continue throughout the disease; though perhaps, after a time, they are united with symptoms of great debility;—just as is frequently the case in inflammation.

When those symptoms, which I have now mentioned, occur quickly and acutely, they show the existence of continued fever; more especially if the morbid appearance of the tongue, the heat, the quick pulse, and the thirst, be out of all proportion to any signs of local inflammation that may exist. In these circumstances we consider that the patient has *fever*, in the proper sense of the word;—*idiopathic* fever;—fever as distinguished from mere pyrexia. Local inflammation frequently exists at the same time; but whether local inflammation is *always* present or not, is a theoretical question upon which I will not now enter. These symptoms, however, very frequently occur without any *evidence* of local inflammation; and are as frequently out of proportion to any that we may observe; and it is this circumstance that makes us consider the person as labouring under *fever*, properly so called.

SECTION I.—SYMPTOMS AND PROGRESS.

The general symptoms of continued fever vary;—from those which characterize an *active* inflammation, down to those which accompany an *atonic* or a *passive* inflammation, or even those which denote mortification;—so that we have symptoms of activity and strength, and all the intermediate shades and degrees, down to symptoms of extreme prostration

of strength; and even a disposition to putrescency in the fluids of the body.

Early Symptoms.—In an attack of fever, there is (from the first) more affection of the head, than when the constitutional symptoms of mere inflammation occur. There is generally (at first) more or less confusion, giddiness, and drowsiness; perhaps even stupor or watchfulness. There is generally, from the first, pain of the loins; with a complete loss of appetite, and a general sense of debility. The countenance, too, in fever, is almost always expressive of heaviness and anxiety. The countenance of continued fever, is exceedingly characteristic; the patient is both very heavy in his look, and is evidently, at the same time, labouring under a degree of uneasiness. Sometimes, in these circumstances, the face is pale; but still there is the heaviness and the anxiety. Sometimes the face is flushed, and the eyes look red; and there is frequently great heat of the head. The vessels feel to the patient to throb; and they feel so likewise to the medical attendant. There is then great pain usually felt in the forehead. The tongue is generally tremulous;—whatever may be its appearance as to dryness or colour. The extreme feeling of weakness, and the aching of the loins, in the beginning of this disease, are no less characteristic than the countenance.

Heat of the Surface.—As to the particular symptoms to which I have just now alluded, the heat is sometimes intense. The temperature of the body will sometimes rise to 104°, 108°, or 110°; and sometimes it is of that peculiar character which authors have denominated *mordant*;—a pungent, or biting heat. Galen, Sir John Pringle, and Sir Gilbert Blane, all speak of "mordant heat." Galen, when treating of autumnal remittent fever, says, that the great mark of it is the mordacity and acrimony of the heat; which erodes the touch, just as smoke does the nose and eyes. ("Maximum indicium est mordacitas et acrimonia caloris; quæ, perinde ac fumus nares et oculos, sic ipsa erodere tactum videtur.") This peculiarity of heat is not felt, he says, the moment the hand is applied; but is perceived on continuing the hand upon the patient for a certain time. Sir Gilbert says, that in ship-fever, there is a peculiar heat of the skin;—a glow of heat imposed upon the palm of the hand of the practitioner, who has grasped the wrist of the patient; and which lasts some hours, if the hand be not washed sooner. He adds, that he never saw this in the sporadic fevers of England; though he has been informed of its occurrence. Andral also mentions the same circumstance. He says that, in the continued fever of Paris, the heat of the skin was in one case very high, acrid, and mordant;—leaving a sense of heat for some time upon the hand of the practitioner;—a sensation, he says, very nearly allied to pain. ("La chaleur de la peau étoit devenue très elevée, acre, et mordicante. En laissant quelque tems le doigt en contact avec elle, on eprouvoit une sorte de sensation penible, voisine de la douleur.") Sometimes, however, the heat is not increased in fever; or if it be increased, it is only partially; and it varies in degree at different times. Occasionally, the temperature in fever is below what it ought to be; and, in the last stage, there is sometimes absolute coldness.

The Pulse.—The pulse, like the temperature, is generally increased. The pulse in continued fever may be full or hard, soft, small, or weak. Like the temperature, it may be of all degrees. As the temperature may be from 110°, down to far below the natural standard, so the pulse may be quick, full, hard, and strong; or it may be more or less slow. It may be so feeble, as to be easily extinguished;—to be what is called a "flutter-

ing", or a "vermicular" pulse. It varies in this way, according to the tonic or atonic character of the disease; and according to the stage of the affection. In examining the pulse, if there be signs of debility, and the pulse be strong, we ought to examine the actual state of the circulation at the heart itself. We ought, if we be in any doubt, to resort to that method; for occasionally there may be the extreme debility of fever, with rather a strong pulse. The heart may be in a state of disease; which, in consequence of not having seen the patient before his present illness, we may not be aware of. The heart may be greatly thickened; and, although it may be acting less forcibly than it did before the attack of fever, yet it may act (from its thickness) so as to produce a full pulse;—such a pulse as might incline us to adopt active measures.

The quickness of the pulse in fever may amount to about 200. Such a pulse as that cannot be counted at the wrist; but we may count it, with perfect ease, at the heart itself. The usual range of the pulse, however, in continued fever, is from 90 to 160. Occasionally it is not quick;—just as the heat occasionally is not increased; nay, it is sometimes even slower than it should be. This takes place chiefly when the head is very much oppressed. It occurs sporadically from the state of the head, or from some peculiarity in the individual's constitution. It has, however, occurred epidemically. There have occurred epidemical fevers, in which one of the characters was slowness of pulse. De Haen mentions a sporadic case of very severe fever, in which the pulse was only 44. Sarconi, in his account of an epidemic which prevailed at Naples, states that the pulse was hardly more than 40 in a minute, in some cases.

Occasionally in fever the pulse is regular; while in health it is intermittent. Many such instances are upon record. Andral mentions a case of fatal fever, where the pulse at first was intermittent; but as the symptoms grew worse and worse, the pulse became more and more regular; till at last it was perfectly so. Rasori, the celebrated Italian physician, mentions the case of an individual, in whom the pulse was regular till the fever was over; and then it became intermittent. He therefore inferred that his pulse, in health, was naturally intermittent. De Haen also mentions the case of a man, who had an intermittent pulse at all times, except when he was labouring under fever. Monro and Shenkius mention such cases; and Dr. Heberden himself saw two persons, whose pulse was always intermittent, except during illness. Dr. Heberden knew a female, who had intermittent pulse all her life; and who at last died of cancer of the womb; but in whose circulating system an able anatomist could discover nothing unhealthy.

State of the Skin.—The skin in fever is usually dry; but, as a favourable change takes place, it becomes more soft; and the moisture is for the most part general. Sometimes, however, in fever there are partial sweats, which are by no means favourable; and when death is near at hand, then the sweats are generally both cold and clammy. Sometimes the sweats are offensive; especially if there be great debility. Upon the skin are not unfrequently seen spots;—discolourations of various sizes. If they be exceedingly small, they are called *petechiæ*; if larger, they are termed *vibices*[a]; if still larger, they are denominated *ecchymoses*. These spots are of various shades; from a tolerably bright redness, down to a purple hue. They occur particularly in the last stage of the disease, where there

[a] From "vibex, vibicis", *a mark of a blow.*

is extreme debility; but sometimes they occur where there is *not* great debility. At particular periods, continued fever is characterized by them; and I once saw a greater number of instances of that description within three months, than I had ever seen before during many years.

State of the Tongue.—The tongue is usually dry in fever. With respect to colour, it may be white, or yellow, and loaded; it may be of a whitish brown, or really brown; or it may be absolutely black. Occasionally it is brown down the middle; and has a broad white band on each side;—the edges, perhaps, being red. It is sometimes of a reddish brown. Occasionally it is red, glazed, smooth, and dry; and not unfrequently, in these circumstances, it is cracked also. It is very common to see it more or less white or brown on the back; with redness at the tip, or redness at the edges. Occasionally it is extremely pale. When the tongue is of a reddish brown, or really brown, or absolutely black, we usually have likewise collections of black matter about the teeth and lips;—"sordes"[a], as they are called. They are the result, no doubt, of vitiated secretion; and sometimes they are partly the result of a little effusion of blood, which coagulates; and, uniting with the secretion, contributes to their formation. The tongue is generally tremulous; and frequently the extremities are in a similar state;—so that, when the patient attempts to move, his hands or his legs tremble; but even when they do not, we may generally observe a tremor of the tongue. From the dryness of the tongue, and perhaps of the fauces, the patient necessarily suffers thirst. The breath is frequently offensive;—much more so than the perspiration.

The Urine.—The urine is scanty and high-coloured;—containing an excess of the lithates, and the purpurates (chiefly the purpurate of ammonia, but also the purpurate of soda); together with the yellow colouring matter, which naturally exists in the urine. As the fever declines, the lithates become super-lithates, and are precipitated; so that we have a red sediment. The urine has a strong animal smell; and not unfrequently it has a strong ammoniacal smell; and almost as soon as it is discharged, it rushes into a state of putrefaction. Occasionally the urine is very dark-coloured; and sometimes it is bloody.

The Stomach.—With respect to the stomach, the appetite, for the most part, is lost; but—just as there are extraordinary instances, from time to time, with regard to the pulse, (such as its being regular in fever, while it is intermittent in health,)—so, with respect to the appetite, there are upon record cases in which, so far from its being lost in fever, it was much increased. In the fifth volume of the "Transactions of the College of Physicians"[b], Dr. Satterly mentions the case of a boy who laboured under typhus-fever, attended by marked inflammation of the head. The exacerbations of the fever were always attended by a voracious appetite;—so that, in the midst of the fever, he would eat four meals a day; and each meal would have been sufficient for a stout labourer.[c] Besides these four meals of meat and vegetables, he daily ate many pounds of dry bread, biscuit, and fruit.[d] He had no sooner eaten a meal, than he denied that he had eaten any thing; so that the more he ate the more he desired:—

[a] Filth.

[b] Page 350.

[c] The boy would eat, at a meal, a pound and a half of beef-steaks, a large fowl, or a couple of rabbits; without, apparently, satisfying his appetite.—"*Medical Transactions, published by the College of Physicians, in London.*" *Volume 5; Page* 353.

[d] "Exclusively of several basons of sago and other slops." (See the Volume and Page mentioned in the last note.)

"Cibus omnis, in illo,
Causa cibi est; semperque locus fit inanis edendo." [a]

If he was not fed the moment he requested it, he sucked the bed-clothes and bit his fingers;—in this, also, bringing to one's mind Ovid's account of Erisichthon:—

"Ipse suos artus lacera divellere morsu
Cœpit; et infelix minuenda corpus alebat." [b]

This boy discharged several very copious stools a day; and he recovered perfectly. The appetite, however, usually returns as the disease declines; and when the disease is first gone, the appetite is for the most part voracious. Persons say there is nothing the matter with them; but that they are hungry. The stomach, however, is frequently much more affected than with mere loss of appetite. Even from the very first there is nausea; and, in many cases, vomiting. Sometimes the vomiting does not occur from the beginning;—does not make its appearance, till the disease has existed for a length of time. The stuff which is vomited may be mere mucus; or it may be bile; or it may be like coffee-grounds; and sometimes the quantity is very considerable.

The Intestines.—The intestines likewise suffer in this disease. There is often more or less costiveness; but very often there is diarrhœa. Sometimes the diarrhœa begins with the disease; and sometimes it will not come on, till the latter has existed for a certain period. The character of the stools is as various, as the character of the matters vomited. They may be very watery; or they may be mucous, or (as the common people say) slimy. They may be (in colour) yellow, greenish, or white. They may be exceedingly offensive; and perhaps bloody.

The Brain.—The functions of the brain are almost always affected. Pain, vertigo, and tinnitus aurium, are very common; and sometimes there are convulsions, dulness, or stupor; there is usually great depression of spirits; and there may be delirium at night, terrific dreams, and watchfulness.

The Breathing.—It is said, with regard to respiration, that more oxygen is consumed in the hot stage of fever (as well as during digestion and exercise) than in health; and that more carbonic acid is formed; whereas, in the cold stage (as, indeed, after bleeding, and in dyspnœa) less oxygen is consumed, and less carbonic acid formed.

Excitement.—The disease, such as I have described it, may have all the symptoms of mere excitement, with no remarkable debility. There is always a feeling of more or less debility; but there may be sometimes *chiefly* excitement; and only that debility which is inseparable from fever. The fever may be subdued; the morbid changes which occur in the secretions and functions, may decline; nothing but weakness and a degree of emaciation may remain; and recovery from these may speedily take place. The emaciation, I may observe, is proportionately greater after fever, than after any other acute disease.

Debility.—However, this may not be the progress of the case. Signs of debility may appear; the breath may become very fœtid; as may also the

[a] "Food, in his case, is a provocative to food; and his appetite is always increased by eating."—*Ovid's "Metamorphoses"; Book* 8; *Fable* 11; *Lines* 104 *and* 105.

[b] "He began cruelly to mangle his flesh with his teeth; and, with the view of nourishing his body, diminished it."—*Ovid's "Metamorphoses"; Book* 8; *Fable* 11; *Lines* 140 *and* 141.

perspiration, and all the discharges;—whether from the stomach, the intestines, or the urinary bladder. What is vomited may be like coffee-grounds; the urine may be bloody; and so may the fæces. Even blood may be found in the mouth; or may be poured forth under the skin. There may be extreme blackness of the tongue; and a great quantity of sordes upon the teeth, lips, and every part of the mouth. All the fluids may be secreted in so vitiated a manner, that they may putrefy as soon as they are discharged; and the body may become putrid directly after death. One cannot conceive the possibility of putrefaction of parts still alive, or of the secretions at the moment of their formation; but they are often as near putridity as is compatible with life. The secretions putrefy, the moment they are separated from the body; and the body itself, as soon as it is dead, will frequently rush into great putridity. The discharges are sometimes so offensive, that perhaps the very house is intolerable. In these circumstances, the pulse is very rapid and very weak; there is extreme prostration of strength; and a death-like faintness is complained of by the patient. The face becomes ghastly;—in fact, we have the "facies hippocratica." The intellect is greatly disturbed; there is an inability to attend to any thing; a troublesome hiccup; catching and working of the fingers (called "*subsultus tendinum*"[a]); perhaps convulsions; at any rate, cold clammy sweats; and an involuntary discharge of the urine and fæces. Still, the debility and putrescency may decline; and a high degree of these symptoms be recovered from.

Varieties.—If the symptoms be purely inflammatory,—purely those of excitement, with good strength at first, and do not afterwards degenerate into debility, or at least not into *considerable* debility, the disease is called "synocha." If they degenerate into great debility, it is called "synochus." If, from the very first, great symptoms of debility appear, it has been called "*typhus*."[b] These are arbitrary names;—the two first having the same etymology[c]; but they do very well to express different characters of the same disease, in different individuals. When it is called "*typhus*", it is the same fever as many authors write of under the name "*ship*-fever", "*hospital*-fever", "*gaol*-fever", "*putrid*-fever", or "*adynamic*[d] fever." If the symptoms be very severe indeed, then it is called "typhus *gravior*"; but if they be mild, though it even prove fatal, it is then called "typhus *mitior*";—typhus being divided into two varieties. There is every variety in continued fever; both as to the degree of excitement and the degree of strength;—from the very highest excitement, and a high degree of strength, down to the most absolute prostration that can be present; and from no putrescency, up to a high degree of it.

Duration.—The duration of the disease,—whether active and inflammatory, or of great debility and even putrescency,—may exist from one or a few days, to several weeks; but it rarely extends beyond eight or ten weeks. Occasionally the disease will end with a discharge of blood, either from the nose, the intestines, or other parts; or with purging or sweating. Dr. Gregory[e] said that he once knew a fever terminate by a great discharge of healthy urine. Andral says that he once saw a fever terminate with a profuse expectoration; and once with an alternation of sweating and expectoration. Suppuration after the disease, a general crop of petechiæ, and even the emaciation which follows the disease, are mentioned by authors as happy

[a] "Leaping of the tendons."

[b] From τυφω, *to smoulder.*

[c] They are derived from συνιχω, *to continue.*

[d] From α (privative), *without*; and δυναμις, *power.*

[e] See Note to Page 270.

terminations;—as critical circumstances, which were closely connected with the happy result of the affection.

Critical Days.—These discharges, when they occur, are called "critical"; and the amendment is called "a *crisis.*"[a] The ancients imagined that a crisis occurred particularly on certain days; and hence those days were called "critical." During the first eleven days of fever, these critical days were of a *tertian* character; so that the third, fifth, seventh, ninth, and eleventh days, were critical days; and were supposed to be those, on which the disease was supposed to terminate well. After the eleventh day, the type was supposed to be *quartan*; so that the fourteenth, the seventeenth, and twentieth days, were then supposed to be critical. If a change took place, it was supposed to be most favourable and most complete when it occurred on those days. It might happen on other days; but it was then supposed to be less favourable. Some are of opinion that the testimony of Hippocrates and Galen, among the ancients, and of Dr. Fordyce[b], Dr. Stoker, and Dr. Percival[c], among the moderns, in favour of these critical days, is too great to be withstood; but others imagine that it was a mere hypothesis, founded upon the Pythagorean doctrine of numbers; or that it was taken from the types of *intermittent* fever, which the ancients supposed *continued* fever must very much resemble. De Haen says, that of one hundred and sixty-three terminations of fever mentioned by Hippocrates, one hundred and seven (that is, two-thirds) took place on the critical days;—namely, on the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, and twentieth; that none took place on the second or thirtieth; and only eighteen (that is, one-ninth) on the other non-critical days;—namely, the eighth, tenth, twelfth, fifteenth, sixteenth, eighteenth, and nineteenth. The only types of fever now talked of here[d], are those of fourteen and twenty-one days;—so that the common people will say, that a patient has a fourteen, or a twenty-one day fever. Perhaps the vulgar only retain notions which formerly prevailed among physicians. Physicians may have inherited these notions from the ancients; and so they may have come down to us, and still linger among the vulgar. The notion *may* be correct. Some persons say they do observe these things; but I cannot say that I have ever noticed the disease to terminate on one day, in preference to another. The reason that we do not observe what the ancients did, is said to be, that we are more active in practice than they were. We do not let nature take her course, but endeavour to knock a morbid process on the head; and we cure far more cases of fever than they did. We allow diseases to run on a much shorter period, than they were accustomed to do; and some ascribe the want of critical days to our active practice. To shew the inefficacy of the practice of the ancients, Broussais mentions that Hippocrates, in the first and third sections of his work on Epidemics, gives an account of thirty cases of acute disease; in which cases sixteen of the patients died, and the other fourteen suffered much afterwards. It must have been bad practice to lose sixteen acute cases out of thirty, unless in particular circumstances;—such as in the eastern epidemic, improperly called "cholera-morbus." Sir Gilbert Blane says, that, in the first and third sections of Hippocrates, forty-two cases of acute disease are mentioned; thirty-seven of which were continued fever *without* local affection, and five *with* local affection. Of these twenty-five died;—twenty-one out of the thirty-seven, and four out of the five. If nature had an inclination to perform

[a] From κρισις, *the separation of something from the body.*

[b] See his "Dissertations on Fever."

[c] "Practical Observations on Typhus Fever; by Edward Percival, M.B."

[d] In London.

her cures on certain days, she had there a fine opportunity; but at the present day we so interrupt her course, that I have never observed critical days.

SECTION II.—LOCAL COMPLICATIONS.

The parts most dangerously disturbed in fever, are the head, the chest, and the abdomen. The relative proportion of disturbance, in these different regions, is exceedingly various; but the head and abdomen suffer most of the three; except where there is a particular epidemic character; or an individual predisposition to, or a local cause of, excitement in the chest. With these exceptions, the head and the abdomen suffer far more, in continued fever, than the thorax. It is in hot climates, and in hot seasons, that the abdomen is most affected. The local disturbance, when very great, is usually of an inflammatory kind;—at least it is usually inflammatory at first. But as there are all degrees of the general affection, from tonic to atonic, so the local affections may be of all degrees of violence;—varying from active tonic inflammation, down to mere irritation, or extreme loss of power.

Cerebral Complications.—To begin with the *head*. The local affection there, when very great, may give rise (as I have said before[a]) to drowsiness, headach, convulsions, vertigo, watchfulness, and tinnitus aurium. But it may amount to a higher degree than this; so that we have violent headach,—such as distracts the patient; violent throbbing, which is visible when you look at the temples; intolerance of light; redness of the eyes; and violent delirium. The delirium may be constant; and it may be such as to require corporeal restraint. There may be loud, incessant, incoherent ravings; and ignorance of persons and things, which before were perfectly familiar to the individual; and yet, in the midst of this, a person may be rational and sensible for a single moment;—he may be momentarily recalled by some circumstance, but is instantly off again. At the same time, there is a picking of the bed-clothes, and tremor. Delirium of this description, is called "*delirium ferox.*"[b] On the other hand, the delirium is sometimes not of this ferocious character. The patient mutters to himself; there are altogether slighter symptoms of disturbance of the head; and it is then called "*delirium mite.*"[c] Occasionally, where there is great debility, there are no symptoms of vascular excitement in the head;—no headach, no intolerance of light, no redness of the eyes, or throbbing of the temples; but merely muttering delirium. Sometimes there is great stupor, and a comatose state; with or without symptoms of an inflammatory disposition in the head.

Abdominal Complications.—As to the *stomach*, there is almost always anorexia[d], vomiting, purging, or costiveness; but these symptoms are sometimes extreme. There may be copious and intense vomiting of every thing that is taken, and of fluids of all descriptions. There may be violent diarrhœa,—of all kinds of characters. The abdomen may be excessively tender to the touch, and painful on the slightest pressure. It may be exceedingly distended; and may be especially painful at the epigastrium, or in the hepatic region. There may be a sense of burning in the abdomen, more particularly at the epigastrium; it may be felt likewise up the throat, and be attended by extreme thirst. When the symptoms in the abdomen

[a] See Page 327.
[b] "Fierce delirium."
[c] "Gentle delirium."
[d] From ἀν, *without*; and ὄρεξις, *appetite*.

run high, they are extreme vomiting, extreme purging, extreme tenderness, and perhaps violent pain, even when compression is not employed.

The state of the *tongue* has been supposed to correspond with that of the alimentary canal. When the internal coat of the stomach is inflamed, the tongue is often, perhaps generally, red;—either throughout, at the edges, or at the tip; but the agreement in the two organs is not constant. The tongue may be red in fever, and in other diseases, without any corresponding state of the stomach;—at least, without any *evidence* of it; and therefore the alleged universal correspondence is a mere assumption. A blackness of the tongue is rather indicative of the general debility of fever, than of a gastric affection. Thirst may be commensurate with a gastric affection; but it may arise simply from the intensity of fever drying the fauces. Again: ulceration and inflammation of the stomach or intestines have been found, where the tongue had not been red during life; and it is said that sometimes neither they, nor any abdominal inflammation, could be discovered, where there had been much pain of the abdomen experienced on pressure. Purging may be very violent without inflammation of the mucous membrane; which may be found healthy in consistence, and even pale;—just as we have profuse sweating in various circumstances, without any inflammation of the skin. It is not a necessary circumstance that the tongue should indicate the state of the stomach or the intestines. There is a certain correspondence between them; but it is by no means invariable. Neither is it a necessary consequence that, when we see great irritation of the stomach, and great irritation of the intestines, there should be inflammation. Frequently, after such circumstances have occurred, inspections have not shown that inflammation existed.

Thoracic Complications.—As to the *chest*, it is commonly a little affected. In general, we have the breathing more or less quickened; and there is a little cough; and generally, if the ear or the stethoscope be employed, we find some degree of sonorous, or sibilous, or mucous rattle in the lungs. The symptoms may not be such as to attract the attention of the patient, or the practitioner, or to demand any measures; but if we listen with the stethoscope, I believe we shall generally find the mucous membrane of the bronchia more or less affected. Sometimes, however, the respiration is very *much* affected. It becomes very rapid; and there is violent cough; pain in the side, or at the front of the chest; great rattle; copious expectoration; and all the decided signs of bronchitic, pleuritic, or peripneumonic affection;—so that, at last, there is blueness of the lips and cheek,—from congestion of the lungs. I believe that, throughout the disease, there is more *congestion* in the lungs than actual *inflammation*. The affection of the chest, though it generally exists, is far less frequently of an inflammatory nature, than the affection either of the head, or the abdomen; and, of these two, the abdomen suffers most.

The Blood.—If we examine the *blood*, we may find it buffed, and perhaps cupped; but frequently it is quite natural. Sometimes the coagulum is exceedingly loose,—corresponding with the debility; and frequently it soon putrefies. In the typhoid stage of exhaustion and debility, it has been found that the chemical characters of the blood are very depraved;—that it abounds more and more in serum, and less in its other constituents. As the disease is more and more characterized by debility, the blood at last resembles mere fibrin and serum. Little or no chyle is formed; and the blood is deficient in carbonic acid, and in saline materials. Dr. Clanny, of Sunderland, pointed out this circumstance; and Dr. Stevens made similar observa-

tions. He made them in a distant locality[a], without knowing what Dr. Clanny had done; —so that we have the unbiassed observations of two physicians, unknown to each other.

Other Complications.—Besides those particular parts that I have now mentioned, others are sometimes very much affected. Sometimes the eyes will become inflamed; and sometimes the throat, bladder, or skin. Sometimes we have an eruption of minute vesicles, of the size of millet-seeds; sometimes we have large patches of inflammation; sometimes we have irregular pimples,—papulæ. Occasionally we have a great discharge of blood from the intestines, and urinary passages; and perhaps all this without any correspondent severity of the general symptoms. Sometimes we have inflammation of the parotid glands;—ending in abscess. Occasionally abscesses will form in different parts; and sometimes a great crop of boils will appear. Now and then mortification of some part occurs;—not general mortification within the head, chest, or abdomen (the parts which are affected with *inflammation* in these cases); but mortification of the extremities, or of the loins. The debility is such, in this disease, that from a patient's lying long on his back, the loins are much disposed to mortify; and so may one or both hips. There being universal debility, the effect of pressure is not resisted, as it is when we are in health. If we lie upon a part, for any length of time, in health, it will not produce mortification; whereas persons in the debility occasioned by fever, from lying on their back, will soon have the circulation sufficiently impeded by the pressure to cause mortification. After fever, the mind will sometimes remain dull, or even imbecile, for a length of time;—sometimes for several months; and sometimes there is a great depression of spirits; which the patient, although in other respects pretty well, cannot shake off. Sometimes a hand or a foot, or both hands and both feet, or a whole extremity, will remain for a longer or shorter time bent, and little influenced by volition;—so that, indeed, a person is perhaps a cripple for life. I have seen several persons, whose hands or feet have been bent up in this way, after fever; and where this state ceased after a time; but I know others, in whom this state of parts continued many years, and continues still.

SECTION III.—MORBID APPEARANCES.

The appearances after death will vary exceedingly. They are chiefly situated in the head, chest, and abdomen;—occasionally in *one* of these parts, occasionally in *two*, and occasionally in *all*; and, in all these parts, they will sometimes vary, both in their positive degree, and their relative proportion. The appearances vary;—from those of active inflammation, down to very slight marks of inflammation indeed;—where the case has been one rather of irritation than of inflammation; and they are sometimes those, not merely of ulceration, but of gangrene, or an extreme degree of softening. The morbid appearances are chiefly found in the head and abdomen;—just as the local symptoms during life are principally situated there; and occasionally we find degeneration of the structure of parts, without much inflammation;—exactly as (I remarked[b]) is often the case independently of fever. We have softening, and various other changes, without any marks of inflammation at all proportionate to those changes.

[a] London.

[b] See Page 198.

Appearances in the Brain.—We will begin with the *head.* We sometimes find, in the brain, more red points than usual. We sometimes find the arachnoid injected;—both as to its superficial portion, and as to that portion which lines the ventricles. The veins and sinuses are frequently found turgid; and frequently there is too much serous fluid upon the brain, and in its cavities. But it must be remembered that, in all this, there is great room for fanciful opinion. On opening the brain, some will maintain that it is very healthy; and others will contend that there are more bloody points than there ought to be;—that the veins and sinuses are too full; or that there is more serous fluid than natural. We must take care, therefore, to be quite sure we are right, when we assert that any thing preternatural is found in the cavity of the head. It will continually happen in fever, that there shall be rather more bloody points than usual; without the patient, during life, having shown particular symptoms of an affection of the head. These appearances will vary in different individuals, even in health; —exactly as appearances do in other parts of the body. To enable us to say that there are decided inflammatory marks about the head, we ought to see appearances respecting which no one would entertain a doubt. When two or three persons differ in opinion, we ought to be much upon our guard in supposing that there is really any morbid appearance. I know there is so much fancy in all these things, that it is absolutely necessary to exercise the greatest caution in drawing a conclusion. But sometimes we do find, in fever, more bloody points than natural in the substance of the brain. The vessels of the pia mater are sometimes really in a state of congestion; sometimes the sinuses; and sometimes we find more fluid, indisputably, than ought to be there. This fluid is various in its appearance;—as in all other cases of affection of the head. Sometimes it is clear; sometimes turbid; sometimes fragments of lymph may be seen floating in it; now and then there is even effusion of blood, or (at any rate) the serum is bloody. But very often in fever, after there has been strong phrenitis, or strong marks of excitement of the head, we find nothing. I have repeatedly opened patients, who have died with marks of affection of the head, in whom the appearances after death have been quite disproportionate to the symptoms which occurred during life; and others in which I doubt whether any one, unprepared to *expect* any thing in the head, would have *found* any thing. Indeed, it is said by Andral, that the morbid appearances in the head, are less than those in the abdomen; and I believe this to be the case.

Appearances in the Thorax.—If the *chest* happen to be the part very much affected, (which is rarely the case,) then we may have far more morbid appearances in the chest than in the head; notwithstanding that many have said, that the disease is situated in the head. If the thorax happen to shew marks of disease, we may find the lungs soft;—we may find them filled with a frothy red fluid; and sometimes they will crepitate as in health, and sometimes not. Sometimes they will be soft, and quite impervious to the air,—especially if there have been extreme debility; and sometimes, but very rarely, they are in a state of gangrene. It is very rare to find them in a state of solidification, or what is strangely called "hepatisation."[a] Now and then we find them solid and grey in different parts;—spots of grey solidification; and it is common to find an abundance of red frothy fluid in them. One of the most frequent appearances in the chest, is redness and thickening of the bronchial tubes; because a slight

[a] From ἧπαρ, *the liver.*

degree of bronchitis is very common in fever. Now and then the pleura is affected. An effusion is observed in the pleura; perhaps redness of the membrane; perhaps adhesions;—at any rate an effusion of lymph. Now and then even blood is found. The appearances, in fact, bear an analogy to those which are found in the head. The blood which is found in the heart and large vessels, is generally fluid, and of a very dark colour. As to the coats of the arteries being inflamed, that we shall not necessarily find to be the case; though some have said that in fever they are always inflamed. The inner coats of the arteries may be inflamed now and then, like other parts; but we may open scores of bodies, and find no such thing. In one case, the coronary arteries were ossified; and yet the patient had no symptoms of angina pectoris; which is said to occur when the coronary arteries are ossified.

Appearances in the Abdomen.—If we come to the *abdomen*, we shall sometimes find marks of inflammation of the peritonæum, or at least of the sub-peritonæal cellular membrane;—or we may find inflammation within the stomach and intestines. The intestines are in general contracted, whether inflamed or not; but inflammation in the intestines is very common as well as in the stomach; and is situated in the cellular membrane under the muscular coat, or in the mucous membrane itself. It has been long known that, in fever, the intestines are very frequently inflamed. Theophilus Bonetus, an old writer, says that inspections of those who died of intermittent fever, shewed that the stomach and intestines were inflamed. ("Anatome eorum qui febre malignâ extincti sunt, docet ventriculum cum intestinis inflammari."[a]) Bartholini bore testimony to the same fact:—"In omni febri acuta, imminet ventriculi inflammatio."[b] Sydenham says that the intestines are frequently ulcerated in continued fever.[c] The knowledge of inflammation existing in the intestines, and also other affections, is not altogether new; though the fact was neglected. When the intestines are opened, we frequently find very extensive redness; and the redness will sometimes end suddenly, as inflammation of the skin will do; and sometimes it is lost insensibly in the surrounding parts. Occasionally we find the redness extensive,—running the length of a foot or so; but generally it is found merely in patches. Occasionally this redness is arborescent; and has little red spots around it. The redness varies in hue, from a bright red to a brown, or even a purple shade,—according to the degree of congestion; and sometimes it is a very dark red. In continued fever, the mucous coat is often thickened; and it may be thickened to a great extent or only in patches. Sometimes it is softened; and, indeed, all the coats of the intestines are sometimes in the same condition,—softened. On the inner surface of the intestines,—the mucous membrane,—there are frequently small, red, conical elevations,—pimples; like the fringes below the tongue; or little white projections, either conical, or with a central depression. These last appearances are observed much more in the inferior two-fifths of the small intestines, than elsewhere; indeed, it is in this situation that we find the chief morbid appearances. In the colon they are generally pointed. Occasionally, these white conical elevations are real pustules; or, at least, small follicles containing real pus;—so that we have what may be considered pustules.

The secretion of the intestines is diseased. The mucus is of a thicke

[a] "Sepulcretum, sive Anatomia Practica."

[b] "In every acute fever, the stomach is in imminent danger of inflammation."

[c] See his "Opera Medica." This wo has been translated by Dr. G. Wallis.

quality than it should be;—sometimes almost as thick as fibrin; and sometimes it is bloody. The mucous membrane will frequently peel off; not from any affection of its own, but from the cellular membrane which attaches it to the next coat being so brittle, as no longer to form a medium of union. Very frequently a quantity of blood is effused into the cellular membrane, under the mucous coat. Nothing is more common than to find ecchymosis [a];—an effusion of blood into the cellular membrane, under the mucous coat.

Ulceration of the Intestines.—Ulcerations are continually found in the lowest third of the ileum, nearest to the cœcum; and the nearer to the cœcum, the greater is the degree of ulceration. I just now mentioned [b] the frequent occurrence of red patches. In the midst of these, there is frequently ulceration; and then, again, the surface beyond the patches is frequently pale. It would seem that superficial inflammation had taken place locally, with great severity; and in the centre had proceeded to ulceration. But these ulcers frequently occur, also, in the little pimples or pustules of the glands; so that we have, in the intestines, two kinds of ulceration;—the one superficial, giving the idea of an abrasion (such as occurs in the mouth, throat, or on the organs of generation); and the other occurring in the glands. These ulcerations are of all sizes, and of all shapes. A portion is sometimes ulcerated to a very great extent; and sometimes these ulcerations are sloughy; or, at least, we may detach a sloughy layer of something;—perhaps sometimes a diseased secretion; and underneath we find an ulcer. Surrounding the glandular ulceration, we frequently see the mucous membrane more or less detached; and the ulcer, of course, extends to various depths.

Perforation.—Sometimes it extends so deeply, as to go through all the coats, and perforate the peritonæum. When this occurs, there is generally sudden peritonitis induced. Pain is felt at a particular spot, and darts from it in all directions; and speedy death generally ensues. Nature, however, sometimes prevents this (as I formerly said [c]) by producing adhesion; or perhaps the perforation is blocked up by a piece of omentum, or something else; but if this do not occur, violent peritonitis takes place, though not always. Occasionally the inflammation which is produced, is of a slow, chronic form. The patient recovers from the fever; but continues to labour under peritonitis, in a chronic form. Occasionally there is no pain; but this is rare. Generally, when a perforation occurs in the peritonæum, violent peritonitis is induced; and the patient sinks. Now and then, we have an abscess in the *substance* of the intestines;—in their cellular membrane, I presume. It occurs there as it does in the cellular membrane anywhere else. The peritonæal and the mucous coats being sound, the matter is produced between them; and is contained in the cellular coat. With respect to inflammation of the *muscular* coat of the intestines, I do not believe that such a thing occurs. Mucous, cellular, and serous membranes, are far more frequently inflamed than muscles. It is rare for muscles to be inflamed; and there is sufficient of the former structures in the intestines to become inflamed, without supposing that the muscular coat is the seat of inflammation.

The period at which these ulcerations may take place, is very various. It would appear that, occasionally, they will take place rapidly; because persons have shewn them who have only had fever a couple of days; but generally they occur slowly. They are more frequently observed in persons

[a] From ἐκχυμωμα, derived from ἐκχυω, *to pour out.*

[b] See the previous page.

[c] See Page 65.

who die of fever, than in those who fall victims to other complaints. The large intestines are seldom affected;—at least, far less so than the stomach or the small intestines; and of the latter, it is in that portion nearest the cœcum,—the lowest third of the ileum, or at the utmost the lowest two-fifths,—that we chiefly find these appearances. [a]

Splenic Disease.—I have in my possession a curious specimen of diseased spleen;—shewing intense ossification. The peritonæal coat is exceedingly thickened;—so much so that it has become absolutely white. It is not only thickened, so as to have become almost cartilaginous; but there is a rare occurrence within. The blood-vessels (I presume, the arteries) are ossified. On passing the fingers over any of these vessels, the coats of the vessels are felt to be bony. There is another curious circumstance. Ulceration has taken place in the peritonæal coat of the spleen; which is rather a rare thing; though sometimes we see ulceration beginning in a serous membrane, and going inwards. In general, ulceration proceeds outwards (as is the case in ulceration of the intestines), till at last the peritonæal coat is ulcerated; but here the external coat of the spleen is alone ulcerated;—there being no ulceration beneath it.

State of the Muscles.—In fever attended with extreme exhaustion, the muscles (I believe) are generally soft and livid. The blood, I mentioned [b], is generally fluid and black in the large vessels; and the muscles are generally soft and livid;—a fact altogether corresponding with the state of the blood. I mentioned [c] that if, in a case of typhus-fever, where there is great prostration of strength, the blood be analyzed, it will be found to contain less saline matter than should be there; and it is said to contain less carbonic acid than natural;—in fact, it is more like lymph than blood. The liver and spleen are rarely affected. The bile is often abundant, and sometimes very dark and thick; but in other cases it is just the reverse;—pale and thin. Sometimes it is acrid, and sometimes not. The liver or spleen may exhibit marks of inflammation; or, if not inflamed at the time, the *results* of inflammation may be seen;—in the form of a little suppuration, &c. The organs in question may be softened. But all these things are very uncertain.

SECTION IV.—DIAGNOSIS AND PROGNOSIS.

Diagnosis.—We form our diagnosis, and determine that the case is one of fever, in a great measure, by observing that the constitutional symptoms are disproportionate to any local affection which may exist. The constitutional symptoms are, of course, influenced by a local affection; but they are out of all proportion to it; and frequently they are altogether of a different nature. For example: there is often to be discovered no local sign of inflammation, or of any local disorganization; but there is extreme debility from the very first;—a sense of debility, indeed, which is not observed in any mere inflammation. The countenance, too, is peculiar;—expressive of both anxiety and oppression. There is almost always, from the first, pain of the loins; and, nearly throughout the disease, tremor of the tongue. All these circumstances are very different from those which we see, in mere inflammation of the brain,

[a] The various morbid appearances here described, as occurring in the intestines, are well represented in Dr. Carswell's plates.

[b] See Page 334.

[c] See Page 331.

or of the chest. Sometimes there is a local inflammation of the liver, or of the stomach; but we have also a disproportionate loss of strength; perhaps a feeble pulse; perhaps a putrescent state of the body;—symptoms, in fact, of a character different to those which arise from mere local inflammation. The countenance, and the sense of debility, are very characteristic from the very first.

Prognosis.—The prognosis must be taken, in the first place, from the severity of the disease; but we need not give an unfavourable prognosis, because the constitutional symptoms of excitement are very violent. Here *general* excitement is by no means dangerous; but when it is accompanied by extreme *local* excitement,—by marks of severe local inflammation, then there is reason to apprehend danger. As long as we can discover no great marks of inflammation in the head, chest, or abdomen, the general excitement, however violent, is not in itself dangerous. But although we have no right to infer danger from extreme excitement, when there is no great local affection, yet symptoms of an opposite description are always dangerous. In proportion to the intensity of the signs of debility, is the degree of danger. Intensity of general excitement, is not alarming in proportion to the excitement; but the danger is proportionate to the marks of real debility.

The marks of debility, in fever, are great rapidity and weakness of pulse. Andral says that he never knew a person recover from fever, whose pulse exceeded 140; but I believe it is well known that recovery will take place after a pulse even of 160,—however dangerous such a pulse may be. Dr. Heberden mentions recovery from fever, after a pulse of 180. If rapidity of pulse be accompanied by weakness, then of course the danger is so much the greater. Involuntary discharges of the urine and fæces, likewise, shew great danger; because they prove extreme debility; or extreme local affection (of the head or abdomen, for instance). They will arise from the patient being unconscious of what he is about,—from being in a state of stupor; and they will also arise from the patient being too feeble to make an effort to restrain them; either of which conditions is extremely dangerous. We learn much, too, from the position of the patient. When a patient lies on his back, there is more danger than when he lies on his side;—a greater effort being required to maintain the latter posture; but if the patient sink in his bed, the danger is greater still; for it then shews that he has very little power at all. A person can exert the muscles of deglutition, long after he has lost control over those of the trunk; and an inability to swallow, therefore, is one of the most dangerous symptoms. The countenance, I have already intimated, is a good index to the degree of danger. Blackness of the tongue, and of the teeth, is also more or less dangerous. We see patients recover every day, whose teeth have been covered with sordes, and whose tongue has been black; but still it is a bad sign. Abundance of the discharges, too, is generally dangerous, unless the symptoms remit; and the danger increases in proportion to their depraved nature. Another very unfavourable symptom is the discharge of blood, or its effusion under the skin;—forming petechiæ, vibices, and ecchymoses. The larger these spots, the greater the danger;—vibices being more dangerous than petechiæ; and ecchymoses more dangerous than vibices. Still, however, the presence of petechiæ in itself is not dangerous; for some epidemics are characterized by it; but if it be very considerable, and accompanied by other marks of exhaustion, then it is dangerous. Hiccup, too, is a dangerous symptom; on account of its usually coming on towards the fatal termination of the disease; but, now and then, fever may attack

dyspeptic persons; and we may have hiccup, not so much from fever, as from the disposition to it occasioned by the habitually weak stomach. Early debility is a very unfavourable sign. Debility, after the disease has existed for a fortnight or three weeks, would not be so dangerous as the same degree of debility at the beginning of the disease; because, if the affection be to last for a fortnight, and there is at the beginning the same debility which, in other cases, we have at the end of a fortnight, the debility may be such when the latter period arrives, that life may be extinguished. The more intense the debility, in the early stage of the disease, the greater is the degree of danger to be apprehended.

When a person has violent pleuritis, peripneumonia, enteritis, peritonitis, or any other local inflammation, the danger is aggravated; and the danger frequently rests solely upon this local affection. The age and constitution of the patient, are important considerations. Individuals of bad constitutions, who have been badly fed, or addicted to the vice of drinking, or have suffered from the want of proper rest, are very liable to fall victims to the disease. We must always consider the character of the epidemic; for if we know it to be of a dangerous nature, we should always give an unfavourable prognosis even at the outset, before dangerous symptoms have come on. We are sometimes obliged to give an unfavourable prognosis, from the state of the patient's mind. I have often seen patients die of fever solely because their mind was uneasy. I have seen two or three patients, within the last six months, who in all probability would have recovered from fever, had it not been for an unfortunate state of mind. If a patient has made up his mind that he shall die, or some real calamity presses upon him, then the medical man has a far less chance of success, than if his mind be in a state of happiness and tranquillity. If we know this to be the state of the patient's mind, we should speak with more caution, even though things are going on favourably, than we otherwise should; for we have an additional enemy to contend with. We must also, in giving a prognosis, have reference to the power which we possess of doing our duty. Sometimes—through the whims of friends, or the unwillingness of the patient—we are not allowed to do what we desire; and sometimes we are prevented, by another practitioner, from being quite as active in the use of means as we wish. These things are all to be taken into the account.

Favourable Prognosis.—The grounds of a favourable prognosis, are furnished by the decline of all the symptoms. But we must be on our guard, when the symptoms are declining generally; and ascertain whether all is well throughout the body;—whether there may not be still existing some local circumstance, from which danger may be apprehended. For example: fever will sometimes decline when the loins slough; and the patient may then die of exhaustion. A return of strength is one of the best signs. When a patient no longer sinks in bed, but is able to lie on his side, then the prognosis is favourable. We judge much from the countenance, and from the feelings of the patient himself. It has been thought that deafness is a favourable sign;—at any rate, it is *not* an *un*favourable sign. Many authors have thought it favourable; but why it should be so, I do not know. In many cases of fever, patients become very deaf; and they recover, just as though this circumstance had not occurred. The return of all the feelings of the patient to a state of health, must contribute to a favourable prognosis.

SECTION V.—CAUSES.

a. Remote Causes.

Predisposing Causes.—I will not enter upon the *exciting* causes of fever now; but will speedily run over the *predisposing* causes; and the first I shall mention is mental depression. Many persons do not become the subjects of fever (though exposed to all the exciting causes) till their mind is depressed. I have known many persons go, year after year, to spots where fever prevailed (from some local circumstance) with perfect impunity, till some calamity happened which greatly depressed their minds; and then they became the subjects of fever. It has been observed, with regard to the plague, that persons have not fallen victims to the disease, till they have lost a relative, or been cast down in spirits; and then they have sickened immediately. Diemerbroeck mentions an instance of this kind. A person escaped the plague, till he saw a funeral pass by; and, on inquiring who it was, he found that it was one of his dearest friends. He went home, sickened of the plague, and died. The same circumstance occurs with regard to fever, and all other complaints. Anxiety of mind will have the same effect;—downright grief, or anxiety lest misfortune should occur. Corporeal depression, and over-exertion of mind, will have the same injurious tendency. Too much muscular exertion, excess of venery, and debilitating circumstances of all descriptions, whether of mind or body, will lay the foundation for fever. The *want* of food, and *bad* food, are both predisposing causes. Famine and fever generally go together; and hence, perhaps, we pray in the same breath against "plague, pestilence, and famine."[a] Want of fresh air also predisposes to it. Adult age (or, at least, the vigorous period of it) appears the most inclined to it; for infants, and very aged persons, have fever less frequently than others. It is in adults, and not in the aged, that we most frequently see fever. Beside this, there appears to be a peculiar susceptibility to it in some persons: they will, with no evident reason, become the victims of fever, when placed in the same circumstances in which others escape.

Exciting Causes.—Some of the *predisposing* causes of fever may, by their continuance, become *exciting* causes. It is possible that the continuance of debauchery may, without any additional exciting cause, increase the disposition so much, that at last the disease itself begins;—requiring nothing at all, in addition to the debauchery, to produce it. One cause, certainly, of continued fever, is exposure to cold; especially when the body is over-heated. Many cases of fever appear to have nothing to do with any other exciting cause than exposure to cold, especially when this is united with wet; and more particularly when the body is over-heated and fatigued. Besides these very common causes of continued fever, there is generally allowed to be one of a peculiar description;—contagion.[b] Before considering this point, however, it will be necessary to make some remarks on the subject of contagion in general.

b. Contagion.

Definition.—By "contagion" is generally meant, I believe, either a peculiar matter generated *in*, or a depraved secretion *of*, a living system under disease; capable of producing the same disease in others, when

[a] See the Litany of the Church of England. [b] From "contingo", *to touch.*

there is *no indisposition* to it; and more especially if there be a *predisposition*.

Nature of the Contagious Matter.—I have said—"either a *peculiar matter* or a *depraved secretion*"; because, in the greater number of instances of contagion, it is a depraved secretion. Very frequently it is pus; as in the case of small-pox, syphilis, glanders, and a variety of other diseases. In the case of hydrophobia, it is either mucus or saliva; and in other instances it is apparently mucus. In the case of the skin, it sometimes appears to be sweat; but, for what we know, it may be sometimes separated from the body, unconnected with the real natural secretions of the latter. It is possible that an emanation of some kind may take place from the surface of the body, or the lungs, and infect the air, independently of the aqueous fluid which is separated from those organs; but whether such is the case I do not know. To avoid, however, the objections of those who admit such a thing, I think it better to say that it is "*either* a peculiar matter, *or* a depraved secretion." I have said—"*living* system", instead of "*animal* system", in order to avoid the objections of those who might urge, that contagion occurs in vegetables, as well as in animals; and of course it is the characteristic,—the necessary attribute of a contagion, that it should be able to produce the very same disease in others. Not that it can produce it in *all* others; because there are some that will not take a particular contagion; but it is able to produce it in others, who have a *predisposition* to it; or rather, I should say, who have *no indisposition* to it. I said—"others" (referring to the antecedent phrase—"living system"), because contagions produced by one species of animals have, in many instances, affected other species; for there are several diseases of the inferior animals ("brutes", as they are called), which may be communicated to the human body. It is necessary to say, therefore,—"produced in a *living system*; and capable of exciting the same disease in *another* living system"; —not of the *same species* merely; but "another living system",—speaking at large.

Nature of the Diseases produced by Contagion.—When diseases are so produced, they may be (in the first place) either *acute* or *chronic*. What are called "the exanthemata", are acute diseases; such as scarlet-fever, measles, small-pox, chicken-pox, cow-pock, and the plague; and so are hydrophobia and typhus (if the latter be a contagious disease); whereas the itch, syphilis, porrigo, elephantiasis, the yaws, the sibbens, and a disease (peculiar to Africa) called "laander", always become chronic if not checked; and are not more active at first than afterwards. Some contagious diseases may be considered both acute and chronic. The hooping-cough (if it be a contagious disease) comes on, usually, as an active disease,—with all the activity of the most acute diseases; and yet it may run on for a length of time; so that it may be either acute or chronic; whereas scarlet-fever, measles, small-pox, chicken-pox, hydrophobia, and typhus-fever, cannot be chronic;—they are always acute. Syphilis, which I mentioned as being a *chronic* affection, cannot indeed be so considered when it first begins; but it rarely has, comparatively, the activity which characterizes acute diseases. Hooping-cough, however, is generally active at the onset; and frequently it has the activity of small-pox or measles; but it may run on for many weeks,—perhaps even months. Contagious diseases, both acute and chronic, are sometimes *febrile*, and sometimes *non-febrile*; and therefore it is better to divide them into "acute" and "chronic." Hydrophobia is an instance of an *acute* disease of a contagious kind; but it is not in the least *febrile*.

Now, although we may put each of these diseases into one class or other of those I have been enumerating, yet it does not follow that a disease which is placed with another in *one* class, will be side by side with it in *another* class. These classes are all distinct;—the characteristics of each have no relation to those of another. The diseases which meet in one class, will not meet in another; and the affections which are of different classes in one respect, will meet in another class with others. For example: hydrophobia is of the class of acute contagious diseases, together with small-pox;—both are acute diseases. But small-pox is in the class of those which may be communicated either by the atmosphere or by contact; whereas hydrophobia is in the class of those that can be communicated only by contact,—by the application of palpable matter. Itch and syphilis meet in the class of those that can be communicated by contact only; yet there is no reason to believe that the latter occurs *de novo*; while, I think, we have some reason to believe that the former does. The cow-pock is in the class of those which can be communicated by contact only; and so is itch; yet cow-pock is in the class, also, of those which occur but once; whereas the itch is in the class of those which recur indefinitely. Hence we see that the classes have no relation whatever to each other.

Mode of Communication.—Some of these diseases must be communicated by contact, either with the patient, or something that he has touched; or some palpable matter that has proceeded from him. Of this kind are itch, syphilis, cow-pock, hydrophobia, elephantiasis, yaws, sibbens, laander,—the three latter of which I have never seen,—and the glanders of horses; together, in all probability, with the plague, and porrigo or scald-head. Some, again, may be communicated both by contact, and merely by the atmosphere surrounding the patient. In the latter case, there must be the contact of something which has emanated from the patient; but then that something has not emanated in a palpable form. It is not the contact of any solid, or any liquid, that is to be *seen*; but the contact of something *invisible*. Still, that something must have proceeded from the patient. The diseases which may be communicated both by contact with the patient, and by contact with something he has touched, or something palpable which has proceeded from him; or which may be communicated by merely being exposed to his atmosphere,—are the small-pox, the chicken-pox, scarlatina, and the measles. The latter have certainly been communicated by inoculation;—just like small-pox. It is probable that, by means of something in the atmosphere which is not palpable, but which has emanated from the patient, we may become the subjects of typhus,—if it be a contagious disease,—and of hooping-cough. Even if an individual touch another labouring under these diseases, still it is probably not the mere contact, but an impalpable emanation from the patient, that gives the disease.

Difference between Infection and Contagion.—The adjective "*contagious*" embraces all the diseases we have enumerated; but it is also employed, in a restricted signification, to distinguish those which are communicated solely by contact with the patient, or with something that he has touched, or with something that has proceeded from him *palpably*; whereas the word "*infectious*" is given to those diseases, which may be communicated by merely being exposed to the patient's atmosphere. The word "*contagious*" is used in the same way as the term "*horse*." The latter is used to include both a horse and a mare; but it is frequently applied to the male only; and so these diseases are all continually spoken of as "*contagious*"; but the word "*contagious*" is also employed in a limited sense, to signify those diseases which are communicated by actual contact; or by touching something

which the patient has touched; or something which has palpably proceeded from him. We sometimes hear quibbles on this subject; but it appears to me that the word "*contagious*" is used as I have now stated;—that we may separately have a contagious and an infectious disease; but that we may express them both, according to established custom, by the word "*contagious.*"

Diseases are Communicated more Rapidly by Contagion.—Some diseases are both contagious and infectious;—may be communicated either by contact (as I have already said[a]), or by merely being in the neighbourhood of the patient. Now it is observed, that when a disease may be communicated in both ways, it is communicable more quickly by contagion, than by infection. If two persons be exposed to an atmosphere infected with small-pox, and we inoculate one with the virus, the disease will appear in him much sooner than in the other. It is a well-ascertained fact, I think, that contagion (in the limited sense of the word) excites the disease sooner than infection, when the disease may be produced in both ways. Hence, when a person is exposed to the infection of small-pox, it is the practice to inoculate him as quickly as possible;—in order to bring the disease on in the artificial manner, before it can arise by infection.

Diseases Occasionally Contagious.—Again: some diseases are thought to be only *occasionally* contagious;—I use the word "contagious" generically. Catarrh is supposed, by many, to be sometimes infectious; but I do not know whether it is so. Ophthalmia certainly appears to be sometimes contagious. In the greater number of cases it is not; but it would appear, undoubtedly, to be contagious in certain cases. Erysipelas is not considered to be a contagious disease; but Dr. Wells, in a paper published in the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge"[b], furnishes very strong reasons for suspecting that certain instances which he details, were instances of erysipelas by contagion. Continued fever may be an instance of the same kind. It arises, certainly, very often, without contagion; but I am very much disposed to think that, in other cases, it is contagious.

Contagion Limited in Time.—Some diseases, again, are contagious only *for a time.* This is the case with gonorrhœa, and with hooping-cough. There is no doubt that, after a certain time, the discharge from the urethra (whether called "gonorrhœa" or "gleet") is perfectly innocuous,—can communicate no disease. It is the same with hooping-cough. Children will continue to hoop, long after there remains any chance of communicating the disease to others. It is said that some diseases are only *partially* contagious. The instance of this which is usually alleged, is syphilis. The matter from the primary sores of syphilis, will communicate the disease. It is contagious enough; but it is said that the matter of secondary sores is not contagious. It is impossible to make experiments on this subject; and, therefore, I cannot tell whether those who hold this opinion are correct or not.

Contagions generated afresh.—Some contagions appear to be occasionally generated afresh. Some of those diseases which will give rise to a something capable of producing the disease in others, do appear to be produced *de novo.* The itch, at any rate, will sometimes occur in patients after continued fever, where it is not possible to trace it to any other persons. Hydrophobia, there is every reason to believe, will sometimes spring up in the same way. Dogs become the subjects of the disease, without its

[a] See Page 341. [b] Volume 2; Page 213.

being in our power to trace it to any other animal;—where there is no probability of their having been exposed to contagion. The same is true of the glanders in horses. This is also said to be the case with regard to typhus;—that a patient has become the subject of it, from a mere common exciting cause; and that he has been known to give it to others. Of this I cannot speak; because I never saw typhus-fever contagious. With regard to all these diseases,—itch, hydrophobia, and typhus (granting the latter to be contagious), whether or not they ever now occur *de novo*, still they must have had that origin at some time or other; and it is not more wonderful for them to occur *de novo* now, than that they were originally produced. There must have been a person who first had measles, small-pox, scarlet-fever, and so on; and who could not have derived it from any other person. If we even go to brutes, still the difficulty is the same; for some of them must have had the disease first of all. It must have occurred *de novo*, in some one instance or other. Indeed, it is not certain that small-pox, chicken-pox, hooping-cough, scarlet-fever, and measles, do not occur, from time to time, without contagion. We frequently see these diseases in children who have been shut up in the country; without having had communication, directly or indirectly, with any others who could have had them; or having been near persons who had visited others suffering the affection;—at least, so far as we can trace it. It is possible, however, that an error may exist on this point; and that there *has* been communication; but, certainly, the ascertainable absence of all communication, direct or indirect, occurs so often, that I do not think we have a right to assert, that the diseases in question never occur *de novo*. I give no opinion on the subject; but I would not be positive on the negative side.

Recurrence of Contagious Diseases.—Some contagious diseases occur rarely more than once. Among them we may mention cow-pock, chicken-pox, small-pox, measles, hooping-cough (by which I mean the real disease,—not a spasmodic hoop), and scarlet-fever. We must all have seen instances of a second occurrence of these affections, and sometimes perhaps of a third; but the general rule is for them to take place but once; while the rest may occur more than once; and, indeed, some of them an indefinite number of times. Some persons contract syphilis and gonorrhœa over and over again;—as long as they expose themselves. It would not answer the moral end of these complaints, were they (like small-pox and measles) to be had but once. With regard to hydrophobia, it is not known whether it may be had twice or not. So far as I am acquainted with the subject, both human beings and dogs have always died of the disease when seized with it; and, therefore, we cannot tell whether it may be had a second time.

One Contagious Disease renders the Body insusceptible of Another.—Another circumstance I may mention is, that we have an instance (or, at least, we *generally* have an instance) of one contagious disease preventing another. The cow-pock is supposed to prevent the small-pox; and, for the most part, it certainly does; but it is to be considered, that it is not by any means proved, that cow-pock and small-pox are not the same diseases;—the former being modified. If they be but one disease, the fact of cow-pock preventing small-pox merely resolves itself into the fact, that some contagious diseases do not usually occur more than once; but if they be distinct diseases, then it is an instance of one contagious disease preventing another.

Period of Incubation.—When a contagion has been applied, there is for the most part an interval before it operates;—there is usually an interval,

between the application of the poison and the appearance of the disease. This interval is various in different diseases; and it is various in different cases of the same disease;—depending upon whether it is applied by means of the atmosphere, or in a palpable form by inoculation. The interval of small-pox is very short, compared with the interval of hydrophobia; and then, again, the interval of the latter is by no means always the same. It will vary, from a few weeks to a few months.

Infection prevented by Dilution.—Some of these contagious diseases which are infectious,—using the word "*contagious*" in a generic sense, to comprise both,—are very easily prevented by dilution of the atmosphere. We find a great difference in diseases, in this respect. The contagiousness of diseases which are infectious, or the *infection* of some diseases, is very easily annihilated by dilution; whereas great dilution has comparatively little effect on others. The infection of small-pox, and of measles, will sometimes operate in a very free ventilation. It is thought, by some, that their infection will not extend to a very great distance in pure air. But, at any rate, in the *purest* air, we see these diseases caught by children, in the neighbourhood of those that labour under them; whereas other diseases cannot be caught, if any pains at all be taken to dilute the air. As a remarkable example of this, I may mention that the contagion of continued fever (if continued fever be allowed to be contagious) may be dissipated with the greatest ease. A comparatively trifling dilution of the atmosphere around the patient, will prevent it from being communicated to any one; whereas a great dilution will frequently not prevent the small-pox or the measles. So easily is the contagion of continued fever (supposing it to be contagious) dissipated, that if there be a very free ventilation around the patient, there is little or no danger of any one catching the disease; and it is asserted that, in small-pox, the contagion, in the worst cases, will not extend beyond half a yard, in the open air. Dr. Haygarth, in his celebrated letter to Dr. Percival [a], says that the infection of small-pox will not extend beyond the distance of half a yard; and that of continued fever much less; and this is one reason why the contagious property of the latter has been denied altogether.

Contagious Diseases communicable to Brutes.—Some contagious diseases are communicated from brutes to man. Hydrophobia, cow-pock, and (it would appear) small-pox, are of this description. Every one knows that the cow-pock may be given to the human subject; but it is said that some experiments have lately been made, with success, to give the small-pox from the human subject to the cow; and these have been adduced as proofs that the two diseases are the same; because the disease produced in the cow by the *small*-pox matter, was the *cow*-pock. The itch is a disease communicable from brutes to man; at least, it is said that a kind of itch is produced from mangy dogs. There is a peculiar disease in Germany, mentioned under the name of "*milzbrand*",—"inflammation of the melt." It is a disease of brutes, analogous to what has been called "malignant pustule"; and is communicable to the human subject. Many persons have had malignant pustules produced in them, by merely touching the blood of animals labouring under a certain disease; or, perhaps, by merely putting into their mouth a knife wetted with the blood. The glanders of the horse is another disease, which may be unquestionably communicated to the human subject. It is possible that all those diseases, which may be so communicated from

[a] "Letter to Dr. Percival, on the Prevention of Infectious Fevers; by John Haygarth, M.D."

brutes to man, may be given back from man to brutes. M. Magendie has made experiments with regard to hydrophobia. He inoculated dogs with the saliva of a man labouring under hydrophobia; and, he says, they became the subjects of the disease. The cow-pock, I believe, may be given from the human subject to brutes; and so, unquestionably, may the glanders. Whether any other contagious diseases than those I have enumerated, may be given from brutes to the human subject, I do not know; but I should think all these may be given back. It is said that there are some other diseases, which may be communicated from man to brutes. The plague, it is said, has affected brutes; sheep have been seen to catch the measles; and the disease called "trichoma" may also be communicated to brutes.

Bad Health sometimes prevents Contagion.—There are some contagious diseases, to which persons are very much disposed by being out of health; —typhus-fever for example; whereas, other contagions act as well upon persons in health as out of it. But it would appear that sometimes bad health will *prevent* a contagious disease. It is well known, I believe, among vaccinators, that they frequently cannot give a child the cow-pock, when it is labouring under any cutaneous affection. It is found by many who vaccinate to a great extent, that they cannot give a child the cow-pock, when it is labouring under any disease, such as scald-head, or any chronic eruption. This may simply arise from the body being indisposed to take on two diseases at once;—not that the body is out of health altogether; for, a cutaneous disease is frequently but a *slight* affection. Habit lessens the susceptibility to some contagions; at any rate, persons who are continually exposed to the infection of typhus-fever, in its most concentrated form, generally escape; and so with respect to the plague. A new comer into some situations, will sometimes suffer immediately; while those who have been accustomed to it will go on with impunity, and never suffer. Habit appears to have a great influence upon contagion;—just as it has with regard to the aguish effect of marsh-miasmata.

Insusceptibility of different Persons and Ages to Contagion.—Some persons have an unaccountable indisposition to certain contagions. Some children will not take the small-pox, though they sleep in the same room, and even in the same bed, with others labouring under it. The same has been observed with regard to the measles; and (what is very singular) after a lapse of time,—sometimes a year or two, and sometimes longer,—the least exposure will produce the disease in the same individual. It is well known that some persons run into the greatest risks, with respect to syphilis and gonorrhœa, without using any precaution; and invariably escape, though as bad as their neighbours. In fact, I have known persons of that description; and yet, after a time, they began to catch the disease whenever they ran the chance of so doing. It is the same with respect to small-pox and measles in young persons, as it is with regard to syphilis and gonorrhœa in adults. The extremes of age are very insusceptible of many infections. Some persons, again, without any indisposition (so far as can be observed) escape, without our knowing why. A person shall be exposed, for example, to the poison of syphilis to-day,—the existence of morbid secretion being proved by the fact that others, yesterday or to-morrow, suffer from the same source,—and catch nothing; and yet, a fortnight afterwards, the same source may give the disease to him. Persons without any indisposition sometimes do escape, without our knowing why.

Existence of Contagion Denied.—Some persons deny there is any such a thing as contagion. Some deny the contagiousness of one disease, and some of another; but there are some who maintain, that contagion was un-

known in ancient times, and is altogether a modern invention. There is (or was) one person so convinced of this (in the case of hydrophobia), that he has written a pamphlet to prove it. He contends that it is a mere imaginary disease; that, at any rate, the symptoms which have occurred, have never taken place *through hydrophobia*. He says that he has inoculated himself, again and again, with the saliva of a rabid animal; and has escaped. His escape, however, is no proof of the non-existence of contagion; because many persons escape all sorts of contagions, every day. Two medical students, at Paris, went so far as to deny that syphilis was contagious; and, in the year 1823, they inoculated themselves with some syphilitic matter. They laughed at contagion; and gloried in having some syphilitic matter under their skin. However, the consequence of this experiment was a very bad suppuration in, and a partial destruction of, the axilla of one young man;—he having inoculated himself on the hand; while the other had a bad ulcer somewhere else; and became so distracted at what had happened, that he actually committed suicide, by opening the crural artery. Others have done exactly the same in the case of the plague; and they have suffered exactly in the same way. A Dr. Whyte was convinced that the plague was not a contagious disease; and, therefore, in the pest-house of the Indian army at El Hammel, he rubbed some pus, taken from the pestilential bubo of one of his patients, inside his own thigh; and, not contented with this, he inoculated his wrist from another pestilential bubo. Four days had hardly passed, before rigors began; with all the symptoms of violent fever; and he died of plague before the end of the third day. It is mentioned, in the "Journal de Medecine" for May, 1811, that an Italian doctor (called Dr. Valli), was so convinced of the non-contagiousness of the plague, that he mixed the matter from some pestilential buboes with a number of other things, and formed it into an ointment, which he called his "pomade." He rubbed this mixture on the eyelids of people who came to him with sore eyes; on the abdomen of others, &c.; and thereby communicated the plague to thirty individuals. He was quite sure that he was doing no harm whatever. The Turks, however, thought differently; for, disapproving his practice, they cut off his head.

There are on record some other singular instances, of the denial of what it would appear almost impossible that any one would think of denying. Dr. Maclean, for instance, denied that plague was contagious; and went so far as to explain why it, or any other disease, was ever supposed to be contagious. He says that the idea of contagion is merely an invention comparatively modern;—that it was neither more nor less than a popish trick of 1547. He would have us believe, that one of the popes, Paul the Third, in 1547, (after the death of our King Henry the Eighth, of *blessed* memory,) when the holy fathers were assembled at Trent, finding he could not manage them,—that he could not get them to vote his own way, broke up the council by setting forth the idea of contagion:—that he stated there was a contagious disease in the town;—a disease that might be caught from those affected with it; and thus excited so much fear among the members of the Council, that all withdrew to Bologna. Thus was the celebrated Council of Trent dissolved. The holy men were so frightened at this invention of his popeship, that away they all went scampering to Bologna.

The introductory part of Boccacio's "Decamerone", contains a description of the plague at Florence.[a] He says, that the disease spread from the dis-

[a] In the year of our Lord 1348, there happened at Florence, the finest city in all Italy, a most terrible plague; which—whether owing to the influence of the planets,

eased to the healthy, as flames spread to an unctuous substance. Not only speaking and associating with each other produced it, but the clothes, or any thing else that belonged to persons who laboured under the plague, commu-

or that it was sent from God as a just punishment for our sins—had broken out some years before in the Levant; and—after passing from place to place, and making incredible havoc all the way—had now reached the west; where—spite of all the means that art and human foresight could suggest (such as keeping the city clear from filth, and excluding all suspected persons); notwithstanding frequent consultations what else was to be done; nor omitting prayers to God in frequent processions—in the spring of the foregoing year [1347], it began to shew itself in a sad and wonderful manner; and—different from what it had been in the east, where bleeding from the nose is the fatal prognostic—here there appeared certain tumours in the groin, or under the arm-pits; some as big as a small apple, others as an egg; and afterwards purple spots in most parts of the body; in some cases large and but few in number, in others less and more numerous;—both sorts the usual messengers of death. To the cure of this malady, neither medical knowledge, nor the power of drugs, was of any effect;—whether because the disease was in its own nature mortal, or that the physicians (the number of whom, taking quacks and women-pretenders into the account, was grown very great) could form no just idea of the cause, nor (consequently) ground a true method of cure. Whichever was the reason, few or none escaped; but they generally died the third day from the first appearance of the symptoms; without a fever, or other bad circumstance attending. And the disease, by being communicated from the sick to the well, seemed daily to get ahead, and to rage the more;—as fire will do, by laying on fresh combustibles. Nor was it given by conversing with only or coming near the sick; but even by touching their clothes, or any thing that they had before touched. It is wonderful, what I am going to mention; which, had I not seen it with my own eyes, and were there not many witnesses to attest it besides myself, I should not venture to relate;—however credibly I might have been informed about it. Such, I say, was the quality of the pestilential matter, as to pass not only from man to man, but (what is more strange, and has been often known) that any thing belonging to the infected, if touched by any other creature, would certainly infect, and even kill that creature in a short space of time; and one instance of this kind I took particular notice of;—namely, that the rags of a poor man just dead, being thrown into the street, and two hogs—coming by at the same time, and rooting amongst them, and shaking them about in their mouths—in less than an hour turned round, and died on the spot. These accidents, and others of the like sort, occasioned various fears and devices amongst those people that survived;—all tending to the same uncharitable and cruel end; which was, to avoid the sick, and every thing that had been near them;—expecting, by that means, to save themselves. And some—holding it best to live temperately, and to avoid excesses of all kinds—made parties, and shut themselves up from the rest of the world;—eating and drinking moderately of the best, and diverting themselves with music, and such other entertainments as they might have within doors;—never listening to any thing that was without, to make them uneasy. Others maintained free living to be a better preservative; and would balk no appetite or passion they wished to gratify;—drinking and revelling incessantly from tavern to tavern, or in private houses; which were frequently found deserted by the owners, and therefore common to every one;—yet avoiding, with all this irregularity, to come near the infected. And such, at that time, was the public distress, that the laws, human and divine, were not regarded; for the officers to put them in force being either dead, sick, or in want of persons to assist them, every one did just as he pleased. A third sort of people chose a method between these two;—not confining themselves to rules of diet like the former, and yet avoiding the intemperance of the latter; but, eating and drinking what their appetites required, they walked everywhere with odours and nosegays to smell to;—as holding it best to corroborate the brain: for they supposed the whole atmosphere to be tainted with the stink of dead bodies; arising partly from the distemper itself, and partly from the fermenting of the medicines within them. Others, of a more cruel disposition,—as perhaps the more safe to themselves,—declared, that the only remedy was to avoid it. Persuaded therefore of this, and taking care for themselves only, men and women (in great numbers) left the city, their houses, relations, and effects; and fled into the country;—as if the wrath of God had been restrained to visit those only within the walls of the city; or else concluding, that none ought to stay in a place doomed to destruction. Divided as they were, neither did all die, nor all escape; but, falling sick indifferently,—as well those of one as of another opinion,—they who first set the example by forsaking others, languished themselves without mercy. I pass over the

nicated it. Even brutes got the disease, by touching the clothes of those who died of the plague. He says:—"I saw two pigs grubbing about the clothes of a man who died of the plague; they then staggered and fell down

little regard that citizens and relations shewed to each other; for their terror was such, that a brother even fled from his brother, a wife from her husband, and (what is more uncommon) a parent from its own child: on which account, numbers that fell sick could have no help, but what the charity of friends (who were very few), or the avarice of servants supplied; and even these were scarce, and at extravagant wages; and so little used to the business, that they were fit only to reach what was called for, and observe when they died; and this desire of getting money often cost them their lives. From this desertion of friends and scarcity of servants, an unheard of custom prevailed. No lady, however young or handsome, would disdain being attended by a man-servant (whether young or old it mattered not); and to expose herself (naked) to him,—the necessity of the distemper requiring it,—as though it was to a woman; which might make those who recovered less modest for the time to come. Many lost their lives, who might have escaped, had they been looked after at all; so that—between the scarcity of servants, and the violence of the distemper—such numbers were continually dying, as made it terrible to hear, as well as to behold. Whence, from mere necessity, many customs were introduced, different from what had been before known in the city. It had been usual, as it now is, for the women who were friends and neighbours to the deceased, to meet together at his house, and to lament with his relations; at the same time, the men would get together at his door, with a number of clergy,—according to the person's circumstances; and the corpse was carried by people of his own rank, with the solemnity of tapers and singing, to that church where the person had desired to be buried; which custom was now laid aside; and—so far from having a crowd of women to lament over them—great numbers passed out of the world without a single person; and few had the tears of their friends at their departure; but those friends would laugh and make themselves merry; for even the women had learned to postpone every other concern to that of their lives. Nor was a corpse attended by more than ten, or a dozen; nor those citizens of credit, but fellows hired for the purpose; who would put themselves under the bier, and carry it with all possible haste to the nearest church; and the corpse was interred, without any great ceremony, where they could find room.

With regard to the lower sort, and many of a middling rank, the scene was still more affecting; for they, staying at home,—either through poverty, or hopes of succour in distress,—fell sick daily by thousands; and, having nobody to attend them, generally died. Some breathed their last in the streets, and others shut up in their own houses; when the stench that came from them made the first discovery of their deaths to the neighbourhood. And, indeed, every place was filled with the dead. A method now was taken (as well out of regard to the living, as pity for the dead) for the neighbours, assisted by what porters they could meet with, to clear all the houses, and lay the bodies at the doors; and, every morning, great numbers might be seen brought out in this manner; from whence they were carried away on biers, or tables, two or three at a time; and sometimes it has happened, that a wife and her husband, two or three brothers, and a father and a son, have been laid on together. It has been observed, also, whilst two or three priests have walked before a corpse with their crucifix, that two or three sets of porters have fallen in with them; and where they knew but of one, they have buried six, eight, or more. Nor was there any to follow and shed a few tears over them; for things were come to that pass, that men's lives were no more regarded than the lives of so many beasts. Hence it plainly appeared, that what the wisest in the ordinary course of things, and by a common train of calamity, could never be taught,—namely, to bear them patiently,—this, by the excess of those calamities, was now grown a familiar lesson to the most simple and unthinking. The consecrated ground no longer containing the numbers which were continually brought thither,—especially as they were desirous of laying every one in the parts allotted to their families,—they were forced to dig trenches, and to put them in by hundreds;—piling them up in rows, as goods are stowed in a ship; and throwing in little earth, till they were filled to the top. Not to rake any further into the particulars of our misery, I shall observe, that it fared no better with the adjacent country; for—to omit the different castles about us, which presented the same view (in miniature) with the city—you might see the poor distressed labourers, with their families,—without either the plague, or physicians, or help of servants,—languishing on the highways, in the fields, and in their own houses, and dying rather like cattle than human creatures; and, growing dissolute in their manners (like the citizens), and careless of every thing (as supposing every day to be their last), their thoughts were not so much em-

dead." ("Amendui sopra gli mal tirati stracci morti caddero in terra."[a]) This was actually published in 1348; and yet a man would seriously have us believe, that the idea of contagion was invented in 1547.

However, some are more hardy than this. They will deny almost all sorts of contagion. There is a M. Lassis, of Paris, who denies all infections and contagions, except those of measles and lues venerea. But this is by no means a modern folly. I imagine that some of these persons have hoped to signalize themselves by advancing something original, when they denied this or the other contagion; and particularly that those who deny many contagions, or nearly all, must have thirsted for fame indeed. But they are too late. They are merely dull imitators; for many persons among the older writers have denied, sometimes one contagion, and sometimes another. Gadbury, the astrologer, says that the *plague* is not *more infectious* than the small-pox, scurvy, pleuritis, ague, and gout. He published in 1665; and his book is called "London's Delivery Predicted."

There can be no doubt, that great mistakes have been committed on the opposite side, as to the contagiousness of particular diseases. We have seen[b] that Dr. Fordyce and Dr. Cleghorn, both able men, believed that *ague* was contagious; and, when speaking of *scurvy*, I mentioned[c] that some contended, formerly, that that disease was contagious. We know now, to a certainty, that neither ague nor scurvy is contagious. Again: some diseases, on the other hand, which we now certainly know to be contagious, were not supposed to be so. It is by no means certain, from the writings of Sydenham, that he was aware that small-pox or scarlatina was contagious, or perhaps even measles. He may occasionally write as if they were, but he attributes them to other causes than contagion; and it is by no means clear that he was much impressed with the fact. But other writers refer small-pox, and the other diseases just mentioned, to causes of all kinds instead of to contagion; such as the faults of parents, before their children were born or procreated;—any thing, in short, rather than contagion. Mistakes, it must be allowed, have been committed on both sides of the question. Diseases not contagious were formerly supposed to be so; and diseases known now to be contagious beyond all doubt, were formerly, at different periods, not imagined to be of that nature; and therefore we ought to listen, with some degree of patience, to those who deny that any particular disease is contagious.

Is Typhus Contagious?—Typhus-fever is a disease, which some deny to be contagious; and I willingly confess, that I never saw an instance in which it shewed that character. Nevertheless, I cannot but believe that it

ployed how to improve their substance, as to make use of it for their present support: whence it happened, that the flocks, herds, &c., and the dogs themselves (ever faithful to their masters), being driven from their own homes, would wander—no regard being had to them—among the forsaken harvest; and many times, after they had filled themselves in the day, would return of their own accord, like rational creatures, at night. What can I say more, if I return to the city?—unless that it is supposed, and made pretty certain, that, between March and July following, upwards of a hundred thousand souls perished in the city only; whereas, before that calamity, it was not supposed to contain so many inhabitants. What magnificent dwellings, what noble palaces, were then depopulated to the last person! What families extinct! What riches and vast possessions left, and no known heir to inherit! What numbers, of both sexes, in the prime and vigour of youth,—whom in the morning neither Galen, Hippocrates, nor Æsculapius himself, but would have declared in perfect health—after dining heartily with their friends here, have supped with their departed friends in the other world. But I am weary of recounting our late miseries.—*Translation of Boccaccio's Introduction to his "Decamerone."*

[a] "Both fell down dead upon the clothes about which they had grubbed."

[b] At Page 294.

[c] See Page 295.

is frequently a contagious disease. Such it has proved itself at the Fever-Hospital, at Battle Bridge. I do not recollect an instance of its spreading; notwithstanding the experience of many years, as physician to St. Thomas's Hospital; where, of course, there is always a great deal of fever. But it is to be remembered, that the majority of cases of fever which are met with there, are generally by no means violent, compared with what (I am told) they are at such an institution as the Fever-Hospital. An exceedingly small number of cases of fever are lost at St. Thomas's;—either because persons are admitted in the early stage, when the disease is easily treated and cured; or because they are not desperate cases that, in general, people think of taking there. I hear, however, that to the Fever-Hospital (which is a receptacle for this disease only) patients are taken, as a matter of course, when they have fever, whether moderately or desperately; and therefore many are so taken, of whom there is no hope that the disease will be cured. The greater success at St. Thomas's, therefore, is owing (in a great measure) to the comparative mildness of the disease treated there. This may be one reason why the disease does not appear contagious there;—the emanations from the body are not of that extremely powerful kind, which they frequently are at the Fever-Hospital; and it is not *all* our patients, but a very small number, who labour under the disease. In the next place, we have extreme ventilation,—extreme cleanliness; and this is another reason why a *mild* disease, at any rate, will not spread. I have no doubt there is the same cleanliness and ventilation at the Fever-Hospital; but they must be infinitely less efficient there; because *all* the patients have fever; whereas with us generally but one or two, and rarely more than three patients with fever, are in the same ward;—large as our wards are. There can be no doubt that, if typhus-fever be very bad indeed, persons standing near the patient, even if there be good ventilation, may now and then contract the disease.

Arguments for the Non-Contagion of Typhus.—But with regard to the arguments in favour of typhus-fever not being contagious, it is to be remembered that it is a disease, the contagion of which may be most easily rendered quite inert, by the dilution of ventilation; unless in some very *very* bad instances, on the one hand; or where there is a great predisposition to it, on the other. In the next place it is a contagion, which is allowed by those who stand up for its contagiousness, to be resisted exceedingly, if the body be in good health, and the person be in good spirits. But it appears to me, that there are instances, without end, of a person catching typhus-fever from others. It is true, I have never met with one of these cases; but instances innumerable are mentioned, by those who see far more of the disease than I do; though I see quite as much as I wish;—perhaps about fifty cases in a year. There will also be found, recorded in books, cases without end;—such as I cannot pretend to controvert. I understand, with regard to the Fever-Hospital at Battle-Bridge, that every medical officer there,—physicians, surgeons, and apothecary,—have had the typhus-fever; and some more than once;—that every nurse, every matron, every laundress, every housemaid, and (in short) every body that ever had any thing to do with the place, have all had it; and many officers have died. Yet nothing of the kind has happened at the Small-Pox-Hospital, which is on the very same spot. This is very important;—as clearing up the point, whether all these persons have had it from the emanations of the patients there, or from the situation of the hospital. I used to see, every day, persons taken to St. Thomas's with typhus-fever, from the midst of others who have the disease; but I never considered that any proof of contagion. The

disease *may* have arisen, in those cases, from contagion; but the fact is not *proved*; for it may have been the *situation* which gave rise to it. Some fault in the house—some drain, or other external cause—may have caused the disease, first in one patient, and then in another. For infection to be proved, the individual who communicates the disease must go from the place where he resides, to the spot where the healthy person is, and there give it to the latter. If the healthy person go to the sick person, and the sick person be still in the place where he was living when attacked, then no one can say that the disease, which the former contracts, has not been produced from the *situation*, and not from the *patient*. The disease *may* have arisen from contagion,—from the emanations of the patient; but this is not *proved*. If the patient go to a healthy spot, especially from an unhealthy one, and the disease then occurs there in others; or if any thing which the patient has touched, be taken from the place where the patient resides, to a healthy place, and there the disease takes place;—then it proves, if there be a sufficient number of these instances, that the disease is contagious. Many persons who have caught the fever at the hospital, have carried it home and given it to others, who had not gone near the hospital. Whether, however, this were the case or not, there are instances (without end) of persons having visited patients with the disease, and then given the disease to others where they have gone.

Fomites.—Inanimate substances have become impregnated with the secretions or emanations from a person labouring under a disease; and have communicated the disease to other persons. All such substances are called "fomites."[a] Among these, woollen substances are by far the most influential. All woollen substances imbibe secretions and emanations, and convey infectious and contagious diseases, far more than any other description of substance. It will be recollected that, even in the case of malaria, some assert that bushes will entangle it; and, on cutting them down, persons have been seized with intermittent and remittent fevers[b];—arising, in all probability, from the disengagement of a considerable quantity of malaria, which had been collected. Even the cutting down of woods[b], will have the same effect; and therefore there is something analogous to fomites, in the case of *malaria*; but it is in cases of *contagion* that, to inanimate substances, the term "*fomites*" is applied. There are instances, without end, of the plague having been conveyed by old clothes. It is even said, that the plague of London was conveyed to Derby by that means. There is scarcely any point in medicine, of which there are more numerous instances, than of plague and typhus-fever having been conveyed by left-off clothes. The exanthemata are frequently so communicated; and when I come to speak particularly of yellow-fever, I shall be able to lay some instances before you, in which this has unquestionably been the case; although it would appear, from the testimony of one whom I have the pleasure to call my friend[c], that yellow-fever is of different kinds;—that there are two kinds; one which is not contagious, and one that undoubtedly is so. I dare not say how long fomites will retain contagion. I know that a person who has been about another labouring under measles, will communicate the disease at the end of even a month; and that a room once infected with scarlatina, will give the disease for a twelvemonth. The contagiousness of fomites is best destroyed by heating them well.[d] Articles may be exposed to a high temperature; and large fires, with plenty of smoke, best disinfect apartments.

[a] From "fomes", *fuel*.
[b] See Page 283.
[c] Dr. Stevens.
[d] The experiments of the late Dr. Henry, of Manchester, have placed this fact in a very strong light.

Sudden Cessation of Typhus.—Whenever such a thing occurs, as disease being produced in a healthy spot, by the approach of an unhealthy person to a healthy one, or the application of fomites to a healthy person, it is a proof of contagion;—provided the instances be sufficiently numerous; for one or two cases may be quite accidental. But an argument against the contagion of typhus-fever, is adduced from this circumstance;—that it will sometimes disappear during an extreme temperature; and will sometimes disappear altogether, without any obvious reason; whereas, if it were contagious (it is argued), it would spread from one to another; till all, or the greater part, suffered from it. It is said, that it is only a disease which depends upon a particular state of the atmosphere, and not upon an emanation from a diseased person; and that *therefore* it is suspended by the extremes of temperature, or will suddenly cease without any obvious reason. It is indeed true, that non-contagious yellow fever, and intermittent and remittent fevers, and other diseases decidedly not contagious, will be aggravated or repressed by extremes of temperature; and by causes not discoverable. But this is exactly the case, not only with typhus-fever, but with diseases which all people of common sense allow to be contagious. Epidemic small-pox is frequently checked by extreme cold. The plague, which (I believe) almost every body allows to be a contagious disease, in the strict sense of the word, (not *infectious*, but *contagious*,) is also stopped by extreme heat or cold. Small-pox is frequently so stopped; and also by the wind called "*harmattan*"[a], which also arrests the plague; and (what is curious) this wind will prevent persons from *taking* the small-pox, even if they be inoculated. When that wind prevails, inoculation is commonly found to be fruitless. We have, therefore, the same fact with respect to diseases undoubtedly contagious, or infectious, or both, that we have with respect to such diseases as our remittent or intermittent fever; or others which depend upon something in the atmosphere, not proceeding from diseased persons. This objection, therefore, has no force. Hooping-cough and measles, which most persons allow to be contagious, are generally checked at the height of summer; and Sydenham says that scarlatina is most prevalent when the summer is over.

But there are still more remarkable facts, with respect to the stopping of diseases known to be contagious;—nay, of some diseases which are, not *infectious*, but *contagious* (in the true sense of the word). Cow-pock, which can only be communicated by contact, will sometimes decline so much that, at one period, Dr. Jenner could not prosecute his inquiries into the disease, for want of matter. Although there was apparently no reason for the disease not spreading as usual,—"in the natural way", as it is said,—from the teat of a cow to the hand of the human subject, it was sometimes so checked, that Dr. Jenner could not obtain a case of it. When he was publishing his work on the subject[b], the very same thing happened; and Dr. Woodville says, that the disease did not re-appear till the following spring, at which time it chiefly prevails. Sometimes, without our knowing why, small-pox (an unquestionably contagious disease) will not affect a place quite contiguous to another; although it is prevailing in the one, and free intercourse is being carried on between them. Van Swieten mentions this; and Sir John Pringle says, that he saw small-pox carried by recruits into the camp; and yet it did not spread. Dr. Odier,

[a] See Note to Page 289.

[b] "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ; a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of 'The Cow-Pox.' By Edward Jenner, M.D."

of Geneva, inoculated children when the disease was not epidemic; and though they were going about the streets, every day, during the eruption of the disease, and although there was the freest communication between the children who had been inoculated and others, yet not a single instance was seen of the disease spreading. There was something (whatever its nature might be) in the atmosphere, that prevented it. Sir James M'Grigor says, that the small-pox was raging in houses at Bombay, contiguous to the barracks; and yet no child or adult in the latter place imbibed the disease. There was something in the situation which prevented it. In Burckhardt's "Travels", there is something equally curious on this point. This author says,—"It is a curious fact, but one which has been attested to me by many persons, that small-pox has never been known to visit the Wadykenous; which is a narrow shore, from the Cataract up to Korosko. But", he adds, "this disease is well known at Derr; which is close by, and where it is much dreaded." It was never known to pass a certain point, notwithstanding there was free intercourse.

If such singularities will occur in the case of diseases known to be contagious, there is no reason to doubt that typhus-fever is contagious, merely because it will suddenly cease in a neighbourhood, or in a district, without our knowing why; or because it may be apparently arrested by extremes of temperature. Not only will undoubtedly contagious diseases sometimes not spread in the natural way (to use common language) at certain seasons; but sometimes we cannot produce a disease, although we inoculate for it. It would appear to be the same in the case of hydrophobia. We sometimes hear of nothing but mad dogs. A mad dog is killed every day, sometimes, for a month; and then we never hear any more of the disease for a twelvemonth. Now one would suppose that the disease would be communicated from one to another easily enough; but it is impossible not to imagine that, at one period, there must be a far greater susceptibility to the disease, than at another. There is no *à priori* objection, therefore, to the possibility of typhus-fever being contagious. The only question would be—"Is it a fact, or is it not?" I think there are sufficient instances—instances without end—of persons having communicated the disease to others. Provided there is plenty of dirt, bad living, unhealthy circumstances, and a want of free ventilation, I think there can be no question as to the disease frequently proving contagious. There is certainly a great difference of opinion on the subject; and it undoubtedly is not contagious to the extent that many believe; and great cleanliness, with plenty of ventilation, will so dissipate the disease, that no practitioner, if in good health and spirits, and well fed, need be afraid of it;—unless it exists in great intensity, and the emanations are applied to him in a concentrated state. In order to imbibe the disease, if the practitioner be in good health, and there is free ventilation, he must go so near to the patient, as to inhale his exhalations in full concentration; but if he be out of health, the disease intense, and ventilation indifferent, he may easily catch it. This must make a great difference in determining whether the disease is contagious or not; for there are very numerous instances, in which the disease does not appear to be contagious; yet it is to be considered that, in these cases, if the bystanders had been predisposed by debility, &c., and there had been no ventilation, it might then have proved contagious. The question, however, must be determined by a great number of cases.

An objection to the contagiousness of typhus-fever has been raised, not only from the irregularity of the period at which it begins, but from the irregularity of the duration of the disease; yet scarlatina, although un-

doubtedly a contagious disease, is very uncertain as to its course. Scarlatina will, in different instances, show the eruption at very different days. Sometimes the eruption will appear on the first day;—the very day on which the patient is taken ill; and sometimes it will appear before there is the least redness or soreness of the throat. Then,—when the eruption *does* appear, it will sometimes last only a day, or a day and a half, or two days; and sometimes it will continue ten days. No valid objection can be raised to the fact of typhus-fever being a contagious disease, merely because it is very various, not only as to the period at which it takes place, but also as to its duration; for scarlet-fever likewise exhibits these very same varieties. Nay, the same would also appear to be the case with regard to small-pox; for Sydenham speaks of an epidemic small-pox, in which the eruption took place on the fourth day; which is not the usual period at which it occurs.

Causes which Facilitate or Retard the Contagion of Typhus.—Granting, however, that it is contagious, there are various reasons for explaining the circumstance of its frequently not spreading far;—it may not be *always* contagious, but only *occasionally* so; like erysipelas, perhaps. Another reason is, that persons (for the most part) escape the influence of the contagion, if they be in good health and spirits while exposed to it. I presume that neither good health, nor good spirits, nor good nourishment, nor any other good thing, however favourable to health, will render a person less disposed to catch the small-pox, or to catch syphilis; but it is a fact, that if a person be in excellent health and spirits,—if he have every means of promoting health in his power,—if all be healthful in and about him, he may be exposed to the emanations of a person labouring under the most virulent typhus, and yet (for the most part) escape. If, however, his mind become depressed, or if his body become debilitated in any way, then we see the same person become the victim of the complaint, when exposed to the emanations of a typhous patient in so slight a degree, that we could hardly suppose it possible for the disease to be communicated. Many persons are exposed, with impunity, to the emanations from patients labouring under typhus, till their mind desponds, or (by some chance) they are thrown out of health; and then the contagion,—if typhus be contagious,—acts as a predisposing cause; and the depression of the mind or the accidental depression of the bodily powers, acts as an *exciting* cause. We have seen[a] that, in the case of ague, a person may be exposed to malaria, and not contract the disease, till he gets cold and wet through;—the common original cause of the disease (the malaria) being the *predisposing*, and "catching cold" the *exciting* cause. Exactly so, in typhus, the peculiar contagion is often the *predisposing*, and depression the *exciting* cause. I mentioned[b] that, in the instance of the plague, persons have been known not to experience the disease, till they have lost some of their most intimate friends; and have thereby become depressed. Diemerbroeck I stated[b], mentions an instance of this kind; and there are hundreds similar.

These things are all to be considered, when we question whether continued fever is contagious or not. It is allowed by those who contend for its contagiousness, that the contagion is one which is most easily dissipated by ventilation. In the next place, it is allowed by them, that if a person be in good health, and with every means of health in full play, he will generally escape; and if it be a fact that the disease is sometimes con-

[a] At Page 301. [b] At Page 339.

tagious, and sometimes not, and sometimes arises *de novo*, then we see another reason why some people have denied the contagion of the disease altogether. However, I am quite sure that much of the difference of opinion, on this subject, must have arisen from this circumstance;—that many diseases have been called "typhus", which were no such thing. There can be no doubt that many of the cases of continued fever which we see, are really cases of *remittent* fever, dependent upon malaria;—having nothing at all to do with contagion. We every day see cases of remittent fever, mistaken for typhus, but easily distinguished from it by nice observers; and persons may be exposed to such cases, without suffering the disease; and therefore typhus is continually said not to be contagious; whereas the patient really labours under remittent fever, which is not a contagious complaint.

Period of Incubation of Typhus.—The interval which occurs between the application of the poison of typhus-fever, and the appearance of the disease, is exceedingly various;—exactly as occurs in other diseases. Dr. Haygarth says, that of seventy-two persons who were exposed to the contagion of typhus-fever, five were seized with the disease within ten days after exposure; thirteen were seized between the tenth and the seventeenth days; forty-one were seized between the seventeenth and the thirty-second day; and one so late as the seventy-second. This variation of interval, is the same as is observed with respect to all diseases acknowledged to be contagious. How long the poison may lie dormant, I cannot say; but to take a case from another poison,—malaria, we must remember that many months frequently elapse before ague is produced; so that the malaria becomes the *predisposing*, instead of the *exciting* cause; and the same may be the case, sometimes, with respect to typhus-fever. It may exist dormant for a length of time; but what is the utmost period it will do so, I cannot pretend to say. It must have a limit, of course; but we know not what that limit is.

Confinement and Filth.—But although the contagion of typhus-fever is rendered much more active by concentration, and both that and filth are injurious to a patient, and must render him more liable to be affected by the contagion, yet it frequently happens, that the utmost filth and the greatest closeness will not produce the disease. Some have ascribed the disease to confinement of air and to filth; and both these will unquestionably be injurious to the health at large; and contribute to render a person exposed to the contagion of typhus, the victim of the disease; yet persons are continually exposed to mere filth and confinement, without suffering. In Kamschatka, the people live (seven months in the year) in "yourts"; which are cavities dug seven or eight feet under ground, and covered with a thatched roof; and which have only one small apartment, for three families perhaps; with a stock of provisions, consisting chiefly of dried putrid fish. In these pits they eat, sleep, and do every thing promiscuously; so that there is the most intolerable stench; which, though not perceived by themselves, is but too evident to travellers. Yet they have no fever. On the contrary, they are all healthy; with the exception of being liable to scurvy, which arises from the want of fresh provisions. The Greenlanders and Esquimaux crowd themselves together, and exclude the air. They have no chimneys in their huts; but an inner apartment, the fog and smell of which are quite suffocating to strangers. Yet they very rarely have fever. In general, they only experience scurvy. The habitations of the Russian boors, are equally intolerable to strangers; and yet it is said, they never have putrid diseases. Dr. Lind says, that in the

slave-ships crossing the Atlantic, although the poor creatures are crowded below deck as much as possible, and at night are shut up under close hatches; and, although they suffer from a change of climate, and some are suffocated; yet (in general) they have no infection; and if an accidental infectious disease enters among them, it is of a much milder character, than when it occurs in felons who have been transported in an opposite direction;—owing, probably, to the opposition of a high temperature to the contagion of typhus. It is said (but I do not know with what degree of truth) that contagious fever never occurs in these slave-ships. At the black-hole in Calcutta,—an apartment forming about a cube of eighteen feet; and only opening to the west, by two windows strongly barred,—one hundred and forty-six persons were confined (in the month of June, 1756) from seven or eight o'clock in the evening, till dawn the next day. One hundred and twenty-three individuals were suffocated; and the rest were, of course, made ill. It is said, however, that the survivors afterwards felt only heat and extreme exhaustion; that a great many had boils; but that no fever was produced. Howard (the philanthropist) says, that there was no fever in the prisons at Venice; though they were the closest possible. He also says, that the prisons at Naples were close and offensive; that the people were ill; but that no fever was produced. He adds, that we must look for an additional cause of fever, than mere filth and confinement. Dr. Mounsey says exactly the same of the prisons at Moscow and Petersburgh; though the prisoners were crowded together, and had but little ventilation. But it is to be remembered that, when fever is introduced into such situations, it rages with the most dreadful violence; and it is also found that new-comers into such filthy places, when contagion is present, suffer much more than those who have been habituated to them; —that contagion acts the more, on account of the bad state into which this filthy confinement throws the constitution. Those that were habituated to these situations, before the contagion was introduced, became gradually accustomed to it. People constantly live in confinement and stench, which would half poison us; but when strangers go into this filth, after having been in pure air, they are much more liable to experience the disease; and, if they suffer, it is worse in them than in others. Still although, till certain contagions are introduced among people who live in close, dirty, and bad situations, they consider themselves as well as others differently situated; yet those contagions, when introduced, at once act as a test of the tendency of the previous mode of life; and these people suffer in an infinitely higher degree than others;—provided there be not present any accidental counteracting cause; such as great heat, in the case of typhous contagion. A mere surgical accident will test the previous mode of life, in two people who might have appeared equally healthy.

Persons have been crowded together in the most filthy prisons, where the discipline was frightful; where they were treated like beasts;—in a way that *we* should not think of treating beasts; and yet no fever was produced. Various authors give an account of a disease which broke out at Oxford, in the year 1577, in the reign of Queen Elizabeth; at what was called "the black assizes." Some prisoners were brought out of prison, where they had been in a state of great confinement, with very little ventilation, and exceedingly dirty. A strong stench arose, and was supposed to proceed from the prisoners. Some of the judges and magistrates, the sheriff, and most of the jury, were taken ill; and died in a day or two. Six hundred persons sickened the same night; in the next three days, three hundred more sickened; and before five weeks had elapsed, five

hundred and ten had died. The symptoms are said to have been violent pain of the head and abdomen, with delirium. Many contended that this was a disease produced by the confinement of these prisoners;—that a contagion was generated from them;—that although they did not suffer themselves, a contagion passed from them, and produced this disease. But others, of equal judgment, are of a different opinion; and urge, on the other hand, that the disease was not contagious. It is said that the court was held in the yard of the castle, that was only a small distance from the river Isis, the banks of which were low; and it is actually recorded that a great damp arose; that "a *breath*", as it is called, or a *fog*, arose among the people; and that, at the same time, an intolerable stench was perceived; and some seemed smothered. The weather was intensely hot. The disease was not the plague; and the physicians would not name it. From all these circumstances, some writers contend that the disease had nothing to do with the prisoners; but that it was an exhalation, owing to the dampness of the earth;—some peculiar kind of exhalation; that we have no proof of its contagiousness; and that typhous contagion rarely affects so instantaneously. Women, children, and poor people, are said to have escaped. How this may be I do not know; but, to shew the bigotry of the times, I may mention that others took up a very different opinion; and alleged that it was neither contagion nor exhalation; but entirely owing to the poor Roman Catholics, who used the art of magic. They stated that it arose from diabolical and papistical arts;—that it was produced by popish blasts, which emanated from the lowest depths of hell. This is particularly mentioned in Wood's "History of Oxford":—"Some have thought, and do think, that it was devised by the Roman Catholics, who used art-magic in the design; and that also, as a certain note witnesseth, (Register of Merton College,) it sprung *ex artificiosis, diabolicis, et plane papisticis flatibus; e Lovanensi barathro excitatis; et ad nos scelestissime, et clam emissis.*"[a] This absurd opinion seemed favoured by the circumstance of a damp or fog having arisen in the court, as soon as sentence of loss of ears was passed upon a book-binder; who had continually spoken against Elizabeth's government, and the reformed religion.

Another singular instance occurred at the Old Bailey, in 1750; where several persons were taken ill, after the prisoners had been brought into court, subsequently to close confinement. This has been supposed to be exactly a similar instance, but it appears that there are objections to it; and many contend that it arose from a window being open, and a draught of air coming on those who suffered. How this might be, I do not pretend to say; because there are many circumstances that might alter our opinion, if we had an opportunity of making minute inquiry. I can only state my belief, that typhus-fever is sometimes contagious; that it may be made so in very unfavourable circumstances;—that it is, perhaps, always contagious in one sense; only that the contagion is so mild and diluted, that it comes to nothing; and that it belongs, like cholera, to those contagions which are not only powerless when moderately diluted, but powerless upon a frame free from disease, in full vigour, and with all or most of the causes of good health about it. We know from Thucydides, that before the plague of Athens,—from Livy, that before the plague of Rome,—and from Hodges, that before our plague in 1665, great crowds were collected in each respective city; that, in the latter case, the sky was serene, and the

[a] "From artificial, diabolical, and evidently papistical blasts; stirred up from the pit [or hell] of Louvain; and privately and most wickedly directed against us."

air stagnant; and that the rich escaped so much, that the disease is said, by Clarendon, to have acquired the name of "the *poor man's* plague."

Putrid Animal Matter.—As mere confinement will not (in general) produce fever, without some predisposing cause, so dead putrid animal matter is also said to be innocuous, while unaided. An instance of the latter is adduced with respect to Paris. In the course of six centuries, there were six hundred thousand bodies buried in Saint Innocent's churchyard, in that city; and they were spread under ground over two acres. The soil, by this vast deposition, was raised above the streets; and there was an offensive smell; but no fever arose from it. They were partially removed, in the heat of summer, till the ground was levelled; and the workmen were frequently asphyxiated,—frequently fell down senseless; but none of them were attacked by fever, although no precaution was employed. It is said that, in Seville, there is a fetid odour from the ground where ten thousand bodies were deposited, during the time of an epidemic; —that the soil cracked, and great stench was produced, but no fever. Howard (the philanthropist) says that, at Smyrna, there was a most horrid smell from the burial-ground, after the plague; and many corpses lay uncovered; but no bad consequences ensued to the family of the governor, whose house was exposed to the exhalations from the spot. Dissecting-rooms will not produce fever; unless an individual be either exposed to contagion, or very much out of health;—through anxiety of mind, hard study, or some accidental circumstance. Persons attending a dissecting-room, will become out of health, and be ill, and perhaps die, from the very severe effects of slight wounds; but I am not aware that fever which will spread to others, has ever been produced in that way. Various diseases confounded with fever, have been produced; but I am not aware that fever itself has so occurred, when there was no depressing passion,—no anxiety from over study, want of proper rest, or any kind of excess. Still if mere stench, unaided by other things, and through delicacy of constitution,—not counteracted by the presence of the ordinary causes of health,—should impair the latter, I can conceive that fever may be produced at last. Nightmen, as far as I know, are as healthy as other persons; and yet their grounds are certainly offensive enough. A spermaceti-manufactory, the stench of which was intolerable, existed near Bristol for two years; but no fever was produced. It is said that, at a manufactory (situated at Oldland, in Gloucestershire) where bones were employed for the purpose of procuring muriate of ammonia, an intolerable stench was produced; and yet no fever resulted from it. It is said that the superintendent removed to a more convenient house, situated upon a hill; and that there he and his family lost their health; so that he had some idea of returning back to the offensive place, that he might recover his health. At sugar-refineries where blood is kept till it is putrid, persons do not suffer. Leather-dressers are exposed to offensive smells; and yet they escape. Many persons are employed in the most offensive occupations with putrid animal matter; and yet fever never breaks out amongst them, if they possess the general means of health, and are well fed and cheerful. But if these persons, in the midst of stench, were in a state of famine, and consequently in great depression of mind, then (in all probability) fever would occur. Those who are interested particularly with this point, will immediately remember the examples adduced by Mr. Thackrah, in his work on the diseases of the different occupations of life.[a] Butchers are exposed to more or less stench; glue-manufacturers, buckram-makers, and tallow-chandlers, are all exposed

[a] See Note to Page 37.

to odours more or less offensive; and yet they enjoy excellent health;—are ten times more healthy than bakers. Orfila mentions the healthiness of knackeries; where there is immense putrefaction in summer, and the soil has been saturated for years.

To shew that these exhalations do not hasten the decomposition of even dead animal matter, the following fact is mentioned. In the neighbourhood of a dissecting-room behind the Hôtel Dieu,—where the odour was so offensive that, after numerous petitions, the dissecting-room was removed,—ragouts, bouilli, and good things of all sorts kept as sweet in the midst of this horrid smell, as in any other situation. A veteran of the imperial guard (to mention another instance) turned gut-maker; and said that, although his premises were truly offensive,—filled with enormous masses of corruption, yet nothing spoiled in his house. It cannot be denied, however, that although these things do not generate fever, yet they operate strongly when other causes come into play. Though they may all be thrown off, as water is from an oiled surface, when a person has no other cause of ill health, and is well supplied with good food, and has good spirits, yet they do produce mischief when other causes are combined with them. It is also to be insisted upon, that if actual contagion be introduced into a place which is offensive, then these things appear to tell; and the mischief is greater, on account of the closeness of the situation, and the exhalations from the putrefying animal matter.

It is therefore certain, I think, that mere confinement,—mere exposure to the emanations from persons crowded together amidst the greatest filth, will not in itself produce fever. I think it is quite certain that animal matter, in the greatest state of putrefaction, does not of itself afford any thing which will produce a disease called "contagious." It may be that the persons so exposed are fed well; and are in good spirits; and have all other means of contributing to health at their command. Still, however, if any matter which is in a state of putrefaction,—as is, or was formerly, the case in dissecting rooms; as occurs in ammonia-manufactories, and manufactories and other places where putrid blood is used, and from which there are horridly offensive emanations;—if this alone could produce contagious diseases, we should have fever every day, where we have nothing but perfect health. There can be no doubt that, if these things throw a person out of health, then any contagion, or any other cause of fever, will act intensely in producing this disease. This is allowed with regard to cholera. Nobody believes that any putrid emanations, or any thing that proceeds from persons crowded together, or the putrefaction of animal matter, will produce that disease; but all know that these things have a tendency to throw people out of health; and by the body being thus brought into an unnatural state, it is rendered an easy prey to any other causes that are applied.

Can the Contagion of Typhus be Generated Afresh?—There is another question;—whether the contagion of typhus (allowing that it is a contagion) may be generated afresh? There is no proof that certain contagions can be generated afresh; but others unquestionably may. Want of good food, want of rest, closeness of situation, depression of spirits, and exposure to bad air, may (by all conspiring together) occasion fever; but whether they occasion *contagious* fever, I do not know. I have never seen an instance of it. I have seen many young men ill from close studying, together with being much in a dissecting-room;—especially when they came fresh from the country, and were not accustomed to a dissecting-room, or to hard study; and were very anxious about their studies. Young men, when about to pass examination,—their anxiety being then so much the more

increased,—have certainly had fever; but I never saw their disease spread contagiously. Others say that they have seen it spread, in such circumstances. They tell us that typhus is a disease, the contagion of which may be generated *de novo*; but, though this is highly probable, yet one should always be cautious in listening to assertions in medicine; because so many assertions are made, without any ground whatever.

Rarely Communicated by the Dead.—The bodies of persons dead of typhus, rarely (if indeed ever) give the disease; and typhus, like other epidemics, whether contagious or not, grows milder and milder, the longer it lasts; although it be spreading more and more.

Other Noxious Exhalations.—Besides *malaria* being a cause of *remittent* and *intermittent* fever, and besides *contagion* being a cause of *continued* fever, it is very possible there are certain other exhalations, which do harm,—which produce actual disease. Sydenham had an idea, that epidemics arose from some peculiar changes in the bowels of the earth. It was only a fancy of his; but it is very possible that some of these peculiar causes of disease, are exhalations let loose from particular spots. Berzelius mentions a curious circumstance. He was making experiments with seleniuretted hydrogen; and, after a certain period, catarrh came on, and continued a very great length of time. A quantity which he inhaled, while making the experiment, did not produce any inconvenience *at first*;—but after a certain period had elapsed, then (as in the case of all specific poisons) it began to operate. Now some persons, from such facts as these, conceive that a volcano may let loose a substance, capable of producing a peculiar operation on the human body. It is not altogether improbable that exhalations, of various sorts, may arise *out* of the earth;—independently of the exhalations of diseased animal bodies; and independently of the exhalations, from the *surface* of the earth, of putrefying vegetable matter. The subject is not at all understood; but it is certainly an inquiry worthy of being attended to, whenever an opportunity occurs.

c. Proximate Cause.

Having considered the *remote* causes, we next come to consider the *proximate* cause of fever; respecting which, there have been, I might say, thousands of hypotheses. In these hypotheses, the writer has generally assumed some one fact which has had no existence; or has taken up one particular circumstance, from among all the circumstances of the disease, and placed that as the cause of the whole.

Solidism and Humoralism.—Some assume it as a fact, that the disease is all in the solids; others assume it as a fact, that it is all in the fluids. Those who ascribe every thing in a disease to the fluids, are said to be "*humoral* pathologists." Their fancy is this;—that a certain something is in the fluids, which is deleterious to the body; that a process, analogous to fermentation, is going on, which they call "concoction"; that the "peccant matter" is then separated, and the process is called "despumation"; and, provided it is thrown off entirely, there is an end of the disease. Now there is not the least proof of any such process occurring. There is proof of the depravation of the fluids; but there is no proof of concoction and despumation,—of a salutary fermenting and despumatory reform of the fluids (if I may so speak). There is nothing peculiar thrown off, when an excessive secretion takes place; as at the crisis when great diarrhœa or sweating occurs; or at least, if there be, we know it not; and it is a mere fancy to say that it does occur. So when there is hæmorrhage, there is no proof that that portion of blood which exudes, is more vitiated than the rest; and it is to be remembered, that it is only a *part* of the blood which

escapes. All these changes of the fluids are, most probably, owing to the solids in the first instance. A morbid cause makes a peculiar impression upon the body, as a living system; it impresses the solids; and, by the operation of the solids, the fluids are secreted in a vicious manner, and of a depraved quality. It is probable that the vitiated state of the fluids, arises from the solids not having manufactured them properly; unless, indeed, a quantity of improper materials be supplied to the body; which the body, without any fault of its own, can make nothing of. In that case, the solids certainly are not in fault. They do their best; but they are obliged to manufacture (if I may so speak) a bad article, because they have bad materials. With this exception, I imagine that the fluids must become depraved through the solids; though of course they, in their turn, must exert an evil influence. Again: it is a fact that fever will continually cease, without any discharge;—without sweating, or diarrhœa, or loss of blood at all. It is most probable that, when these things take place, they are the result of the healthy change altogether. In fever, we may get a patient to sweat profusely; but perhaps he will not be any better for it. If, however, we lessen his disease, then probably he sweats. His improvement is not the result of the sweating; but we have brought him into an improved condition; and sweating then takes place spontaneously, as it were. Frequently, in fever, diarrhœa occurs without any relief; we stop it, and the patient is all the better for the suppression. The critical discharge, too, when it does occur, and when a patient is improved at the same time, is for the most part too small to explain the improvement. It would seem that the discharge is rather the *consequence* of the improvement than otherwise. The improvement occurs; and the discharge takes place, almost as a matter of course.

Again: it is to be remembered that the fluids do, in fact, undergo a peculiar change. As the disease advances and the debility goes on, the saline matters of the blood are more or less deficient; and the blood becomes more and more watery. It is said by a friend of mine, Dr. Stevens, that we can remedy this state, not by the remedies for inflammation, but by supplying the deficient substances in the blood. Of that, however, I shall speak presently.

Spasm; Debility.—Some authors have asserted, that fever is owing to a spasm of all the small vessels. I presume that there is spasm in fever;—that so long as the solids do not secrete, we must suppose that the vessels are closed, so that the fluids cannot escape; but though there be spasm at a certain period, when the secretions are all deficient,—though we allow that this is *one* striking circumstance, yet there is no reason to imagine that it causes *all* the symptoms. Other persons have assumed, that debility is the cause of fever; but people are weak enough, every day, without having fever; and if debility be *one* of the circumstances of the disease, yet there is no proof that debility is the *cause* of the symptoms.

Inflammation.—Many think that inflammation will explain every thing;—not only changes of structure (upon the absurdity of which supposition I have already dwelt[a]); but every thing else that occurs morbidly to the body. It certainly is the first circumstance that takes place in many changes; and it *accompanies* many changes; but there is no proof that this is *always* the case. Syphilis, for instance, is an inflammatory disease. The first thing that occurs, is a pustule, or a mere inflammatory speck, followed by ulceration; and the next occurrence is an inflamed gland; and then, when other symptoms arise, they are more or less inflammatory.

[a] See Pages 195 and 196.

If blood be drawn during the secondary symptoms, it is often found buffed; and we have inflammation in different parts of the body. Syphilis, however, is something more than inflammation. So it is with cancer; so it is with encephaloid disease, and melanosis; and so, I think, it is with fever. Inflammation forms a part of a large number of cases; but it is not sufficient to explain them; otherwise a mere case of phrenitis would be, in every instance, a case of fever; and every case of inflammation of the stomach, or of inflammation of the bowels, would, if there were a certain degree of excitement, be a mere case of fever; which undoubtedly is not the case. Another argument against fever being mere inflammation is, that it is frequently cut short, in a very early stage, by an emetic; or by cold affusion;—not ablution, but affusion. Now this could not be done, if the disease were nothing more than local inflammation; or if it were inflammation at all. Again: inflammation will not explain the difference between typhus-fever and plague; which, though different diseases, are nevertheless in many respects analogous. Inflammation will not explain scarlet-fever; nor will it explain measles; yet they are both inflammatory diseases. The symptoms are decidedly those of inflammation, in a great number of cases; but there is something more than that. The system is in a peculiar state; and inflammation is merely one of the circumstances. Some have imagined that inflammation produces even intermittent fever; but we have no explanation of it; and this is a mere assumption. Any thing may be said in physic; but any thing may not be right.

That the body, in fever, is frequently in an inflammatory state throughout, there can be no doubt at all; neither can there be a doubt that in fever there is continually local inflammation; but there certainly is something more than all this in fever. There is a peculiar feeling of debility; a peculiar aspect of the countenance; generally pains, at first, in the loins; a tremulous tongue, and universal disturbance;—such as cannot arise from any simple local inflammation in any one part. Many of these symptoms are certainly not referrible to an inflammatory state; and if the disease be contagious, then this shows that there is something more than mere inflammation. The local inflammation which occurs, is by no means proportionate to the violence of the fever. There is frequently violent fever; and, although local inflammation be present, yet the latter is not at all in proportion to the former. In some instances, death takes place at the very first, without any inflammatory state being produced;—just as in small-pox (which unquestionably is a contagious disease) the patient sometimes dies, before any inflammation becomes visible;—death taking place merely from the depressed state of the system. Frequently we find the disease running on, and proving fatal, without any decided marks of inflammation at all;—without any thing that bears a proportion to the general sinking of the system. Besides, there are peculiar symptoms in fever, which mere inflammation would not at all explain; such as the particular look of the face, the tremulous tongue, and the extreme feeling of debility of the body. Mere inflammation, whether general or local, although it is a circumstance that frequently occurs in fever, is nevertheless quite insufficient to explain the whole of the symptoms. It is *one* fact in the disease; but not the *whole* of the facts; nor is it a fact from which any one can prove, that the other set of symptoms arises.

The Nervous System.—With respect to those who consider that it is neither situated in the fluids nor the solids generally, but in some one part of the body, I may mention that Hoffmann thought it was a disease of the nervous system. The nervous system certainly is affected, and so likewise

are the secretory organs; and therefore others have just as much right to say that it is a disease of the secreting system, as Hoffman had to ascribe it to the nervous system.

The Capillaries.—Dr. Wilson Philip supposes it to be an affection of the capillaries throughout the body; but then there is a peculiar affection of the nervous system in general; and there is particularly a disturbance of the abdominal organs.

The Brain and Abdomen.—Some have fixed upon inflammation of the brain. Former writers have done that; and a modern physician, in London, has done the same;—he considers it a mere inflammation of the brain.[a] Others, again, in Paris, fix upon the abdomen. Broussais, for instance, considers it to be inflammation of the stomach and bowels;—what he calls "gastro-enteritis."[b] Some patronize one organ, some another.

It is true we may find morbid appearances there; but it is also true that we may open cases of fever, and find the intestines sound; or, at least, with no such appearances as will explain the symptoms of fever. I have, over and over again, inspected cases, in which there was no inflammation of the intestines; and which, if the fact had not been told, would not have been known to be cases of fever. There might sometimes have been a little more redness than usual, in this or that intestine; or if even there was any thing morbid, still it was insufficient to account for the general symptoms of fever. The symptoms observed during life, frequently depend upon local affection; but frequently there is no disease existing in any particular part. Andral[c] says, that of thirty-eight cases of fever which he examined, only eleven presented marks of gastritis sufficient to have influenced the symptoms during life. Thirty out of the thirty-eight shewed some sort of intestinal affection; but only fourteen of these (that is, fourteen out of thirty-eight) exhibited such a morbid affection of the intestines, as could explain any of the symptoms during life. He also says, that the changes which are seen in the nervous system, are comparatively rare and slight. I do not think that fever is to be explained by Morbid Anatomy. Many of its symptoms, and many of the occurrences which take place, may be thus explained. When there is phrenitis, we usually have the *marks* of phrenitis; when there is bronchitis, we usually have *marks* of bronchitis; when there is diarrhœa, we expect to find ulceration of the intestines;—but frequently these symptoms are but slightly or not at all apparent; and after death there are no such marks as will explain fever; although there may be enough to explain the local symptoms that have occurred. Continually is it observed, in fever, that the head is but slightly affected after the first few days; and that the abdomen is scarcely affected at all.

Now I believe, as I just now mentioned[d], that the head is frequently in a state of inflammation, and so is the abdomen; but occasionally the head is far more affected than the abdomen; and in other cases the abdomen is more affected than the head. I stated[d] that the local inflammation frequently bore no proportion to the general symptoms of fever; and sometimes we have violent local inflammation, without any corresponding

[a] See "An Inquiry into the Seat and Nature of Fever; by Henry Clutterbuck, M.D."

[b] "Histoire des Phlegmasies, ou Inflammations Chroniques. Par F. J. V. Broussais." A Translation of this work has been published at Philadelphia.

[c] Andral, I think, is one of the soundest writers on Medicine. He appears to have no theories; but to look out for facts, and to make the most correct and philosophical use of them. I have found all that he has said, in his Clinical Reports ("Clinique Medicale"), to be confirmed; and though it was not till lately that I read his book, yet I was delighted to find the coincidence in our facts and inferences.

[d] See Page 362.

symptoms of fever. The same is the case with regard to the relative affection of the head and abdomen. Sometimes the head is more affected than the abdomen, and *vice versâ*;—they do not bear any proportion to each other. If we assume local inflammation to be the cause, and if we observe the phenomena of many cases, we have no more right to settle the affection in the head, than we have in the abdomen.

All these I consider to be mere circumstances constituting a general collection of truths; but I do not see any reason to suppose that there is disease of one part, more than of another.[a]

Although I deem it necessary to make these remarks, yet I shall not attempt to state what I believe fever to be. I really do not know what it is; and I think it is always a great blessing to know one's ignorance. It is well not to fancy ourselves acquainted with things with which we are not; because if we fancy we are, we sit down contented, and never think of examining the subject further. An excellent observation of this kind is to be found in Voltaire's "Philosophical Dictionary", under the word "*idea*." A person is there represented as lamenting, that he has got so many ideas;—that his cerebral matter is full of ideas; but that he is perfectly miserable, because he cannot tell what an idea is. He fancies it is this, that, and the other; he indulges first in one hypothesis, and then in another; and says it is a shocking thing not to know what it really is. His friend tells him, that—"Il est bien triste d'avoir tant d'idées, et de ne savoir pas au juste la nature des idées."[b] "Je l'avoue", replies the other; "mais il est bien plus triste, et beaucoup plus sot, de croire savoir ce qu'on ne sait pas."[c]—I imagine that we do not know the peculiar state of the system in typhus-fever; any more than in measles, or in hooping-cough. A peculiar cause has operated upon the body; and a peculiar state has been thereby induced; but we can observe only its *effects*.

SECTION VI.—TREATMENT.

Ventilation and Cleanliness.—Notwithstanding this uncertainty, however, the *treatment* of fever is in the highest degree rational, and in the highest degree successful. We must aim, in the first place, at having free ventilation, and the most perfect cleanliness;—plenty of washing, plenty of clean linen, and plenty of fresh air. With fresh air and fresh water, we may go on very well; but if there be any smell, which ventilation and washing will not remove, the chlorides are excellent things. They should be sprinkled upon the bed, or upon the floor; and disposed in saucers, or in rags dipped in the solutions, and hung on the backs of chairs about the room. A solution of chloride of lime ought to be put into the utensils which the patient employs; that no unpleasant smell,—no contamination,

[a] The following table, selected from the Journals of the London Fever Hospital, shews the comparative frequency of the several local lesions, which arise during the progress of fever, as observed in that institution; and offer strong confirmation of the correctness of Dr. Elliotson's opinion:—

I. Cases in which the fever was not apparently complicated with local inflammation in any organ	163
II. Cases complicated with cerebral affection	114
III. Cases complicated with thoracic affection	103
IV. Cases complicated with abdominal affection	71
V. Cases complicated with cerebral and thoracic affection	26
VI. Cases complicated with cerebral and abdominal affection	30
VII. Cases complicated with cerebral, thoracic, and abdominal affection	14
Total	521

[b] "It is very sad to have so many ideas, and not to know accurately the *nature* of ideas."

[c] "I confess it; but it is much more sad, and much more foolish, to think we know that which we know not."

may arise in the room. When a patient is first seen, if he be dirty, it is right (before prescribing any thing else) to prescribe soap and water. Before any thing else is done, I would always have a patient got perfectly clean. When he is well cleansed, with soap and water, all over his body; and especially his lower half, and his lower extremities,—a portion which is sometimes exceedingly filthy,—you should have him well washed with plain water, several times a day. Soap is no longer required; but sponging, several times a day, is always of importance. I believe it is always safe, in fever, to wash a patient with warm water; but if he say that he is hot, or if (on placing the hand upon him) we feel that he is hot, we may employ cold water.

Cold or Tepid Affusion.—If the temperature of the patient be steadily above 98° (as ascertained by a thermometer placed under the tongue, or in the axilla); if there be no pulmonic affection, no general profuse sweating, and the patient himself does not say that he is chilly,—we may take him out of bed, and throw a pail of cold water upon him. This is "cold affusion"; and may be repeated. The patient must be dried, and put to bed; and, as soon as he grows hot again, the same measures may be adopted. This plan makes him exceedingly comfortable. Frequently it induces perspiration; and frequently it sends him to sleep; but even if it fail of this, it nevertheless makes him very comfortable, and sometimes cuts short the fever. Upon this subject, Dr. Currie's "Medical Reports"[a] should be perused. But in general I do not find the heat steadily above 98°;—I do not find patients free from a certain degree of chilliness; and I therefore content myself with tepid or cold ablution. I have never had occasion for affusion; but it is always safe, under the restrictions I have laid down. The cold bath is too chilling a thing;—it would strike too suddenly. But when it would not be safe to take a patient out of bed, and throw cold water upon him, we may always have recourse to ablution, either cold or tepid. I always make it a rule to consult the patient's feelings on this point; and if I think he cannot bear much cold, I have him stripped, and sponged all over with tepid water; and between the intervals of this treatment, basins of cold water should be brought to the bed-side; and he should be allowed to put his hands into them as often as he thinks proper; and his face, too, should be continually washed. If there be any pulmonary affection, or if the patient say that he is chilly from the ablution, then we should use it tepid; for I need not say that tepid ablution is a great source of relief, and that it cools the patient considerably. It does not produce the impression that is made by cold water; but a great degree of evaporation takes place; and it extracts a certain portion of the patient's temperature. When it is applied, its temperature need not be 98°. From 80° to 90° is sufficient; and it cools the patient by its subsequent evaporation.

To co-operate with this treatment, the patient should have but few clothes upon him; and the windows and doors should be opened;—so that he may have, not only a free ventilation, but at the same time a cool temperature. The doors and windows should be wide open; unless the patient feel chilly, or the draught seem too strong for him. As the disease lasts longer, we must apply cold less. There is not the same power of generating heat;—the patient is not so hot as before; and therefore the application of cold is less advisable; and we find it necessary to use *tepid* ablution, where previously we used *cold*. Indeed, as the disease advances,

[a] "Medical Reports on the Effects of Water, Cold and Warm, as a Remedy in Fever, and Febrile Diseases. By James Currie, M.D."

and the patient is getting better, there is little occasion for much abstraction of temperature. Ablution, whether warm or cold, is less and less frequently wanted; and a low temperature is less and less required. But while, in general, ablution is employed for the purpose of *cooling*, it should still be partially employed for the purpose of *cleansing*. The hands, the feet, and the head, ought to be looked after.

Temperature of the Apartment.—With regard to the temperature of the room, the same rule is to be observed as at the beginning; that is to say, the patient's feelings ought to be consulted. If he be delirious, of course we must not attend to him, but judge for ourselves; but if he be not delirious, and say that the temperature of the room is unpleasantly cold, then we ought not so freely to diminish it.

Emetics.—While thus attending to the surface of the body, we likewise have to attend to the inner surface,—to the alimentary canal. It is a good practice, in the beginning, to give an emetic; but if, on making pressure, we find tenderness of the epigastrium, or any part of the abdomen, I would not have recourse to any such measure. If, indeed, there should be a violent determination of blood to the head, I do not know that I should have recourse to it then. Frequently, however, in the beginning of fever, it is an excellent practice to give an emetic;—for instance, a grain of tartar-emetic, with a scruple of ipecacuanha; but I should never think of giving it, without first ascertaining whether the abdomen, on pressure, is tender or not. Sydenham gives very good advice on this point. He advises us to premise bleeding, before we exhibit the emetic. This practice is not always necessary; but if the pulse were full, and there were great signs of a determination of blood to the head, I would bleed first.

Purgatives.—But whether we give emetics or not, there is no doubt of the propriety, in every case of fever, of seeing that the bowels are regularly opened;—that no filth collects in them, any more than on the surface. They should be freely opened, for the most part, every day;—at least, at the *beginning* of fever. If they be confined, one of the best medicines is a large dose of calomel. The quantity must vary from two to five, ten, fifteen, or twenty grains, according to circumstances; but, in most cases, five grains of calomel, followed by castor-oil every two hours, will answer every purpose. Now and then we have obstinate constipation. A patient may not have had a good stool for many days; and then we may give ten grains or a scruple of calomel, and follow it up by castor-oil; but it would be wrong to give a dose of that description, if there were every probability that a few grains would answer the purpose. Nothing is better than to follow it up with castor-oil; but, at the same time, we are likely to accelerate its operation, by giving a common injection. This, however, is not to be done if the bowels be sufficiently open of themselves;—if they be open once a day. Sometimes it will happen that they are *too* open;—that there is the *opposite* state,—that of excitement; and then, of course, purgatives would be highly improper. The purgative plan, when necessary, is to be put in practice at the *onset*; but, with regard to ablution, I would (as I have stated[a]) continue it during the *progress* of the disease. Calomel certainly does clear out the intestines better than any thing else; although it usually requires another purgative to set it off. But although we clear out the bowels well in the first instance, by means of calomel, we nevertheless often find it a good practice to go on with smaller doses of that medicine, or other preparations of mercury,

[a] See Page 365.

during the course of the disease. This will generally prove quite sufficient to keep the bowels open, without any thing in addition; but if from two to five grains, exhibited every eight, six, or four hours, do not effect that object, we must accelerate the action of the mercury, from time to time, either by an injection, or by a moderate dose of castor-oil. Senna and salts are given by some practitioners; but, upon the whole, I think castor-oil is best. Indeed, if the stomach or the intestines be irritable, we ought not to do more than give an injection. Accumulation and torpidity, however, do not always exist; for sometimes we have diarrhœa, and the whole of the abdomen is tender; and of course purgatives, in such a state, are likely to do more harm than good. It is right, before debility arises, to have one, two, or three stools a day; but, if they take place without medicine, and be of a watery character, it is necessary to restrain them, lest the patient should sink. As a general rule, where there is no irritation of the bowels, or much real debility, we ought to make a point of procuring two or three stools a day. There is no rule for the dose of calomel; but, if given in small and repeated doses, it generally keeps the bowels in an open state;—sometimes, indeed, more open than we wish.

The use of purgatives in fever is very great; but, undoubtedly, it has been exaggerated by certain writers.[a] Some books would lead us to conclude, that we have only to turn the patient inside out, in order to cure him; but I am quite certain that such is not the case. There is sometimes found a great disposition to diarrhœa, which it is absolutely necessary to restrain; but no one can dispute the propriety of removing all filth, once or twice a day, from the alimentary canal. Costiveness ought never to be allowed; for it causes the tongue to be brown and dry; and, except in the last stage of fever, where there is frightful debility, there ought to be one stool in the twenty-four hours.

Blood-Letting.—The treatment already mentioned, will enable us, in the greater number of instances, to get rid of fever;—such instances, at least, as I see. In other cases, however, it is necessary to be more active. It is necessary to take away blood; and it may be done either at the arm, or by what we call "*local* means." Venesection is certainly not required for mere generally increased action. If no organ in particular be suffering;—if we cannot discover great excitement of any one organ;—if there be mere general excitement of the system, I do not believe that venesection is required. However, if the epidemic be of such a character, that inflammation is sure to come on, it is as well to bleed in the arm; in order to prevent such inflammation, when it does come on, from being so violent as it otherwise would. But, as a general rule, in the fevers that I see in London, venesection is not demanded in one case out of thirty or forty. It would be wrong for me to speak of what people see in other places; because fevers differ in different situations. In the country, where people are strong and plethoric, and in hot countries where the excitement is sometimes exceedingly great,—the congestion within the head, chest, or abdomen, very considerable,—the lancet is the "sheet-anchor"; whereas, in the majority of continued fevers which I see, venesection is certainly not necessary; and I am sure that those who employ it extensively in this disease, if they do not destroy their patients, yet protract their cases. However, it is of great importance to employ *local* bleeding; and, except in hot countries, I think every good may be obtained from it, in the majority of cases, without that shock which *general* bleeding produces; and

[a] See Dr. Hamilton's celebrated work, entitled "Observations on the Utility and Administration of Purgative Medicines in Several Diseases."

which is very desirable in mere inflammation. In *fever*, this shock is not demanded. In comparatively *mild* fevers, it would make the disease severe; and in those of an asthenic character, it would knock the patient down.

Blisters.—After a proper detraction of blood, or in a case where the loss of blood is not advisable, blisters (applied to the nape of the neck, or to the forehead, or behind the ears) are very useful. A blister applied to the summit of the head, is generally a painful thing; and I would not have recourse to it, except as a last measure. Before the inflammatory state has much subsided, and before there is really more of irritation than of inflammation, the application of blisters would of course be doubtful almost anywhere; but particularly at the top of the head. The hazard, however, would certainly be far less, if they were applied to the nape of the neck, to the occiput, or to the forehead. Leeches must be repeated at intervals; —as long as the local symptoms seem to demand them, on the one hand; and the strength of the patient will bear them, on the other. When, however, notwithstanding local inflammation or irritation, we do not wish to apply even leeches or blisters, mustard-poultices are particularly useful. When applied over the epigastrium, they will stop vomiting. They are very serviceable over the abdomen; and by many persons they are employed at last, or even in an early stage, to the feet; with the view of exciting distant irritation.

Small Doses of Mercury.—In many of these fevers, it is of the greatest use to give mercury; especially if there be a degree of inflammation, and great foulness of the tongue. If given in small, but repeated doses, it will answer the purposes I have already mentioned.[a] It not only purges the patient, but (by degrees) causes the tongue and the interior of the mouth to become moist; and when that is effected, the patient is almost sure to be better. It is necessary to remember, that it should not take the place of local bleeding. It will increase the good effect of detraction of blood; and where that is not required, it will do alone; but where that is necessary, mercury must not take its place. It must be used as an auxiliary to bleeding; and not as a substitute for it. Over and over again, in treating patients, I have omitted the mercury; and have seen the tongue grow darker and fouler; and then, upon having recourse to it again, I have seen the mouth resume its moisture, and the tongue become less foul. I have made the observation too often to doubt its accuracy. It is true there are many cases of fever, that will do without mercury. I only say that, in the mass of cases where mercury is given, the success is greater than when it is omitted. We cannot draw any argument from a single case; it is only from a series of cases, treated in a particular way, that we can arrive at any legitimate deductions; and as far as I have seen, the moment the mouth becomes moist,—provided proper detraction of blood be instituted, and all other suitable means,—the local symptoms of inflammation generally decline; and patients recover more quickly than they otherwise would; and many recover who (in all probability) would not, unless that practice were resorted to. Still (I must repeat) a great number of cases of fever will do well without it; but, where the symptoms are severe, we find it a most useful medicine. We should not aim at any violent affection of the mouth; and, if that should occur, the medicine must be omitted till the symptoms remit; but we should feel the patient's gums every day, to ascertain whether the mercurial effect is kept up. There can be no

[a] See Pages 366 and 367.

doubt that mercury will sometimes take effect, not in consequence of having cured the disease, but by the disease becoming better (through nature and the general means employed), and the mercury being no longer resisted. The proof of mercury doing good, consists in this fact;—that if it be given quickly, so as to get the mouth sore, the sooner that object is effected, the sooner in general is the patient improved.

Calomel, however, is frequently too active for the intestines; blue-pill, or Hydrargyrum cum Cretâ, answers better. After a time, even these will purge; so that it is necessary, along with them, to exhibit chalk-mixture, or an infusion of catechu. It is well to give the infusion of catechu or kino, for it will enable the patient to bear the mercury; and we frequently find that Hydrargyrum cum Cretâ is the only mercurial preparation that can be borne. Mercury, if pushed too far, increases the mischief;—it induces great irritation of the alimentary canal. A remedy, how excellent soever, requires (of course) to be *properly* used. Small doses of opium, I need not say, will tend to check the diarrhœa; and frequently there will be no objection to five drops of the tincture, three or four times a day.

Antimony.—As to antimony, I do not think it an appropriate medicine; for it irritates the stomach;—a circumstance which is not wanted in fever. There is so frequently also a disposition to sickness, that it is very likely to excite vomiting. If we give mercury at the same time, the antimony has a great tendency to counteract its effect. It may cause the mercury to be rejected; and, I confess, I have never seen any material good done by it. In cases of decided inflammation, it would be a good remedy, pushed to a large quantity; but when the case is attended with great irritation of the alimentary canal, (as many attacks of fever are,) and the patient has but little strength, I am sure that it is better not to give antimony;—lest we make the patient's stomach so irritable, that it will not bear food, or any thing else. It is only where there are very decided marks of inflammation, that it might be given; and even then I should much prefer mercury. As to its sudorific effects, I have given antimonial wine in very large doses, without producing sweating. The best mode to ensure sweating in fever, is to clear out the bowels, to reduce the temperature of the surface, and to take away blood locally or generally, accordingly as it may be required. I have seen patients lying in a carpeted room; with the windows shut, plenty of bed-clothes on, and perhaps a fire in the room into the bargain;—and all this, I have been told, was to excite "a gentle diaphoresis"! The diaphoresis, however, never made its appearance; but on opening the windows, putting out the fire, removing the bed-clothes, taking up the carpet, purging the patient well, and removing any local inflammation that was present, it has come on immediately. The idea of a few grains of antimonial powder, or a fraction of a grain of tartar-emetic, once or twice a day, being important in fever, appears to me quite absurd. With the treatment I have mentioned, nothing else will be required, till great prostration of strength sets in.

Treatment of the Local Complications.—It is necessary, in every case of fever, to be constantly on the look out for local inflammation;—every day to ascertain what is the state of the head, the chest, and the abdomen. We should always ask if the patient complains of headach. Look at his eyes; and see whether they are red or not. Ascertain if his pulse is full; and inquire whether there is any throbbing of the head. So, with respect to the chest, we should observe whether there is difficulty of breathing; and if there be, it is well to apply the stethoscope, and ascertain what rattling

there is. The abdomen ought to be carefully felt every day; in order to ascertain whether the stomach, intestines, liver, peritonæum, or other parts, be inflamed. When we find a sufficient degree of inflammatory disturbance of these parts, then it is right to take away blood locally. If the head be affected, then we should cup at the back of that organ; or apply leeches to the forehead, temples, or behind the ears; but if it be the abdomen which is affected, it is always better to employ leeches. If the pain be situated at the front of the head, it is better to employ leeches there. I mentioned [a], when speaking of inflammation, that the effect of leeches or cupping is often very local. I have seen parts where they were applied, relieved; while others, in the neighbourhood, remained as painful as before.[a] At whatever part of the head the pain is felt, there we should direct our means of treatment. If there be delirium, and this delirium be accompanied by pain and heat of the head, or throbbing; or if the eyes be red; or if there be great vivacity, like incipient delirium of an active kind; we ought always to shave the head, then apply a cold wash, or employ a bladder of ice (which is one of the best things), and put plenty of leeches on, or employ cupping at the occiput. If there be vomiting, or tenderness at the epigastrium without it, we should apply leeches, which are the best remedy for it; for, when there is tenderness or vomiting, it generally arises from inflammation of the mucous membrane; and leeches will remove it, by removing the causes of inflammation. So, with regard to the abdomen at large, when that is tender, there is generally more or less diarrhœa; the intestines are acting too violently; and leeches, freely applied, are the best mode of restraining it. After they have been used, apply a blister; but always remember, that a blister will not take the place of local bleeding, if the inflammation be considerable. If there be local inflammation, we frequently find that the application of leeches will remove it; and after it has greatly subsided, slight inflammation, or mere irritation, may be left; and a blister may be of the greatest use. We shall see, when I come to speak of diarrhœa, that leeches and blisters are frequently the best remedy for it.

Cooling Drinks.—All cool drinks are proper; and a saline draught is as good as any thing which can be given for a drink. People will frequently take from half a pint to a pint a day. It is always to be remembered, however, that all acid matters, and even a saline draught, have a tendency to increase any irritation that may be present in the bowels; and diarrhœa is frequently kept up, by a saline draught being continued. But if there be no purging,—if the alimentary canal be tranquil, acidulated drinks are very useful. Upon the whole, however, a downright cool drink,—plenty of cold water, is one of the best things that can be given.

Treatment of Convalescence.—As the symptoms all decline, all the remedies must be diminished, both as to force and to frequency; and there may be less abstemiousness practised. Nourishment may be gradually given; and one of the best articles, after slops are done with, is milk. It is very wrong to continue starving a patient after fever is gone; for when the fever is over, the appetite becomes remarkably keen;—keen in a degree that is never witnessed after any other acute disease. Patients when the fever is over, are sure to say they are very, *very* hungry. Other patients will ask for full diet; but patients after fever ask with great earnestness. They seem to have a craving which impels them to ask it;—whether they think it will offend or not. Patients are more emaciated after fever, than after any other acute disease. Even when no evacuation

[a] See Page 131.

have been practised by the medical attendant, and when the disease itself has not been attended by any great evacuations, there will still be a degree of emaciation, which I think is not witnessed after any other disease; and when the fever is over, and there is so great a craving for food, it would be contrary to common sense to withhold it. It seems to be a real call of nature;—it seems that food is absolutely demanded. I always make a point of giving them light animal food;—not pork or veal, or artificial trash; but plain mutton, and good fresh beef; and carefully watching the effect.

Treatment in Extreme Debility.—Suppose, however, that the disease does not run on in this mild form; or that the inflammation does not become subdued, as in any inflammatory disease; but that signs of great debility come on; we must then have recourse, even in the midst of fever, to good support. Milk should be given, in as great abundance as the patient can take it; and, I think, strong beef-tea. Some imagine that, the digestive process being suspended in fever, animal broths cannot be digested; but, however that may be, I know that persons who take strong beef-tea, frequently do admirably well. By "strong beef-tea", I mean a pound of meat, chopped extremely small, and boiled in a quart of water, until the latter is reduced to a pint. Some persons will take two or three pints of it in a day; while some require only one pint;—and we find them considerably nourished by it. Many persons cannot take milk; but, where it can be borne, it is excellent nourishment. Arrow-root, sago, and rice, may be taken with the milk. I believe that, occasionally, we must give more nourishment than can be introduced by the mouth; and when there is extreme prostration, it is useful to give strong clysters of beef-tea, in which an egg may be diffused. I have seen them given to a patient every four hours; apparently with the result of getting him through the disease. If the clysters be discharged again, and not retained sufficiently long to be beneficial, it is useful to put into each of the injections a drachm, or two drachms, of powdered catechu.

Wine.—More than all this, however, is sometimes required; and we must give a patient wine. If we give wine, as a *general* remedy for fever, I am certain that we shall kill one half of our patients; but if we give it in the latter stages of the affection; or if, from the first, the disease be attended with great debility, we shall frequently do much good by its exhibition. It is often indispensably necessary, but not (so far as I have seen) at the *beginning* of fever. A great number of cases do well without it altogether; but I have seen cases, over and over again, where a glass or two of wine has stopped vomiting or diarrhœa. It is where there is extreme debility,—where there is *irritation* rather than *inflammation*; and where we find that the pulse is feeble,—almost fluttering; and the aspect of the patient indicates that he is sinking;—it is here that I have found it beneficial. I have always been accustomed to quote Sir John Pringle on the exhibition of wine; because I think that his directions, both as to the quantity required, and the time at which it is to be given, are the best which have been written. He says, "In our malignant fever", (he was physician to the army,) "when the pulse sunk, it always became very frequent" (that is generally observed); "and in proportion as it rose with the wine, it turned slower. I have also had experience of the good effects of wine, when the tongue has been both foul and dry." Here is an illustration of the propriety of not attending to one symptom, but to the whole. A dry and foul tongue frequently indicates inflammation; but if no inflammation be present, but (on the contrary) great prostration of strength, with

a fluttering pulse, an anxious countenance, and inability of the patient to move himself,—then we need not fear foulness and dryness of the tongue; but may exhibit wine. "When wine is given", Sir John Pringle says, "in proportion as the patient grows stronger, the pulse becomes slower. Wine, in health, will *accelerate* the pulse; but when a person is weak, and the pulse is quick in proportion to the weakness, and when this state does not arise from inflammation, but downright exhaustion, wine, instead of *quickening* the pulse, makes it *slower*. The surest indication for wine", continues Sir John, "is taken from the long continuance of the disease; the languor, and dejection of strength; and the slowness and faintness of the voice; but we can never be absolutely certain of its effects till we try it." This is also a point carefully to be attended to. We constantly meet with cases, where there is a doubt as to the proper mode of treatment to be adopted. This occurs to me every day; and will occur as long as I live. We are not certain whether the time has arrived, at which to treat the case as inflammatory or not; and we are often made unhappy by this circumstance. Whenever a suspicion of this sort arises, it is best to combine both modes of treatment;—to lessen any excitement; and to begin stimulating and tonic remedies, with great caution. Whichever is found to do good, must be increased; and, in fact, substituted for the other plan. "I have seen", Sir John Pringle says, "in cases of this kind, strange instances of the power of instinct; for when wine was to do good, the sick swallowed it greedily, and asked for more; but when it was to heat them, or raise the delirium, they shewed an indifference, or even an aversion to it." It is of the greatest importance, in fever, to attend to the wishes of the patient,—provided he be not delirious; for then he will talk at random. But if he be not delirious, or only partially so;—if he be sufficiently collected to know his own feelings, and to give a clear account of those feelings, they should, in general, be attended to. "Sometimes", he then continues, "the physician can have no better measure for the quantity requisite, than the appetite of his patient."

Quantity of Wine Necessary.—Half a pint of wine is sometimes required in twenty-four hours;—one glass being given at a time. Generally a pint is the utmost that is requisite; though I have given a bottle with advantage. It is best not to give Rhenish wines, or thin claret, or any acidulated wine; for, if diarrhœa be present, it will increase the irritation of the alimentary canal. It is also best not to give sweet wines; for they are apt to ferment and become acid in the stomach. Sherry, Madeira, and Port, are the best that can be employed. If there be no irritation of the alimentary canal, but a torpid state of it, acidulous wines may sometimes, perhaps, be admissible. If the patient desire porter, or has been accustomed to it, that is very good; but we should not give a pint of porter at once. A wine-glass or two may be given every few hours; or perhaps only once in the twenty-four hours. Because a person desires porter, we are not necessarily to give a pint in the twenty-four hours. When there is mild delirium (not "delirium *ferox*", but a "*muttering* delirium"), or when the pulse is rapid and weak, and when extreme debility has come on, then it is right to resort to this treatment; for it will frequently stop the delirium, or (at any rate) check it. But if we go on with it after it has stopped the delirium, it will frequently bring it back;—so that the patient is worse than he was before.

Other Stimulants.—In this state of debility, many give ammonia and ether; but I cannot help thinking that wine, or good malt-liquor, is the best article that can be exhibited; unless the malt-liquor bring on diarrhœa.

It is much better to give those stimulants which most people like, than to give ammonia or ether. The former are *natural* stimulants; and are much more grateful to the patient. Care must be taken, with all these things, not to overload the stomach. The moment you find the head affected by them, or the stomach overloaded, it may be necessary to give an emetic. For the same reasons that I have already stated, I should also prefer giving wine, to giving what are called "*vegetable* stimuli";—such as serpentaria. It is true I know nothing about them. I dare say they are good; but I have always been able to do without them.

Tonics.—As to tonics, by far the best is quinina. If we judge it right to attempt supporting the patient by means of quinina, it should be given, in doses of three or four grains, every three or four hours. I certainly fancy that I have saved patients in the last stage, when there has been no longer room for giving mercury, by supporting them well with good nourishment and wine, and by giving sulphate of quinina in considerable doses. But it must be remembered that, in giving sulphate of quinina as a tonic, it may do harm by purging; and therefore we should be on our guard against this, by administering astringents at the same time. I frequently accompany it by catechu; and then the irritation is generally put a stop to.

Saline Treatment.—Dr. Stevens says that, in this state of debility, he has seen great benefit arise,—far greater benefit than from any thing else,—from very small and repeated doses of the carbonate of soda, nitre, muriate of soda, or chlorate of potass; which supply the deficiency of saline particles in the blood. He has a vast collection of testimonies in favour of the saline treatment in yellow-fever; where, after a certain period, ordinary treatment generally does more harm than good. In all such fevers, he contends that, in the first instance, it is the best practice to bleed the patient and give mercury; but, after a certain period has arrived, the blood falls into the condition I formerly stated [a]; and that condition is made worse by mercury; and, of course, by bleeding; but he says it is admirably remedied by small doses of neutral salts, particularly those I have mentioned. Twenty or thirty grains are given every three or four hours; except of the chlorate of potass; of which about a third of that quantity is a dose. It appears that those who have adopted this plan, in the West Indies, have had the greatest success. He informed me that, in yellow-fever, many had agreed that they did their patients altogether more harm than good by treatment; and that those succeeded best, who gave nothing but saline draughts, in large quantity. Neutral salts are now given, in the large doses I have stated, and with the very best effect. By adding neutral salts to blood, however black it may be, we make it of the brightest scarlet; but if we add acids or alkalies to *red* blood, we make it *black*.

Opium.—In the last stage of fever, some give opium in small doses, for the purpose of keeping up excitement. Dr. Wall, of Oxford, and Sir John Pringle, did so; but others give a dose once in the twenty-four hours, for the purpose of tranquillizing the system. I have no great experience of it as a stimulant; but I know that, when a patient has long laboured under fever, it is quite safe to give him a dose of this kind, in order to procure him a good night's rest. I suspect that wine is a better stimulant than opium; although opium is certainly exceedingly useful in the latter stages of the complaint. Some highly praise musk. I need not say that morphia is sometimes greatly adulterated. It is said that opium is not always of a certain strength, and that morphia is; but, from being adulterated, morphia

[a] See Page 331.

is of the same uncertain strength as opium. Opium is particularly useful in procuring sleep; and in putting a stop to vomiting and purging. The muriate of morphia is an admirable form of opium, if not the best.

Concluding Remarks.—The treatment of fever, therefore, consists in subduing inflammation, on the one hand; or in supporting the strength, on the other; and we must always carefully look out for local symptoms, and check them. The vomiting is frequently urgent, and very distressing to the patient; and although effervescing draughts will sometimes stop it, as will also hydrocyanic acid, yet if there be inflammation present, it is not in the nature of these remedies to arrest it; and we must then employ leeches, blisters, or sinapisms. So with regard to purging, opium will frequently put an end to it, and so will all astringents; but, as I have before said [a], it is best not to give astringents if there be inflammation present. Leeches and blisters will then effectually subdue it, when nothing else will. If the fæces be exceedingly fetid, it is a very useful plan to give yeast, either by the mouth, or in the way of injection. An injection of yeast will frequently very much correct the offensive odour. Some give it in porter. The injection of the chlorides would, I fancy, be useful; but I have no experience of it. In fever it is necessary, every day, to attend to the state of the bladder. It frequently happens, in this disease, that a great accumulation takes place in the bladder; and patients might go three or four days without making water. Great inconvenience may, at last, arise from this source; and therefore it is a point that should be carefully looked after every day. There is only one other circumstance that it is necessary to attend to; and that is the longings of the patient, during the progress of the disease and afterwards. These should be indulged, unless there be some very good reason against it.

The treatment of fever, therefore, bears an analogy to the symptoms. We have seen [b] that the symptoms of fever vary from those of the most violent inflammation,—the most violent excitement of the system, on the one hand, down to extreme prostration of strength on the other; and the treatment must vary in like manner. It may be requisite that the treatment should be of the most active anti-inflammatory kind, on the one hand; or the most gentle anti-inflammatory treatment, with a moderate support of the system, on the other; or it may even require to be of the most supporting and stimulating kind. Fever is not to be treated because it is *fever*; but according to the circumstances of each particular case. If we have twenty cases of fever, we are likely to find them more or less different from each other; and requiring more or less difference of treatment, according to the urgency of the symptoms. Remember, therefore, that in fever we have to vary the treatment; from that of an active inflammation, to that which is employed in mortification, when the mortification is attended by inflammation.

[a] See Page 157. [b] See Page 323.

CHAPTER VI.

REMITTENT FEVER.

Its Nature.—I now enter upon the subject of *remittent* fever; which resembles both *intermittent* and *continued* fever; and partakes of the character of each. Essentially it is the same as *intermittent* fever. It arises, I believe, from the same cause,—malaria; but—either through a modification of the malaria, or the influence of such causes as predispose to, or excite, *continued* fever—we have only remissions;—not *inter*missions, but *re*missions. The disease is really *continued*, although *remitting*;—having a relaxation of severity at different hours. This disease occurs in hot climates particularly; and in cold climates during hot seasons. It therefore occurs when and where there is the greatest abundance of vegetable matter; and where there are all the circumstances most favourable for decomposition, and the production of *aguish* fevers; and, also, where there is the greatest prevalence of those causes, which are likely to excite *continued* fever;—excitement and relaxation of the body, and disturbance chiefly of the abdominal organs. Many epidemics described, in ancient books, as plagues and pestilences, were really remittent fevers.

Symptoms.—There is continual fever every day throughout the twenty-four hours; but the patient is much less hot at one time, than at another; so that, although he has constant feverishness, he feels himself far less ill at different intervals. Sometimes, in addition to the continual fever, there is a regular paroxysm of ague. I have seen a person constantly hot day and night; except, perhaps, every *other* day; when he had a cold fit; and then the heat would become more intense, and sweating would occur. But when the latter was over, there was no intermission; for the patient was hot again. The usual form is continued feverishness; with a great aggravation of it at particular periods. Or (to put it in another way) we have the symptoms of continued fever; but there is a relaxation of these symptoms at particular periods. But besides this, (although I do not recollect its being described,) I have seen continual fever, with a paroxysm of ague coming on, at regular intervals, in the midst of it.

Sometimes, instead of remissions alternating with an aggravation of the feverish symptoms, the remittent nature of this continual fever is shewn only by occasional chilliness. I have frequently discovered that *continued* fever (as it appeared to be) was really *remittent* fever, by noticing that, although there was continual feverishness, heat, and thirst, yet the patient, in the midst of it, was frequently chilly; and on other occasions by observing that, in the very midst of the heat, there was from time to time profuse perspiration. The nature of the disease was pointed out to me, either by the occurrence of chilliness (even amounting to rigors) from time to time; or by the occurrence of sweating at intervals. The correctness of this opinion has been proved, by giving the patient quinina; which has restored him to health. So far as my own observation goes, I think, that remittent fever shews itself sometimes in these two forms. Intermittent

fever will become *remittent*, if the cause of *continued* fever be superadded, after *intermittent* fever has begun. Supposing a patient has ague, and goes through great fatigue or want of rest, or is exposed to wet or cold, he may be thrown into continued fever. These circumstances alone would not cause ague; but as ague already exists, the disease becomes remittent fever. The causes of *continued* fever, are applied to a constitution labouring under *intermittent* fever; and then we have *remittent* fever. Frequently, however, the disease is produced from the very first.

When remittent fever is acute, it seldom (I believe) lasts more than six weeks.

Varieties and Duration.—Dr. Macculloch, however, imagines that remittent fever is often a chronic affection; that it is often mistaken for hypochondriasis; and that the paroxysms are not observed, because they occur in the night. I am persuaded he is correct. I am persuaded that many persons have long-continued remittent fever;—frequently for many months; and, its true nature not being detected, it is thought to be some indescribable complaint. I had under my care a patient, who appeared to be in this state;—a man who was frequently very hot; complained of heaviness in the head; was affected in his mind; and had great depression of spirits. This man took five grains of sulphate of quinina, three times a-day, without any effect; but, on increasing the dose to *ten* grains, I found him better. I have seen many such cases; and they long puzzled me. They are principally characterized by oppression of the head, heat occasionally in the night, and great depression of spirits.

Aggravated Form of the Disease.—The disease in its acute form frequently assumes a very aggravated type; as dreadful for rapidity as violence. It is in hot climates, particularly, that this occurs. This form of the disease is so violent, and so acute, that there is at first delirium and violent vomiting; with an absolutely roasting heat in the stomach; and great pain, tenderness, and agonizing distress, at the epigastrium. Besides these local symptoms of the head and the stomach, there are all the signs of a violent inflammatory fever; and these symptoms, both local and general, are soon followed by the most awful debility, and by all the signs of typhus.

East Indian Fever.—The fever of the East Indies is a violent and acute remittent fever;—accompanied by great derangement of the liver and stomach; and occurs in various other parts of the East besides Bengal. At Bengal it arises from the overflowing of the Ganges, and the subsequent fall of the waters, acted on by a high temperature. After the Ganges has overflowed, the waters fall in November and December; and, in consequence of the heat, such emanations are produced as to cause this fever. The violent delirium, pain, and vomiting are succeeded, after a certain time, by a remission and a sweat. This occurs about twelve or fourteen hours after the attack; and the pulse, from being 130, may fall down to 90; and then the delirium ceases, and the mind is restored. The remission, however, is but short; for the symptoms soon reappear; and are then succeeded by the awful debility to which I have referred. If the disease prove fatal, there is very soon no remission at all. The gastric symptoms become more violent than before; the tongue becomes black; the pulse small; and the patient sinks. If it be fatal, it generally proves so (we are told) between the third and the seventh day; but occasionally it has been known to last fifteen, or even twenty days. Of course, I am only speaking from information which I have derived from authors.

Yellow-Fever.—This disease has appeared, with some other symptoms,

in the Mediterranean, in North America, and in the West Indies. In the Mediterranean it has appeared at Rochfort, Bourdeaux, Lisbon, Gibraltar, and Minorca. In addition to the symptoms I have already enumerated, the fever is characterized, in these countries, by yellowness of the skin, and a vomiting of black matter. Thus varied, it has been called "yellow-fever", —from the yellowness of the skin. In America it is said that thirty-six, or even seventy-two hours, generally elapse before the remission takes place.

The Black-Vomit.—The black-vomit, which is as much characteristic of yellow-fever as the yellowness of the skin, is thought to be bile a little changed from blood;—imperfectly formed bile; or even blood only a little changed. Indeed, some suppose that, of the two, it would be more proper to call it "*blood*" than "*bile*". It is said to have been found on the surface of the stomach, when there was none in the duodenum;—as though it had not come from the liver. This black vomit is said to be by no means acrid. Dr. Physic, of America, says it is tasteless; and that he dropped some into his eye, and the organ did not become irritated. He also says that he found an abundance of it in the stomach, when a different fluid was observed by him, both in the gall-bladder and the gall-ducts. It is decidedly of the appearance of charred blood;—of blood that has undergone certain changes, and is poured forth from a mucous membrane. Another gentleman has carried his experiments, with the black-vomit, farther. Dr. Firth tells us that he procured two ounces from a patient (whether dead or alive I do not know); that he drank it undiluted; and found it harmless. Before this he had drunk a large draught of it, mixed with water, with impunity; but he took two ounces in its genuine state; and said he was none the worse for it. He wished to try it in a solid form; and therefore made an extract into pills; and he says that he found as little inconvenience from them, as he had previously done from his "black draughts." The fluid and concretion of melanosis, also, are generally inert.

Yellowness of the Skin.—The yellowness of the skin is ascribed by some to bile pervading the system; but there are very great doubts as to whether that is its origin. The bile is very abundant in this disease; and may be regurgitated, by violent vomiting, into the veins, through the compression of the parts; but there is no obstruction. At any rate, it is certain that, if it be bile, it is not obstruction that produces regurgitation of it; for the fæces are well tinged with bile. One reason for saying that it is not bile, is that it will occur in patches. It is not more visible in the eyes and nails, than in other parts of the body; and it is not diffused equally throughout the body, as we observe in jaundice; but occurs in patches, as ecchymoses would do. It would appear rather to owe its origin to the blood being changed;—to the serum, with a few red particles, escaping more or less into the cellular membrane;—the blood having undergone a change. It is altogether analogous to ecchymosis, when nearly gone; and we know that an ecchymosis does not arise from bile; but from an effusion of blood, that is subsequently in a great measure absorbed;—the portion which remains giving a yellow colour. Sir Gilbert Blane says, that when yellow fever prevailed in the West Indies, he has observed it spread from bed to bed; and that it bore no proportion to the malignity of the disease. It appeared in two vessels (the Alcides and the Royal Oak), when there was only a slight indisposition. He also says that, unlike jaundice, it begins usually about the parotids. There is usually fulness and flushing of the face and neck; but particularly about the parotids. Here there is the most blood; and here it is that the yellowness appears in the most distinct manner.

Climates and Seasons most Liable to Yellow-Fever.—This yellow-fever (or

"causus icterodes", as some call it) is apparently another form of bilious remittent fever; and occurs only in countries and in seasons, where the heat is such as would destroy or arrest the plague. It occurs, too, in hot seasons;—such as would usually put an end to contagious typhus-fever, when that is prevailing. Yellow-fever, and bilious remittent fever, are always extinguished by cold weather. As soon as the cold sets in, they cease.[a] It is said that the blacks, in America, are usually less violently affected than the whites; but that if they go into a cold country, and reside there for a time, and then return to America, they suffer equally with the whites. Persons who are unaccustomed to a high temperature, it appears, suffer most from this disease. Blacks coming from hot countries, or having descended from parents born in hot climates, suffer less; but if they reside in cold climates, their constitution partakes in some degree of that of the white; and then they suffer far more than others of their black brethren.

Cold countries, and the cold seasons of hot climates, are free from this disease. It generally occurs only in the tropics, and elsewhere when the heat is as high as in the torrid zone; but very intense heat, in cold climates, has been known to occasion it. If the temperature have accidentally been as high as in a hot country, then even a cold climate has been subject to it. Sir John Pringle, for example, says that he has sometimes seen yellowness of the skin in Flanders. Dr. Brocklesby mentions seeing it, in 1758, in the Isle of Wight. Dr. Home saw it at Worms, in Germany, in 1743. It prevails in the West India Islands, in Charlestown, Norfolk, Providence, Philadelphia, New York, Baltimore, and Boston. Those places that have the largest quantity of vegetable matter for decomposition, when the hot weather comes, and have the most moisture, are most subject to this yellow fever. It occurred at Lisbon till the earthquake happened. It occurs also at Cadiz, Bourdeaux, Rochefort, Seville, and Gibraltar. The latter place is situated high enough; but although high in reference to the sea, the town is low in reference to the mountains. The rain that runs off four thousand acres, it is said, streams towards the town; bringing with it a quantity of vegetable matter from the hills, as well as fragments of vegetable refuse from the markets. Even straw has been said to afford the source of this disease at Gibraltar. Sir John Pringle says, that the straw was very injurious to the army there. The rocky soil increases the mischief, as it causes the water to remain.

Causes of Yellow-Fever.—However, notwithstanding it would appear that yellow-fever is the product of malaria, there has been a difference of opinion on this subject entertained at different times. A Mr. Vines, a planter and "physicker" in the West Indies in 1647, writing from Barbadoes, ascribes the yellow-fever to "the Lord's heavy wrath"; and not to any thing in the climate. The island was not cleared for a considerable time after he wrote. The disease prevailed then, to a greater extent than it does now. A Spanish officer named Armesta, who ascribed the disease to local situation and atmospheric causes, was actually at one time arrested; and was obliged to retract his views, as being "false, dangerous, and seditious opinions." So violent, at one time, was the opinion that it had nothing to do with local situation, that fifteen hundred copies of this officer's

[a] There is nothing, connected with yellow-fever, which seems so invariable as the decline of the epidemic on the setting-in of cool weather. At a temperature of about 50° (Fahrenheit), fresh cases soon cease to appear; and, in Spain and North America, the disappearance of the disease at a particular period, is usually calculated on with precision.—*Dr. Gillkrest, on the Yellow Fever; in the "Cyclopædia of Practical Medicine"; Volume* 4; *Page* 279.

book were burned. In the year 1800, the government had a different opinion; and ascribed it to something in the atmosphere. And this is really the case; for it is owing to miasmata.

Is Yellow-Fever Contagious?—A great question has arisen in the western hemisphere, and in the Mediterranean, as to whether yellow-fever is contagious or not. Dr. Firth, of Philadelphia, who tasted the black-vomit in the way I have stated[a], says that he has frequently inoculated himself with it; and also with the serum, saliva, &c., of patients labouring under yellow-fever; but that no prejudicial effect was produced. It is said that it is never propagated a mile from Philadelphia; and that therefore it must owe its origin to local causes. Dr. Rush—who was a celebrated American physician, and a violent contagionist—contended that this was a contagious disease. He afterwards retracted his opinions; and begged the forgiveness of the friends of science and humanity, if the publication of his former opinions had had the effect of increasing the miseries attendant upon the disease. He says, indeed, that such is the pain he feels in recollecting that he ever entertained or propagated the opinion of its being contagious, that it will always lie heavy at his heart; and deprive him of the pleasure that he might otherwise have derived, from a review of his attempts to fulfil the duties of his public station. He says he was misled by Dr. Lining, and other writers. "I am aware", he says, "of the influence which changes in opinion have upon a medical man's reputation; but still I would cheerfully make a sacrifice of that kind, could it avert the evils which are connected with the belief of its being a contagious disease." The mode in which a false belief in contagion does harm, is by preventing the healthy from attending upon the sick; by stopping commercial intercourse; and by allowing the patients to remain in the unhealthy spot, which really causes the disease.

It is impossible for us who live here[b], to know any thing about these matters; for there is as much evidence on the one side, as on the other. In the East Indies it is never thought to be contagious; but in the West Indies it is so considered, by a large number of persons. The fever in Gibraltar gives rise to a diversity of opinion; and there are as many protestations as to its being contagious, as there are as to its arising from malaria. Dr. Stevens thinks that he has discovered the reason of all these discrepancies of opinion. He says there are three distinct yellow-fevers in the western hemisphere. In the first place, there is one in which there is no contagion at all; but which is a climate-fever; and arises simply from excessive heat. It occurs to new comers, who are operated upon violently by the intensity of the temperature. Severe bilious symptoms arise; but he says there is nothing contagious in it. He contends, next, that there is the remittent fever; the *yellow*-fever; arising from the local cause of malaria and heat together;—a fever which is seen by every body, and acknowledged to exist by most. Besides these, he says there is a yellow *typhus*-fever; which he has been able to trace to the negroes in America, who have come from Africa. It is a contagious disease, attended with yellowness of the skin, and brought there by the Africans. He says that all these three fevers are attended with yellowness of the skin. What his observations are, or how numerous they may be, from which he has drawn these conclusions, I cannot tell. He says that the symptoms of these fevers are all different at first; but that after a time they are all the same; and that although the general treatment of the whole is the same, yet (as they

[a] See Page 377.

[b] In England.

differ in their minutiæ) they require a modification of treatment. I cannot say more upon this subject. I give no opinion upon it; but I should think it likely to be the case;—that there are two or three different kinds of fever; and that the intensity of the heat occasions them *all* to be characterized by great yellowness of the skin, *some* by a depraved state of the blood poured forth under the skin, and *others* by jaundice. I have no doubt that Dr. Stevens has founded his opinions on numerous facts; and that many of them will be found well established. I believe that the greatest authorities in America are satisfied that the yellow-fever (as it prevails there) is, for the most part, not contagious; but that it is *sometimes* contagious, appears very certain.

Dr. Stevens's Opinions on Contagion.—In a conversation which I had with Dr. Stevens, he mentioned an instance of yellow-fever occurring in a family, situated at a great distance (across the sea) from any place where the disease had prevailed. The captain of a vessel was in a port, where yellow-fever prevailed; and, being continually among the people, his clothes and his linen were impregnated with it. I am not sure whether he had the disease himself; but he had been in the midst of those who laboured under it. When he left the port, he cheated the quarantine; and went, with his linen unwashed, to another place, where no fever had prevailed. According to the quarantine regulations, his linen should have been washed; but I understand that, under those regulations, washing is very dear; and that every thing is charged double. He, therefore, to save this double expense, contrived to take some of his dirty linen with him;—satisfied that the disease was not contagious. The linen was taken out by his family, in this place where yellow-fever had not prevailed; and, in a very short time, one and another of the sisters and maids who washed it for the captain, died; and an old woman, who lived in another part of the country, and came to help them, was also seized with the disease. It spread from house to house, all through the town; and produced very great devastation. Dr. Stevens says, that he knows it was the contagious form; that, in fact, it was what he calls "African typhus." He took a voyage for the purpose of inquiring into the circumstances. The sisters said that it arose from the dirty linen; and it appears that he was able to trace it with the greatest accuracy. He also mentioned his opinion that *cholera* is contagious; but he is satisfied that the contagion is not efficient *at first*. He says we may be exposed to a person labouring under "African typhus" (as he calls it), or to a person labouring under cholera, without any fear of catching it, while in his *first emanations*; but that if exposed to these emanations after they have continued to pass from him many days, then we stand a chance of getting the disease. He considers that what proceeds from the body is not, at first, efficient;—that it is not a perfect poison when it is first produced; but that it undergoes a change, which enables it to produce the disease. He reasons in this way. Many persons who have visited cholera-patients, have escaped; but they have suffered as soon as they have been exposed to fomites, in which the secretion was contained. How that may be, I do not know. He also says that he has ascertained another circumstance;—that, before the disease breaks out, the blood will shew the disease. He says that this may also be remarked in scarlet-fever. A medical man, finding that he was ill, was bled. The blood was shewn to Dr. Stevens; who found that it would not turn red with the usual neutral salts. He stated that he was satisfied the gentleman was about to have a contagious disease; and, in three or four days after this, scarlet-fever occurred. He says that he has seen yellow fever in the blood, before the disease appeared; and

that, in all instances where the disease subsequently appeared, he found the blood was of such a character, that it would not redden on the application of a mixture of neutral salts. Of course, all these things are exceedingly crude at present; but it is the opinion of many eminent chemists, that we are upon the eve of some important discoveries, with regard to the nature of all these matters;—that, by the treatment which Dr. Stevens has recommended, great light will be thrown on the pathological changes, which take place in the various fluids of the system; and on the nature of many diseases. I feel satisfied with the truth of much that has been said; and I feel satisfied that a strong and new light will be thrown upon a number of these matters, respecting which we are all at present in the dark. The latent period of this yellow-fever, is thought to be from two to ten days.

Treatment.—With regard to the treatment, the best writers agree that, in the first instance, there should be copious venesection. Whether it be the fever of the western hemisphere, or the mere bilious remittent of the east, cold affusion, or cold *ablution*, is always serviceable. Great attention should be paid to any local inflammation that may occur; and local bleeding may be demanded. As to emetics, they cannot be employed if there be any tenderness of the epigastrium on pressure. Mercury is found useful in the first instance; but not afterwards. When there are symptoms of violent inflammation, it is very useful; but still a person may die with his mouth sore, if it be given too late, or bleeding to a proper extent be not practised. Of course moderate purging is necessary; but as soon as the remission occurs, sulphate of quinina should be given in great abundance; and Dr. Stevens says, that when the symptoms of typhus-fever come on,—after venesection, and mercury, and cold affusion have been freely had recourse to,—no time should be lost in pouring in neutral salts. He says he has strong evidence to shew that, where these fevers had proved fatal to a frightful extent, the mortality has been reduced almost to nothing, by practitioners having listened to his advice. By giving neutral salts (as the carbonate of soda, the chlorate of potass, and common salt) every hour during the disease, the beneficial effect has been infinitely beyond what any one could have anticipated. I know that this gentleman states nothing as a fact, but what is strictly true. If he merely give an *opinion*, of course (like other men) he may be wrong; but upon whatever he states as a *fact*, the greatest reliance may be placed; and if he say that a certain number of cases out of the whole number have been cured, the statement may be depended upon as correct.

Sol-Lunar Influence.—Before I conclude the subject of these fevers in hot countries, I must mention that, in the East Indies, the sun and moon appear to have a great influence upon them. Dr. Balfour has written a work upon what he has called "the sol-lunar influence"[a]; and he proves that bilious remittent fever is most easily taken at new and full moon; that at new and full moon the disease is greatest, and relapse most common; and that those suffering from "pernicious fever"[b], which has destroyed the constitution, are particularly affected at that period. This may appear incredible or whimsical; but I have no doubt of the fact. I have seen medical men who have practised in the East Indies; and they say it is well enough for *us* not to believe it; but they have suffered enough to know that it is perfectly true. I do not suppose that it is to be ascribed to the direct influence of the sun and moon upon the body; but that it arises from the

[a] "Treatise on the effects of Sol-Lunar Influence in Fevers, &c. By William Balfour, M.D."

[b] See Page 305.

operation of these upon the tides. The new and full moon, with respect to the elevation of the water, may have very great effect; and the tides, again, may have an effect, by causing more or less malaria to be disengaged; so that the atmosphere is more impregnated with it at those periods, than at others. I believe there can be no doubt whatever on the subject;—that at new and full moon, in the East Indies, fevers are most easily taken, relapse is most common, and fevers are most intense; and that those who have suffered most from these fevers, then feel a strange sensation about them; —just such as we continually find here, when the east wind blows upon a person who has previously laboured under ague.

PART III.

LOCAL DISEASES.

BOOK I.

CUTANEOUS DISEASES.

I HAVE spoken of those diseases which may affect various parts of the body;—inflammation and different structural diseases; and have termed them "*general* diseases."[a] I have spoken, likewise, of certain diseases which appear to pervade, nearly or entirely, the whole of the body; and may be called "*universal* diseases."[b] I now come to the affections of particular parts; and I said[c] that I should proceed from the head to the foot,—*a capite ad calcem*;—that being as good an arrangement as any; and much more serviceable than an alphabetical arrangement; for, in this way, diseases which are situated in contiguous parts, and must therefore have many symptoms in common, are considered together.[d] Before we begin with the head, it will be better to consider those which affect the surface; and after we have gone over the surface, we can proceed into the interior.

The diseases of the surface of the body are commonly called "*cutaneous* diseases." They are far more numerous than would be supposed from the works of Dr. Willan, and his pupil Dr. Bateman.[e] Their works may be considered as the same; for the labour and honour was Willan's; and Dr. Bateman added little to what he learnt from his master; who was profoundly read in cutaneous diseases, and had laboriously observed them. The best work on cutaneous diseases I conceive to be that of a French writer,—Rayer.[f] He treats of all the diseases of the skin and its appendages;—thus taking a more enlarged view than Willan; and he treats of a

[a] See Page 64.

[b] See Page 241.

[c] See Page 63.

[d] The advantages which Dr. Elliotson here contemplates, are best secured by Dr. Fletcher's "Physiological Arrangement of Diseases"; which has been published, as a Chart, by Butler, Medical Bookseller, St. Thomas's Street, Southwark.

[e] "Description and Treatment of Cutaneous Diseases; by Robert Willan, M.D." "Practical Synopsis of Cutaneous Diseases; according to the Arrangement of Dr. Willan; by Thomas Bateman, M.D." With the generality of readers, Dr. Bateman's reputation is as great as Willan's;—just as smatterers in phrenology speak of Gall and Spurzheim as equal; though the originality and glory is all Gall's; and his pupil, Dr. Spurzheim, learnt the science from him; worked under Gall, as his assistant; and has merely added to and improved upon Gall (if he *has* added and improved; which I will not deny); and stands at a humble distance from his master.

[f] "Traité Théorique et Pratique des Maladies de la Peau, par P. Rayer; accompagnés d'un Bel Atlas de 26 Planches, Gravées et Coloriées avec le plus grand soin; représentant, en 400 figures, les Différentes Maladies de la Peau et leurs Variétés." This work, published at Paris, has been translated into English by Dr. Willis.

much more considerable number of affections of the skin itself. When I say that Rayer's is altogether a much better book than Willan's, I do not at all wish to depreciate the latter; for a great part of the merit of Rayer's is ascribable to Willan. As far as Willan went, Rayer is under great obligations to him. Willan preceded Rayer; and the arrangements of the latter, in reference to the subjects treated of by the former, are grounded altogether on his publication. Rayer's is the best book;—on account of its arrangement, the greater number of diseases of which it speaks, and the fuller and more scientific account of the nature, causes, and treatment of the diseases.

Rayer's Classification.—Rayer divides the diseases of the surface of the body into four groups:—I. Diseases of the skin itself. II. Diseases of the *appendages* of the skin;—such as the nails, and the cutis which furnishes the nails. In this division are to be found whitlow, and morbid affections of the nails, the hair, and sebaceous follicles;—such as plica polonica, baldness, greyness, &c. III. Foreign bodies which sometimes beset the skin; as others do the intestines. These are divided into "inanimate" and "animate";—*inanimate*, such as the sebaceous matter on the scalp of newborn infants;—*animate*, which (I need not say) include fleas, bugs, and lice; together with certain other animals of which we shall speak. IV. Those affections which commence in other parts of the body; and afterwards implicate and disfigure the skin; such as the disease called "elephantiasis"; in which the skin becomes implicated only secondarily. The whole describes, in a very comprehensive way, the diseases of the surface of the body.

Then, again, truly cutaneous diseases are arranged by Rayer into six classes:—1. All those diseases of the skin which are *inflammatory*. 2. Those which are mere *congestions*; and cutaneous and subcutaneous *hæmorrhages*. 3. Those which are *nervous* affections of the skin;—such as morbid or deficient sensibility of it. 4. Changes of *colour* in the skin;—not at all dependent upon congestion. 5. Morbid *secretions* of the skin. 6. Diseases of the *structure* of the skin. This is a very useful view of diseases of the skin itself.

Willan's Arrangement.—They are arranged by Willan without any reference to their real nature. He arranges cutaneous diseases, as follows:—1. Mere pimples, without any contents;—"papulæ." 2. Scaly;—"squamæ." 3. Diffused patches of redness;—"exanthemata." 4. Collections of water;—"bullæ." 5. Secretion of pus;—"pustulæ." 6. Little vesicles;—"vesiculæ." 7. Tubercular appearances on the skin;—"tubercula." 8. those in which there are stains;—"maculæ."[a] Several sets of diseases thus arranged by Willan, come together in the arrangement of Rayer, under the one head of "inflammatory diseases."

Willan's work (and Bateman's) is rather one of Natural History than Pathology. His delight and excellence are in the description of appearances. Rayer's work is excellent for deeper matters. This is the natural progress of knowledge. First, perfection is attained in distinguishing the *outward appearances* of objects and phenomena; and, this accomplished, their *nature* and *causes* come next to be investigated. Willan accomplished much, though greatly indebted to foreign predecessors; but his labours were only a stepping-stone to what then became important.

Frequently Dependent on a Diseased State of the System.—It is very im-

[a] A Chart of the various diseases of the skin, arranged according to this system, has been published by Butler, Medical Bookseller, St. Thomas's Street, Southwark.

portant to remember, that although these are called "diseases of the *surface* of the body", many of them are affections of a much deeper nature;—that the affection is frequently connected with, or dependent upon, a general diseased state of the system. Frequently the mucous membranes are affected as much as the skin;—for example, the conjunctiva of the eye, the Schneiderian membrane of the nose, and the mucous membranes of the mouth, throat, and of the whole of the air-passages and alimentary canal. All these parts are liable to be affected, in some diseases of the skin. In measles, which is called "a disease of the *skin*", we frequently have inflammation of the various mucous membranes which I have just named. So in the disease which is called "purpura", and which is considered a disease of the skin (because there are purple spots on that organ), we have often the same appearances within, as upon the surface. I formerly mentioned[a], that this was as much an *inflammatory* disease as one of *congestion*; and it may be *entirely* inflammatory. The intestines, the lungs, the liver, and even parts within the head, are sometimes beset with black patches: for, in this disease, blood has sometimes been effused in such quantity, that apoplexy has occurred. Although these diseases particularly affect the *skin*, yet in many of them, before the affection of the skin appears, there is some *internal* derangement; which occasionally ceases when the external affection appears, but which sometimes continues throughout. In many there is an internal derangement, at a certain time, during an affection of the skin. In many of these cutaneous affections, the whole system appears more or less in an inflammatory state; and in others the whole system is in a state of extreme debility,—complete exhaustion. Although, therefore, these are called "diseases of the *skin*",—from their producing very prominent symptoms there; yet it is to be remembered, that many of them are of a more deep and extensive nature. Many, of course, are *really* local; such as a change in the *colour* of the skin,—called "pityriasis *versicolor*"; where a person has a yellow appearance of the skin (very common on the necks of young women); and diseases of the *appendages* of the skin; such as diseases of the nails, and various affections of the hair and sebaceous glands. These are pure diseases of the integuments of the body; but many affections, called "*cutaneous* diseases", are only cutaneous in one point of view.

Dr. Elliotson's Arrangement.—We see, therefore, that the diseases of the integuments of the body may be considered, in the first instance, according as they are diseases of the skin *itself*, or of the *appendages* of the skin; as there are foreign bodies upon the skin;—which cases are still allowed to be called "diseases of the skin"; or as the disease begins in other parts, and implicates the skin. We have, then, to consider whether cutaneous diseases, like others, are inflammatory or not; and we therefore group together all those that are inflammatory. Then all those are naturally grouped together, that depend upon congestion; such as ecchymoses, cutaneous tumours, and subcutaneous bloody tumours,—sometimes called "nævi materni." Thirdly, those which are seated in the nerves of the part; fourthly, changes of mere colour; fifthly, morbid secretions; and sixthly, malformations, and structural changes of the skin. In this way we shall bring before us all the diseases of the skin itself.

The *inflammatory* diseases of the skin are arranged by Rayer, first, as they occur in *patches* of inflammation,—"exanthemata"; then, as they produce collections of *water*,—"bullæ"; then, as there are *minute* collec-

[a] See Page 146.

tions of water,—"vesiculæ"; then, as there is suppuration,—"pustulæ"; or as there is *more extensive* suppuration,—"furunculi"; then, as there are mere *specks* of inflammation,—"papulæ"; then, as there are *tubercular* appearances,—"tubercula"; then, as there are *scales* produced,—"squamæ"; then, as there is inflammation in *lines*,—"*linear* inflammation"; then, as there exists a disposition to gangrene,—"gangrænosi" (as plague, malignant pustule, and glanders); and then he makes a class called "multiform"; in which diseases have no fixed appearance (such as syphilis). It appears to me, that the most simple way of considering these inflammatory diseases, is to consider them, first, when the inflammation is in the most *minute extent*;—simple inflammation not larger than the point of a pin;—"papulæ." Then we shall come to a more extensive inflammation,—"exanthemata"; then, to one which produces a little collection of *water*,—"vesiculæ"; then to a *large* collection of water,—"bullæ"; then, where *pus* is secreted,—"pustulæ"; then, where pus is secreted in *larger quantity*,—boils, or "*furunculi*"; then to where the inflammation proceeds to *gangrene*; then where there is *organic* disease;—first of the *slightest* kind (only of the cutis) as in the "*scaly* diseases";—then of a kind seated more deeply, as in the "tubercula"; and thus we shall go on in a more natural way, than that which Rayer has adopted.

CHAPTER I.

PAPULÆ.

Definition.—We now enter upon the consideration of inflammatory diseases of the skin itself; and, in the first place, we shall speak of those which produce no secretion whatever;—no pus, no water; but which consist simply in inflammation, and that of the most limited extent;—producing a little *speck* of inflammation. Of course there may be a *number* of these little spots. When inflammation of the skin appears in minute spots, these are called "papulæ"; the English of which is, strictly speaking, "pimples."[a] The word "*pimple*" is commonly used to signify any little elevation or inflammation of the skin;—whether there are no contents, or whether there is water or pus; but, in strictly correct language, by a "pimple" is meant a minute inflammation of the skin, causing a very small acuminated elevation of the cuticle, without any contents whatever. Dr. Willan's definition of a papula, or true pimple, is—"a very small and acuminated elevation of the cuticle" (I should suppose of the cutis and the cuticle together), "with an inflamed base; not containing fluid; not tending to suppuration. The duration of papulæ is uncertain; but they terminate, for the most part, in scurf."[b] If such a slight inflammation be attended by *watery* contents, it is called a "*vesicle*"; but if the contents be *pus*, we call it a "*pustule*";—so that, with respect to the most minute inflammation of the skin, we may have a papula, a vesicle, or a pustule;—in other words, mere *inflammation*, inflammation with *water*, or inflammation with *pus*.

Progress and Termination of Papulæ.—Where these papulæ (which are, more or less, of a red colour) occur, there is experienced an uneasiness, which may be called pain; but it is pain of an itching character;—"painful itching", we might say. Inflammation of this description may end in resolution, without any formation of scurf; or it may terminate in a more extensive separation of the cuticle, which is called "desquamation"; —a separation of the skin in scales. For the most part, however, the cuticle is separated in such minute portions, that only a fine dust (*scurf*) comes of; which will take place, not only with evident inflammation, but sometimes with so exceedingly slight a degree of inflammation, that we can hardly call it more than "a little irritation." A new cuticle is found underneath the exfoliation. There is no rawness produced; but, under the minute portion of cuticle which comes off, we see a fresh cuticle. There is no moisture at all;—the parts being still perfectly dry. If this inflammation be increased by the person rubbing or scratching the part, or by heat improperly applied, it may proceed to the formation of water;—so that we convert the papula into a vesicle. Again: if we add still more irritation, we may cause it to produce pus; and so convert it into a pustule. If the individual scratch himself still more, and great irritation be excited, instead of mere pustules we may have boils;—pretty

[a] The word "*papula*" is derived from "pappa", *a nipple*; and the diminutive "pappula" (from πάππη); and signifies, therefore, "a little nipple."

[b] "Description and Treatment of Cutaneous Diseases"; Definition 5.

large collections of pus; but all this is not the tendency of the disease itself. These papulæ, which consist of mere spots of inflammation, are not contagious.

Seat of Papulæ.—These papulæ are considered, by Dr. Willan, as inflammations of the papillæ of the skin; which he considers to be enlarged, elevated, and indurated; but I should think, if it be the papillæ which are inflamed, we should be justified in saying, as I *have* said[a], that there is something more than elevation of the cuticle. If the papillæ be inflamed, of course we must consider the disease as situated in the cutis;—the cuticle being elevated above the skin itself. The inflamed base cannot be in the *cuticle*; – that is out of the question; and therefore it must be situated in the *cutis*.

Varieties of Papulæ.—Dr. Willan makes *three* kinds of papulæ. These are the "strophulus" (or "red-gum") of children; the "lichen" of adults; and the disease called "prurigo." His first plate contains a good representation of them. But I think that there are only *two*; for I believe that strophulus and lichen are purely the same disease; and I think it would be better if the name "*lichen*" were given to both; or if both names were dropped, and one term substituted for them. The disease called "prurigo", is characterized by great itching; and is often mistaken for itch. Neither lichen nor prurigo has any particular name in English.

SECTION I.—STROPHULUS.

This disease is peculiar to infants; and is called, by the common people "red-gum" or "red-gown." It is supposed that "*gum*" is a corruption of "*gown*"; and, in some old dictionaries, it is still written "*redde-gowne.*" It is also occasionally called, by the common people, the "tooth-eruption." It is a very unimportant disease. The least irritation will cause it;—whether in the gums, abdomen, or other parts of the system; and, with a very little attention, it goes away. In fact, it need never create any alarm. It is divided, by the common people, into "red" and "white." Several parts of the body are affected in succession;—it does not come out at once. It chiefly affects the face and extremities; and is sometimes intermittent;—not *periodical*; but coming and going.

Varieties.—It is divided, by authors, into a number of tiresome varieties; which only serve to burden the memory, and are soon forgotten in practice. The great point which I would insist upon, at present, is to recollect the characters of diseases *in general*; and as to the particular *varieties*, we can learn them afterwards, as different cases present themselves to our notice; and then we need not trouble ourselves so much about the *names* of these varieties, as about remembering the fact that there are some varieties in the appearances of the affections, and some varieties in the condition of the *system*, and of the *part affected* in these diseases;—a fact that is not sufficiently dwelt upon by subdividers. It is impossible to recollect all the minute divisions of these different diseases, without seeing patients; and then it is impossible to learn them all at once. It is a waste of time; and there can be no doubt it would be quite as well, if many of them were not so subdivided by authors. This particular affection is divided into:—1. Strophulus *intertinctus*. 2. Strophulus *albidus*. 3. Strophulus *confertus*. 4. Strophulus *volaticus*. 5. Strophulus *candidus*.[b]

[a] At Page 387.

[b] These affections are represented, extremely well, in Dr. Willan's "Description and Treatment of Cutaneous Diseases" Plates 2, 3, and 4.

If the papulæ be of a vivid red colour, but are intermixed with red dots or specks, called "stigmata"[a], it is then called "strophulus *intertinctus*." If the papulæ consist of whitish specks, it is called "strophulus *albidus*"; —that is to say, "white-*gum*"; and this is often intermixed with the other. If the papulæ be all united together, it is called "strophulus *confertus*"; and, by the common people, "*rank* red-gum", or "tooth-rash." It is hardly worth while to give particular names to these little variations of the disease. We sometimes observe different varieties in different parts of the same child. If the papulæ of strophulus be of large size, and have no inflammation at their base, they are called "*absolutely* white",— "strophulus *candidus*." This, however, is a contradiction; for a papula, according to Dr. Willan's definition[b], is "an acuminated elevation of the cuticle, *with an inflamed base*."[c] This variety usually succeeds acute diseases of children a year old. If, after continuing some time, they produce a scurf, and then disappear, and another crop comes on, it is then called "strophulus *volaticus*";—coming and going;—continuing but for a short time. The patches are circular, and turn brown in a few days; and the whole series ends in a few weeks. I am sure it must be difficult to remember the differences, which occasion the disease sometimes to be called "candidus", and sometimes "albidus"; the important point will be, however, not to recollect the names of these little particulars, but to remember the general character of the disease. It is sometimes pretty severe; and a great many papulæ are crowded together; and then the variety is called "strophulus *confertus*";—the papulæ are extensive, crowded, smaller, and less vivid. This form will occur in children from seven to eight months old. The patches may be hard; and they usually exfoliate in a fortnight. In this severe form, it sometimes begins in the legs, and spreads upwards to the loins and navel, with a general redness; —the cuticle cracking into large pieces; and this will occur, every now and then, for two or three months. Some children will labour under it, till they have cut all their first teeth.

Causes.—With regard to the *causes* of it, I believe that any little irritation of the alimentary canal will produce it. The irritation of teething, and very frequently exposure to cold,—especially if aided by wet,—will produce this, and various other inflammatory diseases of the skin.

Treatment.—Whether the disease appear in this aggravated form or not, one of the best things is to give mild purgatives, with some alkaline matter; as, for example, a little Liquor Potassæ, or carbonate of soda, or magnesia, two or three times a day. There is, generally speaking, acidity; which may be corrected by something of this description. Moderate aperients can be given at the same time; and the warm-bath is found particularly useful. If the disease should prove obstinate, I would certainly give Hydrargyrum cum Cretâ;—mercury in a very innocent form; but, for the most part, it is not required. There is no *essential* difference, however, in the treatment of the different varieties of this affection. Great attention should be paid to the diet; for, very frequently, the disease arises from some little error in that respect;—something improper having been accidentally (or designedly) given. If the disease suddenly disappear, we may find the child evidently in want of stimuli; and, when that is the case, a few drops of Liquor Ammoniæ, two or three times a

[a] Willan, in his "Description and Treatment of Cutaneous Diseases" (Definition 1) defines a "stigma" (from στιζω, *to inject blows*) to be "a small, red speck, occasioning *no* elevation of the cuticle."

[b] See Page 387.

[c] See his "Description and Treatment of Cutaneous Diseases"; Definition 5.

day, will be of use; particularly if it be conjoined with the warm-bath, and good nutritious food. The warm-bath is one of the most important measures that can be had recourse to, in diseases of the skin, when we want to bring out an eruption, or to encourage it. I am told that the warm-air-bath does as well; but I have no experience of it. To avoid cutaneous irritations, nurses should always *wash* infants' napkins, and not merely *dry* them.

In this disease, if we should find a pretty active inflammation of the skin, we would of course give stronger purgatives; and there might be no harm in applying leeches. If, on the other hand, we found debility, it would be well to give tonics,—iron or quinina; and to order nutritious diet. Cutaneous diseases occur in all states of the body. Sometimes there is such debility, that we cannot cure the affection without the temporary use of meat, wine, porter, iron, &c.; while, in other cases, there is an inflammatory state of the body;—making it evident that bleeding must be had recourse to, and low diet. So, in this disease of children, sometimes there is debility of the whole body;—the disease continuing because the whole system is out of order; and then better nourishment and tonics will be required. In other cases, local bleeding and stronger purgatives will be necessary; but, in general, all that is wanted is a warm-bath, and alkaline and aperient substances.

Avoid Exposure to Cold.—In this disease, be particularly careful that the child is not exposed to cold. It is dangerous to put a sudden stop to the eruption, by allowing the child to catch cold. It is possible that the eruption may cease, and that the child may fall into a state of depression; in which case the warm-bath will be required. But internal inflammation may be the result; and in that case, also, the warm-bath may be useful; but antiphlogistic measures may be required in addition; for when eruptions suddenly cease, there is often an internal inflammation suddenly set up. It is right to know that these accidents may happen; but, for the most part, the disease is a mild insignificant affection;—more a matter of curiosity, indeed, than any thing else.

SECTION II.—LICHEN.

This affection occurs in adults, and is similar to strophulus. Indeed, there is scarcely any difference in the appearance of these diseases; and I have always been accustomed to consider them as the same;—affecting children, and called "strophulus";—affecting adults, and called "lichen."[a] When I read Rayer's work for the first time, I was glad to find that he entertained the same opinion as myself. I always spoke of them as the same; but I thought I might be wrong; for I do not pretend to be so skilled in these matters, as those who have devoted themselves entirely to them. But Rayer says he would unite them, were it not for the fear of making more confusion, by introducing a new division in the history of papular diseases, which Dr. Willan has described with minute accuracy.[b] I think it had better be done; as it would simplify the matter at once, and burthen the memory with one disease and set of names the less.

Seat and Varieties of Lichen.—This disease, in adults, usually occurs in the extremities; and particularly on the outer and posterior parts of the extremities. The size of the papulæ is that of the head of a very small

[a] "Spring-eruption", "scorbutic pimples", &c. (Willan.)

[b] See his "Description and Treatment of Cutaneous Diseases"; Order I.

pin; and they generally terminate in scurf. The disease is sometimes acute; sometimes recurrent; sometimes chronic; sometimes general; sometimes partial; and sometimes connected with internal disease. It is divided, by authors, into—1. "Lichen *simplex*." 2. "Lichen *pilaris*"; that which occurs particularly about the roots of hairs. 3. "Lichen *circumscriptus*"; a form in which the papulæ are clustered together. 4. "Lichen *agrius*"; a very severe form indeed. 5. "Lichen *lividus*." 6. "Lichen *tropicus*." 7. "Lichen *urticatus*." In the simple form, we must expect the papulæ to be larger than when they occur in children. If they be very severe, they cluster together; the skin becomes inflamed; and they form deeply red patches.[a]

Duration and Progress of Lichen.—The simple form of this complaint lasts, generally, from ten to twenty days. Sometimes, it is preceded by nausea, vomiting, and pain of the head; and sometimes these symptoms will disappear as soon as it comes; while, at others, they will continue with it. It sometimes takes place at the end of certain cutaneous diseases; particularly after fever and catarrh, and (it is said) even after peritonæal inflammation. Some persons have it annually;—some at the beginning of summer, others in autumn; while some are so unfortunate as to have it in both. I know a young lady who had it every spring and every autumn. It was observed by the Romans, who called it "sudamina"; and the Greeks, who noticed it, called it ἵδρωα. In this country, in hot weather, we often have a great tingling of the skin. It is sometimes rather a sharp disease; but there is nothing dangerous in it, though the general excitement is great. It is said, that when it occurs about the hairs ("lichen *pilaris*"), it is often chronic. When it occurs in the severe form, called "lichen *agrius*", there is a great degree of itching, and a great degree of heat; and the inflammation is sometimes so violent, that we have vesicles and excoriations. This severe form of the disease, is sometimes preceded and accompanied by nausea, pain at the stomach, and pain of the head; and may last several weeks. It is much more frequent in women. It corresponds with "strophulus *confertus*." This variety is sometimes connected, but only locally and temporarily, with a pustular disease, called "impetigo"; with another, in which serum is secreted,—"eczema"; and another, in which scales are formed,—"psoriasis"; and sometimes it will degenerate into them. Sometimes, though rarely, the papulæ are livid; and the variety is called "lichen *lividus*." More frequently it is united with petechiæ; or dark spots of congestion.

Prickly Heat.—There is one kind of this affection, called "lichen *tropicus*", which is attended by a great degree of tingling. This is mentioned by all writers on the diseases of hot climates; and it is described by them as a most distressing affection. When a person is subject to this variety of the affection, the moment he goes to bed or takes exercise, he has a most violent pricking of the skin, called "prickly heat." It is called "lichen *tropicus*";—from the disease occurring in tropical climates. It is not easily repelled; and its sudden cessation is generally the *effect*, not the *cause*, of an internal affection. The "prickly heat" is thought to be a sign of good health. Sometimes the papulæ, in this disease, are attended with little bumps, like the bites of gnats or bugs; and then it is called "lichen *urticatus*." It affects the neck and face,—particularly in spring and summer; and is attended by a stinging pain. But though there

[a] These are well represented by Willan, Plates 5 and 6; and also in Rayer's Work, Plate 6 (First Division).

are bumps or wheals, still there are papulæ. It chiefly affects the neck, face, and hands. It corresponds with "strophulus *candidus*."

Treatment.—In all these forms of the disease, the treatment is to be the same as in the strophulus of children. If there be great excitement of the system, and headach, we should bleed. If a patient have a strong pulse, even *without* excitement, by far the shortest way is to take a little blood from him, put him on low diet, purge him well, and order him the warm bath. Do not allow the *hot*-bath; for, if we apply much heat to the skin, we shall in a great number of cases make matters worse. Just as in the case of the strophulus of children, purgatives (especially combined with alkaline matters) given two or three times a-day, and low diet, will usually remove lichen; but if the disease be severe, the shortest way is to bleed in the arm in addition. Even if the severity of the disease do not *indicate* this measure, yet if the constitution of the patient and his pulse *justify* it, I should still have recourse to it.

Local Applications.—For the relief of the parts themselves, which are tingling and itching, the chlorides of lime and soda answer better than any thing else. Many persons use vinegar for this purpose; and it answers pretty well; but I think that, in all cases where there is itching of the skin, if that organ be sound, and the chlorides be properly diluted, they are by far the most serviceable. I have known some persons relieved by the application of prussic acid, of the strength of a drachm [a] to eight ounces of water;—sometimes stronger. I had an old man at St. Thomas's Hospital, with great inflammation of the legs, connected with varicose veins;—which is certainly not exactly this disease; but nothing relieved him except prussic acid;—one ounce [a] to a pint of water. Sometimes, however, this will produce heat and tingling; and it is best not to use at first more than a drachm [a] or two drachms [a] to a pint; but, if this produce no effect, increase it. Occasionally there is great heat and dryness induced by applying it in greater strength.

Bleeding at the arm, low diet, and purging, are the best general means; and, as local remedies, either vinegar, prussic acid, the chlorides, or plain water, warm or cold.

SECTION III.—PRURIGO.

Symptoms and Progress.—In prurigo [b], the papulæ are very little discoloured;—being nearly the same colour as the skin; but they are larger than in lichen. They are particularly characterized by itching; which is a far more striking symptom then the eruption itself. That is not the case in the two affections already described; except in that form called "lichen *tropicus*." In the latter there is a very severe eruption; whereas, in prurigo, the eruption differs but little from the adjoining skin. The papulæ also vary from those of lichen, in not being so pointed. So severe is the itching, that people scratch themselves, till they rub off the surface of the papulæ. A little blood exudes;—a very minute portion; and then it forms a little black crust; so that the papulæ will have an artificial black top; and, from scratching them, water will ooze as well as blood. This, however, is incidental; and has nothing to do with the complaint. If the patient will continue to scratch, he may cause these papulæ to be converted

[a] Of the officinal preparation,—"Acidum Hydrocyanicum Dilutum."

[b] From "prurio", *to itch*.

into vesicles; if he scratch still more, suppuration will take place, and he will have pustules; and the skin may even be brought into such a state, that it will crack, and become indurated and hypertrophied. This is a chronic disease. Lichen and strophulus are sometimes chronic, and sometimes acute; but prurigo usually lasts a considerable time, unless properly treated at an early period.

Prurigo Mitis.—If the disease occur in the mildest form, it is called "prurigo *mitis.*" This chiefly affects the young. The disease altogether, in every variety, affects both the young and the old; but that called "prurigo *mitis*" principally affects the young; and occurs particularly about the spring or beginning of summer. It is said, by some, to degenerate into the itch; but others deny this. Sometimes the eruption is scarcely visible at all. There is intense itching; but it is rather difficult to find out any eruption. It will remit; and sometimes it will *intermit*,—come and go entirely.

Prurigo Formicans—If it be very severe, there is an epithet added to the word "*prurigo*", to signify great intensity; and, from the itching resembling so much the bite of an ant, ("formica") it is called "prurigo *formicans*"; which is a very severe,—I may say, a *dreadful* disease. It affects adults at all periods, but not children; and it occurs in every part of the body, except the palms of the hands and soles of the feet. Occasionally it is preceded by feverishness, pain of the head, and sickness.

Prurigo Senilis.—There is a third form, which is confined to old age; and which is called "prurigo *senilis*"; and this is likewise a very severe form of the disease. I should sometimes be at a loss to distinguish between "prurigo *formicans*" and "prurigo *senilis*"; for the former only occurs in old people. I think it would be better to say, that prurigo is a disease which sometimes is mild, but now and then severe. If it attack old people, it generally continues very obstinate, for a great length of time.[a] There are no scales, or scabs, or water; nor is there any pus.

Local Varieties of Prurigo.—This disease is sometimes local; attacking a particular part of the body only; and not being diffused. It affects, particularly, the scrotum of the male, and the pudendum of the female. The scrotum, from constant irritation,—from the patient everlastingly scratching himself, becomes scaly, and very much indurated. It will attack the prepuce; and then it is called "prurigo *præputii.*" Sometimes it has occurred within the urethra;—"prurigo *urethralis.*" It will sometimes affect the extremity of the rectum;—"prurigo *podicis.*" The worst seat of it, however, is in the pudendum of the female;—"prurigo *pudendi muliebris*"; and there it is sometimes very violent,—very distressing; so that a woman cannot go into society at all. She cannot appear before men; nor, indeed, can she appear before strange *females*; in consequence of her being under the necessity of scratching herself. I have known women driven almost mad, with the vexation of finding that they were not able to pass five minutes, without scratching themselves violently. I saw one woman, who was obliged to get up several times in the night. She was unable to go to sleep; for, at last, the heat became so great, that she was compelled to get out of bed, and wash herself with cold water; and so she had passed every night, for months, when I saw her. The vagina and the inner surface of the labia, in very severe cases, become thickened; and small indurated

[a] These forms of Prurigo are well shown in Willan's Work on the "Description and Treatment of Cutaneous Diseases"; Plate 7.

masses are formed here and there. The latter are not properly tubercles; but have a tuberculated appearance. When this occurs in females, it excites a desire of copulation; which, as they have told me, relieves it for a time; but, in a little while afterwards, they are worse than ever. It is impossible for them to get relief, in this way, every moment; and I advised the woman to whose case I had just referred, and who told me that she lived separately from her husband, to use nothing but cold water. It is really, though not dangerous to life, a distressing disease; and women will cry, and absolutely wish for death, when they are labouring under it. I cannot conceive any thing more lamentable; and, if it occur to a modest woman, it is the most horrid sort of case that can come before us. It rarely occurs in females before the middle period of life. Dr. Willan [a] says, that aphthæ may appear on the nymphæ, and internal part of the labia; and may be communicated to the glans penis, and internal part of the male prepuce; that they are easily cured; and that these aphthæ, as well as "prurigo pudendi muliebris", often occur after the fourth month of pregnancy.

Causes.—[Dr. Willan [b] attributes the milder form of prurigo to "sordes collected on the skin, producing some degree of irritation, and also preventing the free discharge of the cutaneous exhalations; the bad consequences of which must necessarily be felt at that season of the year, when the perspiration is most copious." Hence he considers, that those who have originally a delicate or irritable skin, will in such circumstances be the greatest sufferers. The more severe form of prurigo ("prurigo *formicans*") is generally, according to Dr. Willan [c], attended with an unhealthy condition of the system, consequent on grief, watching, fatigue, and poor diet. As, however, the concurrence of these circumstances will not, in all cases, produce this disease; Dr. Willan conceives [c] that it must, in part, be referred to the original texture of the skin, or the state of the cutaneous glands. In support of this opinion, he states [c] that "the greater number of cases had a more than usual coarseness or roughness of the skin; which seemed often to have been communicated hereditarily; and that when the itching and papulæ disappear at the termination of the disease, the cuticle is left dry, scaly, and thickened." Want of proper cleanliness is also a frequent cause of this disease among the lower classes. "Certain modes of diet" (according to Dr. Willan [c]) "have likewise a considerable effect in aggravating or exciting the prurigo formicans. Many persons are affected with it, who in the summer season live much upon fish and other stimulant animal food; at the same time drinking freely of wine or spirituous liquors. Some of the white Spanish wines excite, in particular habits, an eruption of itching papulæ; which is excessively troublesome for many hours afterwards; but does not become permanent, if the beverage be discontinued."]

Effects and Duration.—This disease is not dangerous to life; but it is sometimes really a most dreadful disease;—"dreadful", I mean, so far as suffering is concerned; and, for what I know, it may injure the general health. I have known imbecility of mind sometimes caused by the intense suffering it occasions. The intense suffering has continued, month after month; and, indeed, year after year; and has produced such depression of

[a] See his "Description and Treatment of Cutaneous Diseases"; Order 1; Genus 3; Species 6.

[b] See his "Description and Treatment of Cutaneous Diseases"; Order 1; Genus 3; Species 1.

[c] See his "Description and Treatment of Cutaneous Diseases"; Order 1; Genus 3; Species 2.

spirits, and such exhaustion of mind, that persons have become imbecile,—really worn down; and a sort of fatuity has arisen from mere exhaustion. I once had a man come to me, in this state, at St. Thomas's; when I attended the out-patients. He pulled off his coat, uncovered his bosom, and shewed me every part in an instant;—he was so quick in all his movements. He then pulled a comb from his pocket; and assured me that was the second comb he had bought;—having worn out the first in scratching himself. I have no doubt this was true. The itching was most intense; and he had been in this state two or three years. Some years ago, I had a man who came to the hospital; and whose sufferings had been nearly as intense. The idea had not occurred to him of buying a comb; but he used his nails well in scratching himself. His mind was as much gone as that of the other patient. He was really falling into childishness.

Prurigo Mistaken for Itch.—The mild form of prurigo may be mistaken for itch. I will not point out the diagnosis now; but advert to it when I speak of itch. I may mention, however, that it will occur in every part of the body. It will occur in the face, as well as other parts; but the itch, I believe, will not. Prurigo, too, is not a *contagious* disease.

Treatment.—With regard to the treatment, supposing it to be the mild form of the disease, it is right to make the patient avoid stimuli of every sort;—pepper, mustard, wine, beer, &c. Many persons have a tingling, immediately on taking certain articles. If I take a grain or two of pepper, or taste vinegar, I have an itching of the scalp; and, wherever I am, I must begin to scratch my head. If I take opium, I have a violent tingling of the nose, for many hours afterward. Now all these matters, especially mustard and pepper, are likely to increase the affection. If a patient will bear it, it may be right sometimes to take blood. At any rate, it is proper to purge him moderately; and I should advise alkalies;—as there is often acidity in the stomach. But there is a remedy from which I have found greater relief, than from any other; not in the *mild* form only, but also in the *severe*; and one of the men I have just mentioned, was cured by it;—at least, he was so far relieved, that I could keep him no longer in the hospital. That remedy is colchicum. I am sure that purging with colchicum will produce more benefit than any thing else. In the mild form of the disease, undoubtedly, this is the best remedy. Patients should avoid going near the fire, or taking much exercise, so as to irritate the skin; but I am quite satisfied that colchicum is the best remedy we can employ internally.

Local Applications.—As to the itching itself, that is very much mitigated by diluted acids, such as vinegar; and also by the chloride of lime, or of soda. These produce a very great mitigation of the itching. We also find relief, sometimes, from a fomentation of prussic acid. The woman who was so bad from "prurigo pudendi muliebris", found great relief, for a time, from applying prussic acid. She used it, at length, to such an amount, and of such a degree of strength, that it produced giddiness and fainting;—so that she could not stand it; and yet it did not cure her complaint. It appeared, at last, that the best thing was a cold application; and therefore she had a pail of water brought into her room at night, and used it very frequently. I believe this local prurigo will arise, occasionally, from some local cause of irritation. Worms in the rectum, will produce "prurigo podicis"; and a stone in the bladder, is sometimes attended with a violent itching of the prepuce. In women, it sometimes attends structural disease of the womb. It is right to endeavour to ascertain whether there

is a local cause; and, if there be, we must endeavour to remove it; but if we cannot find a local cause, then (I believe) the application of the chlorides, or prussic acid, or cold water, is the best thing. Some tell me that they have seen great relief from what is called "the yellow wash";—bichloride of mercury and lime-water. It is much about the same thing as using the chloride of lime. The French use sulphureous baths, and emollient baths containing gelatine; but I have no experience of them.

CHAPTER II.

EXANTHEMATA.

We now proceed to another class of diseases;—a class in which the redness is not confined to spots, but forms patches. Such diseases as these are called "exanthemata"[a], or (in English) "rashes";—a "rash" being an extensive redness of the skin. In these diseases there are not pimples or spots, but patches;—the same thing precisely, only of greater extent. They are defined by Dr. Willan[b] to be "red patches, variously figured, in general confluent, and diffused irregularly over the body; leaving interstices of a natural colour. Portions of the cuticle are often elevated in a rash; but the elevations are not acuminated. The eruption is usually accompanied by a general disorder of the constitution, and terminates, in a few days, by cuticular exfoliations." The former class of diseases ("papulæ") it will be remembered[c], either terminated without any thing following, or induced a scurf. These, being a more extended redness,—being patches instead of pimples, are followed, not by scurf, but by an exfoliation of the cuticle. Large portions of cuticle separate; and therefore, instead of being branny or scurfy, it is in plates. These exanthemata often render the surface uneven, by elevating the portions affected. The brightness is variable; and sometimes, Willan[d] says, extravasation occurs.

The chief diseases of this description are, in the first place, "erythema" and "roseola"; which I will unite together (or endeavour to do so), as I did lichen and strophulus. The next is "measles"; the next "scarlatina"; and then comes "urticaria." Some of these are contagious, and others not. None of the first class were contagious; but two of these are;—namely, measles and scarlet-fever. These two usually occur but once during life. The two first of these affections are very slight;—just like lichen and strophulus; and are not contagious.

SECTION I.—ROSEOLA.

Characters of the Eruption.—Roseola[e] is described as consisting of rose-coloured patches, without wheals, little bumps, papulæ, or minute elevations of the skin; and these patches are circular or oval.[f] It occurs at all ages, but especially affects children; when it is called "roseola *infantilis*." There is sometimes an itching attending it; and sometimes only a tingling. The patches are of all sizes, and are sometimes diffused very generally over the body; but if not, still they are pretty numerous. If the patches be round, it is called "roseola *annulata*." Sometimes there is a little feverishness, or a little irritation of the bowels; and those symptoms

[a] From ἐξανθέω, *to effloresce*.

[b] See his "Description and Treatment of Cutaneous Diseases"; Definition 6.

[c] See Page 387.

[d] See his "Description and Treatment of Cutaneous Diseases"; Order 3. (Pages 213 and 214.)

[e] From "rosa", *a rose*.

[f] It is well shown in Willan, Order 3; Genus 4; Plates 25, 26, and 27.

generally occur from two to seven days before the eruption appears. It is usually a superficial complaint; very innocent to the body; very short in its duration; and, after it, there is scarcely any exfoliation. The character of this eruption is said (by Rayer) to be that, after pressure, the redness returns at all points. In scarlet-fever, if we press the rash, the redness, on removing the finger, returns from the circumference of the part; but, in roseola, every part recovers its redness at the same time. I never made the observation myself; and therefore cannot answer for its accuracy. Now and then it might be mistaken for scarlet-fever; but, he says, that we may distinguish between the two affections, by noticing what I have just stated.

Duration and Varieties of Roseola.—It is a trifling eruption, and seldom lasts more than four or five days; so that it never becomes chronic, unless there be many attacks of it;—unless it be remittent. If it come and go, a patient may be troubled with it for a length of time; but the disease never remains incessantly, for any long period. In the spring and summer, it will no doubt frequently arise from the heat of the weather; but frequently it happens without any evident cause whatever. If it occur in the summer, it is called "roseola *æstiva*"; but if it occur in the autumn, it is designated "roseola *autumnalis*." If it occur in small-pox, it is called "roseola *variolosa*"; if in cow-pock, "roseola *vaccina*." It has various names, according to these circumstances; which names it is unnecessary to remember. Occasionally we see such rosy patches in continued fever; but still it is called "roseola." The redness of the skin observed in gout, is also called "roseola"; and the redness of the skin sometimes observed in rheumatism, especially of the fingers, bears the same name. Occasionally the mucous membrane of the throat, more particularly of the pharynx, suffers the same degree of redness. It would appear that, occasionally, something of the same nature occurs in the stomach and intestines. At least when there is this eruption of the body, there will be a violent degree of heat in various parts of the abdomen. After inoculation for small-pox, this little redness will sometimes take place before the pustules appear. This is said to have happened in one out of fifteen cases; and inoculators used to imagine, that it betokened a mild form of the disease; while, if the redness was general and deep, and there was much pyrexia, they supposed it indicated that the disease would be severe,—would be confluent.[a] The roseola which occurs in cow-pock, generally appears on the eighth or ninth day.

Treatment.—This disease requires no treatment whatever; unless it be thought right to lower the child's diet, and give it a dose of physic. The great importance of knowing this rash, is not for the sake of curing it, but in order to distinguish it from another disease; for many children have been said to labour under measles, or scarlet-fever, when they have only had this redness of the skin. We hear of children having had measles or scarlet-fever, half a dozen times; whereas they had merely this little redness of the skin, called "roseola" (or "rose-rash").

SECTION II.—ERYTHEMA.

Identical with Roseola.—The next disease is, by some writers, separated from roseola, and is called "erythema." It is said to consist of red

[a] Rayer entertains a different opinion.

patches, or diffused redness. It often affects the subcutaneous tissue; so that there is a slight swelling. To shew the absurdity of separating these two diseases, I may mention that one is called "red patches, variously figured and irregularly diffused"; and the other is called "red patches, or diffused redness." I am sure it is frequently impossible to distinguish between these two diseases. The different varieties of erythema are much more unlike each other, than many cases of erythema and roseola. All that we have to remember is, that a little redness is called either "roseola" or "erythema"; that roseola occurs particularly in infants; and that erythema [a] occurs sometimes in rather a severe form.

Varieties.—Erythema may be transient, and last only about a week; and then there is furfuraceous (branny) desquamation. Sometimes it is local, arising from friction; and then it is called "erythema *intertrigo*." If the skin in the groin or arm-pits be irritated, the motion of the parts increases the irritation; and if they be accidentally irritated by the dress, then the redness will increase; and this is sometimes called "intertrigo." However, when this redness is slight, it is called "erythema *fugax*." If the skin be very smooth, it is called "erythema *lævе*." If it have a distinct margin, it is named "erythema *marginatum*." If there be small papulæ, it is designated "erythema *papulatum*." If, instead of papulæ, we have slightly elevated tubercles, it is called "erythema *tuberculatum*." If we have large bumps, it is then designated "erythema *nodosum*."

Causes.—[Rayer has primarily subdivided erythema into "idiopathic", and "symptomatic";—divisions far more comprehensive and practical in their nature, than those proposed by Willan; who has classified *appearances*, rather than *causes*. Idiopathic or local erythema ("intertrigo") generally arises from some obvious cause of irritation;—such as friction, pressure, distention of the integuments, extremes of heat or cold, the stings of insects, chemical irritants, or the presence of various eruptive diseases, wounds, or ulcers. Symptomatic erythema, which embraces six of Willan's varieties, is contingent on and associated with various inflammatory affections (especially those of mucous membranes), continued fever, dysentery, and other affections.[b]]

Accompanying Signs.—This disease is now and then preceded by a little illness, which disappears when the eruption occurs; and now and then there may be a little feverishness during the attack; but, for the most part, it is a trifling complaint, or is consequent upon some other affection. Rayer considers, that when there is an internal affection, the disease is the sympathetic effect of the internal irritation;—that an irritation of the stomach or intestines is the real cause of the disease; and not that this disease itself is at all capable of affecting the constitution. When persons are out of health, there will be an external inflammation, not attended with any secretion; and that inflammation is called "erythema."

Erythema Nodosum.—But there is a form of this disease which is very obstinate. It appears in great patches, chiefly on the legs, and particularly in females. If we draw our fingers along the legs, we find very hard and red bumps. It is called (as I before said) "erythema *nodosum*." We are frequently consulted respecting it, and asked to give it a name; and if we cannot, we are considered deficient in skill. Patients place the more confidence in the physician, if they fancy he knows what is the matter with them; and it is very natural that they should do so. It is very easily

[a] Sometimes called "red-rash."
[b] "Cyclopædia of Practical Medicine"; Article "Erythema"; Volume 2; Pages 115 and 119.

cured, if treated properly at first; but if be neglected, it is a very obstinate affection. Now and then, instead of bumps, we have tubercles (in the common acceptation of the word); and then the affection is called "erythema *tuberculatum*."[a] The tubercles are like peas. This variety is worth knowing; because patients frequently die when they have it, though I do not know that they die *of* it.

Treatment.—The best treatment for this disease, is anti-inflammatory;—in fact, just the same as for all the others that I have mentioned. If the patient's strength will bear it, we may take away blood with advantage; and generally it is buffed and cupped. It is proper also to purge the patient. In fact, we may treat him on the antiphlogistic plan; either purge him alone, or bleed him at the arm as well. If there be anasarca of the legs, we may favour its removal by the recumbent posture. We cannot expect the erythema to disappear, while the leg is hanging down; as it arises from the distention of the part; and if the distention of the part be allowed to remain, nothing will remove the erythema. The general rule, however, is to treat erythema as we should any other inflammation. In the erythema which occurs in the legs of females, we shall derive very great benefit from these measures;—that is to say, bleeding in the arm, the application of leeches to the neighbourhood of the part, and active purging; but we shall derive more benefit from colchicum than from any thing else. I have had great experience in the treatment of this disease; and I know the comparative efficacy of combating it by purging with common cathartics, and by purging with colchicum. I find that colchicum is the best medicine that can be employed, not only in severe prurigo, but also in this species of erythema.

Erythema Tuberculatum.—I mentioned that, in one variety of this affection, there was great redness of the skin, with hard lumps;—not so large as in "erythema *nodosum*"; but small lumps about the size of peas, or small-pox pustules. This is a state of the parts which I have never seen but once; and then I confounded it with "erythema *nodosum*", and thought nothing of it;—imagining that I could cure it. The lumps had no sooner disappeared, than the man became paralytic, then hectic; and died in an extraordinary way, with symptoms of various diseases. I was not then sufficiently aware of the distinction between "erythema *nodosum*" (which is an innocent disease), and "erythema *tuberculatum*"; but Dr. Willan says, that he had seen only three cases of "erythema *tuberculatum*"; and all of them proved fatal.[b] Two of his patients died of hectic,—just as mine did; and one died of subsequent hydrocephalus. My patient died hectic; and if he was not hydrocephalic, he had affection within the brain; for he was paralytic. Dr. Bateman says that he never saw the affection. The treatment, I presume, would be the same as for "erythema *nodosum*";—bleeding to a certain extent, and colchicum. I gave it to this man; but, to my astonishment, he did not get well. It is not the erythema that gives rise to paralysis or hectic; but (I presume) it takes place only in constitutions which are strongly disposed to some internal disease, and when the patient is on the eve of labouring under it.

[a] These forms of the disease are very accurately delineated in Plates 31 and 32 of Willan's work.

[b] See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 4; Species 5.

SECTION III.—URTICARIA.

The next of those diseases in which the inflammation is extended in patches over the skin, is "urticaria." I select it as the next because it is not a *contagious* disease; and, indeed, is almost always a disease free from danger;—just like the three I spoke of in the class of papulæ,—namely, strophulus [a], lichen [b], and prurigo [c]; and just like the two of which I have already spoken in this class,—roseola [d] and erythema [e]; except "erythema *tuberculatum*" [f]; which, although it will not itself prove fatal, occurs in persons who usually soon die of something else.

Characters of the Eruption.—This disease, urticaria, is (in plain English) the "nettle-rash." It is so called because the appearance is precisely that of a person stung with nettles;—"*urtica*" being the Latin for "*nettle.*" It is described by some writers under the term "*essera*"; which, I understand, is the Arabic name. Dr. Heberden (I think) speaks of nettle-rash under that title. In this disease there are "efflorescences" (as they are called),—extended patches; but besides that there are wheals. I need not say that a wheal is a pretty hard elevation of the skin; such as occurs from a horse-whip applied to the surface of the body;—but it is defined particularly, by Dr. Willan [g], to be a "round, oval, or longitudinal elevation of the *cuticle.*" One ought to comprise more in it than that, however. We might say, in general terms,—"a round, oval, or longitudinal elevation of the *skin*"; but still we must add—"not permanent; not containing fluid; and not tending to suppuration." Of course, if the *cuticle* be raised (according to Dr. Willan's expression), there must be something under it. One would imagine there must be a vesicle, water, or pus; it is therefore, improper to say,—"elevation of the *cuticle.*" The cuticle *is* raised; but it would be wrong to say,—that the cuticle is raised from the other component parts of the skin. The cellular membrane indeed is raised, as well as the cutis; and there is a hard bump, and an extended efflorescence (or patch) around the bumps. This efflorescence is of a vivid red,—a very *intense* red;—sometimes really of a *damask* hue; almost the appearance which we observe in those persons said to have "claret-marks." Occasionally there are a few very small wheals, but not always;—the *efflorescence* being the character of the disease; though, in the greater number of cases, in the midst of this efflorescence, we find these wheals; which appear white in the midst of the red patches. There is an extreme itching;—that sort of itching which is called "tingling"; exactly as if a person were stung with nettles. To the eye of a bystander, and to the feelings of the patient, the state is just that of a person stung with nettles. [h]

Varieties.—If the bumps be very hard indeed, they are, at the same time, large; and that variety of the disease is called "urticaria *tuberosa.*" It is sufficient to remember, that sometimes the bumps are pretty large and hard, and very painful. This variety chiefly occurs in the loins and legs, and is generally worse at night; subsiding in the morning, and leaving the patient weak. If it happens that these wheals and patches are numerous, and of irregular form, and coalesce, it is called "urticaria *conferta*"; and these are

[a] See Page 388.
[b] See Page 390.
[c] See Page 392.
[d] See Page 397.
[e] See Page 398.
[f] See Page 400.
[g] In his "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 3.
[h] The appearance of this affection is well shown in Plate 25 of Willan's work. It is sometimes mistaken for measles or erysipelas; and therefore its characters should be studied with great attention.

said to occur chiefly in persons of a dry, swarthy skin, above forty years of age. If the disease has been preceded or is accompanied by headach, nausea, gastrodynia, drowsiness, and pyrexia, it is called "urticaria *febrilis*." Very frequently, whether *preceded* by these symptoms or not, it is *attended* by them when it does appear. If they precede it, they will still continue; but frequently they will come on only when it appears. Generally, in severe cases, there is heat and thirst. The tongue is white, yellowish, and loaded; the epigastrium is tender; the pulse is full and quick; and now and then the disease will come on, like any other inflammation, with shivering. Now and then the internal symptoms, which occur before the eruption, are relieved by its appearance; or, at least, are diminished, or disappear; but they reappear when it ceases again. Frequently, however, these will all exist together; – the internal symptoms (feverishness); and the external symptoms (efflorescence and wheals).

Sometimes the disease is chronic; and is called "urticaria *perstans*." It is sufficient to remember that urticaria may be a chronic disease. The redness will go; but the wheals, perhaps, will remain. Now and then, instead of remaining chronic, it comes and goes for many months;—vanishing and recurring; and then it is called "urticaria *evanida*." But it is unnecessary to remember these expressions. It is sufficient to know that it comes and goes, or stays;—without knowing how authors arbitrarily choose to designate these varieties. Dr. Bateman says there is no pyrexia; but I know that there frequently is; and also an inflammatory state of the head and of the abdomen. It sometimes happens that the eruption disappears, or only comes from time to time; and when the tingling comes between the appearances of the disease, it is then called "urticaria *subcutanea*." It is, perhaps, difficult to imagine a disease *of* the skin to be *under* the skin; but so it is called. It lies underneath; and teazes the patient without shewing its face.

Attendant Symptoms.—This disease is sometimes so active, that persons can hardly see out of their eyes; and, in fact, we can see but little of their eyes. Every part around is swollen;—the cheeks, lips, and scalp are tense —the nose among the rest. The eruption will vary in intensity, and vary in situation, not only on different days, but at different hours of the same day; it will come and go several times in the twenty-four hours. Warmth will aggravate it; and, on the other hand, exposure to cold will do just the same. When a person undresses, and there is an application of cold air to a part of the surface which before was covered, it will frequently bring out the rash, and make it worse. On the other hand, if a person go into the other extreme;—if he stand near the fire, or take stimuli, he will be worse. Rubbing and scratching make things a great deal worse; but people will do so; and, on account of the pain, they really can hardly help it. This disease is often not confined to the surface. It affects the internal mucous membranes next the surface; and the submucous cellular membrane. We often find the tongue, fauces, and throat swollen;—so that the patient can perhaps hardly swallow. The irritation of the mucous membrane, in the upper part of the throat, sometimes occasions a degree of cough. I have frequently seen patients unable to swallow, and nearly unable to breathe. It is said (though I have never seen it) that, now and then, there is an irritation of the bladder, producing strangury; and sometimes diarrhœa is induced. The internal affection, in this complaint, is sometimes said to end fatally; but I presume this internal affection does not arise from the eruption. On the contrary, I imagine that it is the *general state* which gives rise to the *eruption*. The disease will last for a few days, perhaps a for

night; and now and then there is a slight scurf afterwards. The cuticle, in consequence of the irritation, is separated from the parts beneath, and comes off in the form of slight scurf. This occurrence, however, is not general.

Causes of Urticaria.—I believe that the most frequent cause of urticaria is the application of cold; especially when the body is heated. It will frequently arise from cold applied to the surface;—sometimes cold and wet; but especially when the body is over-heated. It is, perhaps, sometimes induced by sudden heat. It will frequently arise from an emotion of the mind, from teething, and from certain ingesta. Some have it through *one* kind of food; and some through *another*. In some persons, almonds will occasion it; or rather the *skin* of almonds. It is not the *blanched* almonds that cause it, but the *unblanched*;—so that it is the *external part* that produces the disease; and this it does in consequence of the skin of the almond containing hydrocyanic acid. The latter, in its medicinal form, will now and then have the same effect. Various kernels of fruit will give origin to it, in some people;—in consequence of containing the same substance. Mushrooms, also, will sometimes occasion it. I suppose the mushrooms must be of peculiar kinds. Herrings, particularly "*red* herrings", and shrimps, will likewise occasion it. Shell-fish are very often the cause of the disease; but I believe muscles produce it more frequently than other kinds. We hear of persons being poisoned with muscles; and they are said to swell. I imagine the idea of swelling from being poisoned, arises from this circumstance;—that urticaria is produced by different substances; and, when it is produced, the face often swells prodigiously, and sometimes even the whole body; and if persons have previously eaten muscles, they are sure to say they are poisoned; but it hardly amounts to that. So intense is the idiosyncracy of some persons, as to muscles, in reference to this disease, that a gentleman mentioned to me the case of a woman, in whom urticaria was induced by one tea-spoonful of the water in which muscles had been boiled. She always had urticaria if she tasted muscles; but, having boiled some for her husband, and being extremely fond of them, she thought she might indulge herself with a little taste of them; and so she took a tea-spoonful only of the liquor; but it had the same effect as if she had partaken of the muscles. Crab-soup, which (I suppose) is much the same as the liquor in which muscles are boiled, will also induce the disease. Malt-liquor, white-wine-vinegar, and common spirits, will, in some people, produce it. A medical man told me, that his wife always had it if she took gruel. One of the most common causes, among medical agents, is copaiba. Many persons, on taking copaiba, are covered with nettle-rash. I had a patient in whom it was produced, in the greatest intensity I ever saw it, by the sulphate of quinina. I never knew this before. His eyes were closed; his face was so swollen, that his friends did not know him; he was in a most intense burning heat; and could scarcely breathe. Swallowing was impossible. His brother came to me, and told me of the circumstance. I wished to ascertain whether it was the sulphate of quinina; and I begged him to take only a grain. He complied with my request, and it had the same effect, only in a less degree. He then took a minute *fraction* of a grain. There was not more quinina than (as is sometimes said) was "sufficient to swear by"; and even that produced a degree of uneasiness in his throat, and a certain tingling in his skin. I have known several persons, in whom the disease has been induced by laudanum;—in fact, by opium in any common form. I men-

tioned[a] that, in my own case, whenever I take opium, I am sure, in two or three hours to have an itching of my nose; which will not leave me quiet for several hours. The same substance, in other persons, will induce universal tingling of the skin, with bumps;—in fact, nettle-rash. Pepper, and various spices, will have the same effect. Pepper and vinegar occasion in me a great itching of the scalp. I once saw the disease induced, very violently, by a mixture of subcarbonate of iron with treacle: whether it was the iron or the treacle, I do not know.

External stimuli will induce it; and it may spread along the skin, so as to prevail to a considerable extent. Dr. Willan says[b] he knew a person, in whom it was produced by a slight application of Unguentum Hydrargyri; and another who had it from rubbing the hands with oatmeal. It is worth notice that, when an irritant is applied to the skin, the effect is not always limited to the spot; but other parts, either around, or *to* some distance, or *at* some distance, may suffer. Croton-oil often causes redness and vesicles, far beyond the spot of application. Tartar-emetic, applied to the legs, often causes pustules in the genitals.[c]

Treatment.—With regard to the mode of treatment, the shortest way, if the patient's strength will bear it, is to take blood from the arm. Even if any thing improper has been taken into the stomach, bleeding in the arm produces almost instantaneous relief; and the patient will speedily get rid of the complaint. A friend of mine was taking copaiba, in consequence of his misdeeds; and, next day, was seized with an eruption all over his body. His face was swollen and burning; and his lips were so stiff, that he could scarcely move them to eat. The aperture of his eyelids became very small; his pulse was about 100, and full; he was in a great heat, and red all over. Before I saw him, he had taken an emetic to empty his stomach; but it was quite in vain. The copaiba had entered his system; and was there causing irritation. When I went to him, I immediately saw it was nettle-rash; and begged another friend, who was by, to put a lancet into his arm, and detract a quantity of blood. Before the basin was half filled, he felt relief; and as the blood continued to flow, he felt more and more benefit. He became paler and paler; the swelling of his face declined; and before evening he was tolerably well. He took a dose of physic to assist the bleeding; but I dare say he would have done without it. The venesection, notwithstanding the emetic had been fruitless, instantly relieved him. A short time afterwards, he found it necessary still to go on with the copaiba;—his other troubles not having ceased; and the same effect was again produced. He took no emetic that time, but was again bled; and the disease instantly disappeared. He had no further trouble.

Evacuants.—However, if we are sure that the cause is still in the stomach, in consequence of the short time which has elapsed since it was taken, it would be but common sense to empty it; but I confess, if the person were of full habit, I should take away blood first; for we shall find that a most speedy mode of cure. We must, as in all other inflammatory complaints, regard the constitution of the patient on the one hand, and the intensity of the disease on the other. If we take away blood, we shall cure the disease in perhaps a twentieth part of the time that will be required, if we trust to low diet and purgatives. I would, in every case, back bleeding

[a] See Page 395.

[b] In his "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 3; Species 2.

[c] For this fact I beg to refer to a paper of mine, on Subcarbonate of Iron, in the thirteenth volume of the "Medico-Chirurgical Transactions." (Page 241.)

by low diet and purging. In the chronic form of the disease, the patient should avoid stimuli, and adopt the antiphlogistic regimen. He should avoid eating any thing that can excite either his body or his mind; and if the pulse be strong, he should unquestionably lose a small quantity of blood. The warm-bath is said to relieve the affection; and in some cases bathing has done good. Bark and acids are praised. All the cases, however, that I have seen, whether acute or chronic, have been best and most successfully treated by venesection, and common antiphlogistic measures. In the case of the lady who had urticaria from taking the subcarbonate of iron in treacle[a], for a couple of days, the eruption began one Sunday morning; and it was supposed that she had got scarlet-fever. The eruption was of a damask-red colour, with bumps; and it came out suddenly. She was in the greatest agony. Her countenance expressed great distress; but, though I imagined it arose from the medicine, I did not give her an emetic. I had her bled; and while her noble blood flowed (for she was a peeress) the symptoms declined; and when the arm was tied up, there was no redness to be seen. No pains were taken to get rid of the offending matter; which, in all probability, was the cause of the disease. I did not know the use of bleeding, in this complaint, when I began practice. But, finding it mentioned by several authors, it seemed rational; and I adopted it in every case afterwards, where the pulse would allow it.

Treatment of the Chronic Form.—In the chronic form, if we find any other disease be present, we must endeavour to remove that. The urticaria may arise from chronic enteritis or gastritis; and that ought to be remedied in the usual way; which usual way is to apply leeches to the abdomen, or adopt general bleeding, &c. We may get great and deserved credit for curing this disease; which is sometimes very obstinate. The secret of the cure generally lies in bleeding, and adopting antiphlogistic means. Among local applications, the chlorides, prussic acid, or nitric acid, best alleviate the itching.

SECTION IV.—RUBEOLA.

Various Names and Derivations.—The next disease of which I shall speak, is "measles";—a severe affection, which is frequently fatal. It is called, among the medical men of this country, "morbilli", or "rubeola." We have adopted the expression "*morbilli*" from the Italians; who so named the disease from its being a less kind of plague;—the "minor plague",—the "little disease." The expression "*rubeola*" was formerly applied to scarlet-fever and measles in common; as well as to other diseases. In fact, it was Sauvages (the first writer on Methodical Nosology) that restricted the term "*rubeola*" to *measles*. The word "*rubio*" ("red"), from which it comes, is Spanish; and it was written "*rubiólo*", as it is pronounced;—the accent being placed on the *o*.

Its Nature.—This is a contagious and infectious disease, chiefly affecting children; and is more severe in them than in adults. There is very rarely an indisposition to it; for we seldom meet with any one that will not take it. The indisposition is less frequent than the indisposition to small-pox. It rarely occurs more than once; but sometimes it does. Dr. Baillie[b] describes eight cases of its occurrence more than once. When it does occur

[a] See Page 404.

[b] In the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge."

more than once, it generally prevails as an epidemic disease.[a] It chiefly prevails in winter and spring. It is very well characterized;—having very peculiar symptoms, which hardly any one (I think) can mistake.[b]

Progress of the Disease.—It is almost always ushered in by catarrhal symptoms;—that is, by flushing of the face, redness of the eyes, heaviness of the countenance, a "running" of the eyes and nose, soreness of the throat, sneezing, and a hoarse and sounding cough;—a cough which old women, who have been much amongst children, describe as the "measle-cough." I cannot describe it. I can only say it is a *hoarse* cough.

These catarrhal symptoms will sometimes last *two* days, and sometimes *twenty*, before the cutaneous affection shews itself. But, in general, it appears on the *fourth* day;—sometimes as early as the *third*, sometimes on the *fifth*, and sometimes on the *sixth*. It is generally upon the face that the cutaneous affection presents itself. It appears as a rash on the forehead and the chin; and thence it spreads all over the face. The next morning it is found to have spread, not only over the face, but over the breast and trunk, and upon the extremities. On the fifth day, the disease has pretty well covered the body; and it is on that day that it is most vivid on the face. On the sixth day, the eruption is pale on the face, and most vivid on the body; and on the seventh day, it begins to disappear in the latter situation. The disease altogether is of about seven days' duration. The catarrhal symptoms appear for four days; upon the fourth day the cutaneous disease appears; and this lasts three days;—making seven altogether. But, now and then, children have catarrh for two or three weeks; and then, in the midst of the catarrh, without any previous additional symptoms, except perhaps an increased intensity, the cutaneous disease shews itself. Now and then, there are, on the back of the hand, patches, which did not appear before the sixth or seventh day of the fever; and, in the remote parts of the body, the redness occasionally does not come on till that time; and then the eruption in these situations does not decline, perhaps, till the eighth day. On the ninth day, there is only a slight discolouration left;—a sort of brownish appearance. The colour, in this disease, is by no means so vivid as in roseola, and as in scarlet-fever. When it subsides, if the inflammation have been pretty extensive, there is a furfuraceous desquamation. This, then, is the course of the disease.

The longer the premonitory symptoms and the general indisposition occur, before the appearance of the eruption, and the more severe they are, the more severe, generally speaking, will be the disease itself. The affection, too, is usually more severe in the *cold* than in the *warm* months. Sometimes, in the severe form of the disease, there are, about the fourth day, small dark patches in the mouth, on the hard and soft palate, upon the tonsils, and upon the uvula;—the mucous membrane being affected, as well as the skin.

[a] By "epidemic", I do not mean *contagious*. The word "*epidemic*" has been attempted to be restricted to those diseases which prevail over a number of persons, without any contagion in the atmosphere; but the word relates to diseases that prevail temporarily over many people, without a local cause,—be it contagious or not contagious.

[b] Dr. Montgomery (in the "Cyclopædia of Practical Medicine") gives the following clear and concise definition of rubeola:—"A contagious inflammatory disease, affecting at once the skin and gastro-pulmonary mucous membrane; in which, after catarrhal fever has continued about three days, a rash appears on the skin, at first in small stigmatized dots, not unlike flea-bites; which, presently coalescing, form patches of a crescentic or semilunar form; first on the face, and thence spreading gradually downwards over the whole of the body and limbs, at the end of four days disappear by desquamation of the cuticle." (Volume 3; Page 625.)

Characters of the Eruption.—When the affection first appears, there are only (at the utmost) little red dots, nearly circular; which are scarcely perceptible, and rather less than the spots of flea-bites. They become more and more numerous, however; and coalesce into patches. All the exanthemata begin and extend in this way. The patches which are formed in this disease, are of an irregular figure; and frequently assume a semicircular or crescentic form. This is characteristic of the disease, and is worthy of notice;—not that the diagnosis is often at all difficult; but, if it *be* difficult, we may be assisted by remembering, that the patches in measles affect a semicircular or crescent-form; that, in the midst of these patches, there are circular spots; and that, around the patches, are spaces of the natural colour. The disease is most severe upon the face. The skin of the face is finer, and more abundant in red vessels, than that of many other parts; and there it is that the effects of inflammation are most severe,—from these circumstances. The skin is not smooth, but roughened; so that, by passing the finger along it, a little roughness is observed;—hardly worth the name of *roughness*, perhaps; but an *inequality*. Occasionally, if the inflammation be severe, this is observed in other parts of the body. Occasionally the red dots are more or less hard and elevated. Although the disease is characterized by patches, the inflammation may be so intense as to cause the face to swell, and the eyes to be closed; nay, the symptoms may be so severe as to cause little collections of water, the size of millet-seeds, which are called "miliary vesicles"; and sometimes there are papulæ on the hands, wrists, and fingers;—elevations of the cuticle, having a distinct roughness, in the midst of the patches; so that while the patches give to the feel a sensation of being elevated above the surrounding skin, in the midst of these there will be another roughness, arising from the papulæ.

Diagnosis.—When we hear a child sneeze and cough, and see these crescentic semicircular patches, we may be sure it is the measles. It is on the face we usually see the disease best characterized. We may mistake it on the arms, hands, and body; but we can hardly do so on the face. It is very important to make a correct diagnosis here, although the disease may be of a slight character; because the man who tells a parent that the child is about to have the small-pox, when it is going to have the measles, will of course be deemed ignorant. Sometimes the spots will go down as fast as they appear.

Continuance of the Catarrhal Symptoms.—It is almost constantly observed, in this disease, that the catarrhal symptoms are not much lessened on the appearance of the eruption. It is often said by authors, that when the eruption comes out, in cutaneous diseases, the internal symptoms are relieved. We all meet with this occasionally; but, in a great number of cutaneous diseases, I have seen the internal symptoms not alleviated by the appearance of the external. In measles, however, it is a well-known fact, that, so far from there being an alleviation of the internal symptoms, they are more frequently aggravated than not; at any rate, in general, they are not mitigated. When the eruption comes out, the catarrh is confined perhaps to the bronchia. It appears that the catarrh is more or less bronchitic; for there is an affection of the superior parts of those tubes. But frequently the irritation of that part of the membrane below the larynx increases; so that we have decided bronchitis. Sometimes there is an affection of the substance of the lungs (pneumonia); and sometimes of the investing membrane (pleuritis).

Sequelæ.—Frequently, when the measles are over, they leave chronic bronchitis, chronic pneumonia, chronic pleuritis, or even phthisis. They

frequently seem to give rise to tubercles. Frequently, too, there is left after measles a chronic diarrhœa (generally of an inflammatory character); frequently inflammation of the eyes (ophthalmia); ear-ache; running of the ears (otorrhœa); deafness. Frequently there is disease of the mesenteric glands; and frequently, after the disease, we see various chronic cutaneous affections; such as ecthyma, rupia, porrigo, boils, aphthæ, &c.[a] In fact, there is no end to the mischiefs that measles leave behind. They may recede suddenly; and then we may have internal inflammation of the lungs, or within the abdomen, or in the head; but it is chiefly in the chest that inflammation occurs, when the disease recedes. It is not by any means certain, that the retrocession of the measles causes these symptoms. It is just as probable that, in many instances, the occurrence of the internal disease puts a stop to the external. It is a great mistake to suppose, that the retrocession of an eruption causes internal disease, in every case where such internal disease occurs. There can be no doubt that the occurrence of another disease, in the *internal* part of the body, will put a stop to, or suspend, a disease which has previously been going on in an *external* part; but it is a fact that, when measles suddenly disappear externally, for the most part there is some internal affection.

Predisposing Causes; *Age.*—Infants, or at least children, are considered to be much more susceptible of the disease than adults; but infants at the breast are certainly not so susceptible of it as others. It is not at all an uncommon thing to notice the disease in a family of children; all of whom have it, excepting one which is at the breast. There is no doubt that *extreme* infancy is not so disposed to the disease, as *later periods* of infancy. It is considered, however, that infancy at large, childhood, and the young adult period, are more subject to it than the *full* adult period; and much more so than old age. In considering this question, we ought to reflect on the circumstance, that although fewer adults have it than children, yet it is a disease that occurs generally but once; and it is possible that the reason why it is not seen in adults is, that almost all adults have had it when children. To ascertain the fact fully, we ought to have a number of *adults* who never had the disease; and expose them with an equal number of *children* who never had the disease; and see how many of each are affected. But even if a smaller number of adults escaped than of children, still that might not be satisfactory; because those adults probably did not have the disease in infancy,—owing to a positive indisposition; and that indisposition might still prevent them from taking it. We can draw no inference from the number of persons who have the disease in childhood; as is usually the case. Dr. Babington, I have heard say, has seen measles occur after sixty years of age; and it is a fact that we may see small-pox after seventy. Some children are said to have been born with measles[b]; and others have

[a] Dr. Montgomery ("Cyclopædia of Practical Medicine") says,—"In a few instances, gangrene of the inside of the cheeks, gums, and lips has been observed; in other instances, mortification has affected the uvula. Anasarca has been known to appear after measles, as it very often does after scarlatina; but this is so rare an occurrence, that where it does occur there is much reason to suspect, that the previous disease has been scarlatina. Dr. Harty, who has had extensive opportunities of observing this disease, informed the writer, that he has very frequently found, during convalescence from measles, that the pulse became unusually slow (about forty or fifty in the minute); but it did not appear to be connected with any thing unfavourable in the condition of the patient, whose recovery was uninterrupted." (Volume 3; Page 631.)

[b] "It is asserted by Rosen, Vogel, and others, that infants have been born with the traces of measles. Guersent ("Dictionnaire de Medecine", Tome 18, Page 513) mentions having seen an infant born with measles on it (having taken the disease

had it at a very short period after birth; but, as a general rule, the extremes of age are very unfavourable to this affection.

Exciting Cause.—The exciting cause of the disease is, indisputably, a peculiar contagion; and this has been communicated by art;—the disease has been conveyed by inoculation. Experiments of this kind were made, many years ago, by Dr. Home [a], Professor of Materia Medica in the University of Edinburgh. Many have thought but little of these experiments; but, in 1822, an Italian physician (Dr. Speranza) in the territory of Mantua, repeated them. He inoculated six cases, and afterwards himself, with the blood taken from a slight scratch in a vivid papula. In a few days the measles appeared; and went through their course mildly and regularly. This encouraged him to make further experiments; and he says they were all successful. Occasionally the measles do produce little vesicles; and it is certainly likely that these vesicles contain the contagious matter in a concentrated form. Many who have attempted to inoculate for measles have failed; but that measles *have* been communicated by inoculation, there can be no doubt; and as the disease, when produced naturally, is so severe; while it is slight when produced artificially; and as most children have the disease, I think it a pity the subject has not been more attended to. There is not the same facility of producing this disease, as small-pox; but it is possible to communicate it; and there can be no harm in scratching a few children, and attempting to give them the measles, during the favourable period of the year. Nor do I see why, as most children have it, they should not be exposed to the contagion, by having the clothes of others labouring under measles placed near them, during the warm summer months.

Period of its Occurrence after Exposure.—With regard to the time at which the disease occurs after exposure, Willan says that he knew a person who had had the measles, and became convalescent; and his clothes infected a child in the country; and that the child had the eruption sixteen days after being first exposed. I suppose the usual period is from five days to a fortnight; but most probably this varies, as in most other contagious diseases.

Varieties:—1. *Rubeola sine Catarrho.*—The measles sometimes occur, without any internal affection;—without any catarrhal symptoms, running of the eyes or nose, sneezing, heaviness of the head, or cough; and it is said, that when disease occurs in this exceedingly mild form, it does not prevent a second attack. This was mentioned by Dr. Willan [b]; and, as an accurate observer, he was, perhaps, never surpassed; but Rayer declares that this kind of disease is not measles at all, but only roseola. Dr. Willan [b], however, says that he saw two distinct cases of measles,—indisputable measles, without any catarrh; and I myself attended a family, in which several of the children had had the measles, with catarrh; and one of them had, at the same time, an eruption exactly like the others, but without catarrh; and which was pronounced, by the medical attendant, to be the measles. The rest of the family never had the disease again; but this one, a year afterwards, had regular measles. From this fact, occurring within my own

from the mother); but, we presume, such instances must be of exceedingly rare occurrence."—"*Cyclopædia of Practical Medicine*"; *Volume* 3; *Page* 625.

[a] "Clinical Facts and Experiments"; published in the year 1758. He was the father of the present Edinburgh Professor.

[b] In his "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 1; Species 2. (Page 235.)

knowledge, I cannot but think that Willan is right. If any one could distinguish between rubeola and roseola, it must have been Dr. Willan. Besides, all contagious diseases will occur in an imperfect form. The most intense contagious disease may be of unusual shortness, or of unusual mildness, or both; and may even want some of its symptoms. Pustules of small-pox sometimes occur without any indisposition. Doubtless, measles is no exception to the general truth. When small-pox has so appeared, Willan[a] says it may begin regularly, and be perfected on the eighth or ninth day from the first appearance of the pustules, *without indisposition*. In the same manner, measles will sometimes appear, and proceed to perfection in a few days after the eruption, *without catarrh*. It is well, therefore, to tell the parents, that the child may have an attack again; for a second attack of measles is possible in any case; but if they occur without catarrh; it is almost certain that the patient will have them again.

2. *Rubeola Nigra*.—The measles are sometimes attended with a darkness of the skin. About the seventh or eighth day, the rash suddenly becomes yellow, or livid. There is languor and quickness of the pulse; but no inconvenience arises; and the whole ceases in a week or two. It does not appear that there is any danger from the mere lividness of the patches in this disease. Many eruptions of the skin, when they subside, become of a dingy or yellow colour, without any danger whatever. There is merely a little change of colour, which is quite independent of the present indisposition. So it happens in measles. The dinginess is more intense than usual; the part becomes exceedingly brown and yellow; but this generally ceases after a week or two. Perhaps the blood is in a state approaching to stagnation;—the circulation not going on in the natural way. This species is called "rubeola *nigra*."[b]

3. *Rubeola Putrida*.—But it is said that measles sometimes do occur in a really typhoid state of the body;—that "putrid measles" take place. Sir William Watson, who was physician to the Foundling Hospital, said that he saw this sixty years ago. Others think this was an error; because (like Morton, a cotemporary of Sydenham) he did not distinguish measles from scarlatina; and proposed to banish the latter word as superfluous. Indeed, the original writers on measles all consider it and small-pox as the same disease in different forms. Dr. A. T. Thomson, however, declares, that he saw a case in 1804, where the languor and state of the pulse were alarming; and the skin rubbed off like a moist cobweb; but the patient recovered by the use of wine and cordials. I never saw this form; but the other (rubeola nigra) is not very uncommon.

[The prognosis in measles, during the early stage of the disease, is always favourable; but a mild attack of the proper symptoms is often suddenly converted into a most dangerous disease. It should be recollected that the eruption, or the mere disease, rarely puts the patient's life in hazard;—as we so frequently observe in scarlatina, in which the vital powers are so alarmingly depressed by the action of the poison; but in measles, the internal inflammation, particularly of the lungs, which frequently supervenes, is the chief source of danger. It is very generally admitted, that measles are more severe, and attended with more danger, in adults than in children. Dr. Montgomery dissents from this doctrine; and states that, as far as his experience enables him to judge, he should pronounce

[a] See Note at Page 409.

[b] "Rubeola sine catarrho", and "Rubeola nigra", are well represented in Plates 21 and 22 of Willan's Work.

exactly a contrary opinion.[a] The most severe cases of measles which have come under our notice[b], have certainly been in adults. The character of the prevailing epidemic, and the peculiar type of continued fever of the same period, should be carefully weighed in forming the prognosis, as well as in determining the treatment of measles. The season of the year has a more important influence on the issue, than in scarlatina or variola; the complaint is more likely to proceed favourably and safely in mild than in cold damp weather. When measles quickly succeed to other infantile disorders, as pertussis or remittent fever, the danger to be apprehended is greatly increased; the same may be said when it attacks children disposed to affections of the brain, or to scrofula. The following are the general circumstances which denote danger:—unusual violence of the eruptive fever, especially if attended with spasmodic twitches or convulsions; the eruption appearing late, and of dark livid colour; the supervention of thoracic or abdominal inflammation; severe headach, with nocturnal delirium; retrocession of the rash; extreme dyspnœa, coming on late in the disease, with a dusky flush on the cheeks, and livid lips; the accession of typhoid symptoms; the appearance of petechiæ, or profuse hæmorrhages from mucous surfaces.

A favourable prognosis may be pronounced when the eruption appears at the usual time, and proceeds regularly over the whole body and limbs; by the mildness of the bronchial affection; by the appearance of moderate diarrhœa; by the softness of the pulse; by the uniformly warm and moist state of the skin; and by the return of sound refreshing sleep.[c]]

Treatment.—In the treatment of measles, the first point is to attend to any internal symptoms of inflammation that may exist. A large number of cases will do very well, without any medicine at all. The child cannot eat; and therefore, if not recommended by the parent, will not take any thing injurious. He is more inclined to take plain water, milk, or milk and water, than any thing else. The patient should be kept *cool*; but it is rather dangerous to keep him *cold*. He should be kept in a *moderate*, but by no means *stimulating*, temperature; for heat would do great harm, and aggravate any disposition to bronchitis; but I do not think there would be the same propriety in exposing the child to cold air, that there is in small-pox and scarlet-fever;—owing to the great disposition to bronchitis. Some have recommended the cold affusion in this disease; but the tendency to bronchitis is such, that I have never practised it, and I would not recommend it.

From the catarrhal symptoms in this disease, and their great disposition, on the appearance of the eruption, to become severe, it is always necessary to direct attention to the state of the chest;—to observe, carefully, whether there is peripneumonia, or bronchitis, or pleuritis, or any other affection of the chest; and to treat it just as if no measles were present;—to take blood from the arm or the jugular vein, or apply leeches, as the case may require. It is not requisite to pay such great attention to these symptoms before the eruption occurs; but if they be severe when the eruption comes out, blood should be taken. Leeches generally answer; but if the child be large, blood might be taken from the jugular vein, or the arm. Moderate purging is proper, and low diet. The patient must be treated on the antiphlogistic plan, according to the degree of inflammation.

[a] "Cyclopædia of Practical Medicine"; Volume 3; Page 630.

[b] That of Dr. G. Burrowes.

[c] "Library of Medicine"; Volume 1; Page 331.

Recession of the Eruption.—If the eruption does not come out, or recedes, we should put the patient into the warm-bath; but we must remember that this is most likely produced by some internal disease; and that internal disease, in nine cases out of ten, is inflammatory; and in eight out of that nine it is situated in the chest. The internal affection may be the consequence of the measles receding; but, in a great number of cases, it is the internal affection that puts a stop to the progress of the disease on the surface. The best mode to bring out the measles again, is to lessen the internal disease. The measles will sometimes be suspended for many, many days, after appearing on the surface. They will recede in consequence of the internal inflammation; which we must subdue; and then, frequently, they will re-appear. This is a very curious circumstance. Now and then, there may not be internal inflammation. There may be mere debility; and then it is necessary to give stimulants;—ammonia and wine. When there is diarrhœa, it generally requires antiphlogistic treatment.

Diarrhœa.—The diarrhœa is generally troublesome, when the disease is over; but it is important, in all cases, to press upon the abdomen, and see if there be any tenderness. In a large number of cases, there is tenderness; and the diarrhœa is only to be subdued by sinapisms, leeches, &c. Sydenham pointed out that the diarrhœa was inflammatory; that opium and opiates were improper; and that venesection ought to be resorted to. Venesection is out of the question, in many cases; but it is sometimes proper. However, this is no general rule. We see cases where there is so little inflammation, that astringents and opium will cure the disease; but frequently they are not to be trusted to alone. In some we must unite this plan with the remedies for inflammation; in others we must solely treat inflammation, and the diarrhœa will cease. This is a most important point in practice, although it is simple; and unless it be carefully attended to, we may do harm when good might be effected.

Measles are very apt to leave after them an obstinate diarrhœa, which ends in disease of the mesenteric glands; and a bronchitis, that is apt to leave a disposition to the formation of tubercles. We have chronic bronchitis, and then tubercles; so that children frequently die of phthisis; but measles often set up scrofula, both in the abdomen and chest.

Putrid Measles.—In the putrid form of measles (which I have never witnessed), the opposite plan must, of course, be adopted; only we must take care not to mistake a blackness arising from extreme congestion in the lungs, for a putrescent state of the body. When there is congestion of the head and chest, wine and tonics would be exceedingly improper; but I should think that a careful practitioner would not make the mistake to which I have adverted.

SECTION V.—SCARLATINA.

Formerly Confounded with Measles.—The next disease among the rashes of which I will speak, is scarlet-fever; which is called, in medical Latin, "scarlatina." Till the close of the eighteenth century, this disease was confounded with measles. Morton, who (as I before observed[a] was a contemporary of Sydenham, thought they were mere varieties of the same disease.[b] In the middle of the seventeenth century, Sennertus asks why

[a] See Page 410.

[b] "Opera Medica; nimirum, de Phthisi; de Morbis Universalibus Acutis; de Febribus Inflammatoriis. Auctore R. Morton, M. D."

the disease is sometimes "small-pox", and sometimes "measles"[a]; and Diemerbroeck, who published in 1687, asserts that measles and small-pox differ only in degree.[b] Such were those days of diagnosis. In 1769, Sir William Watson did not distinguish measles from scarlet-fever.[c] On this account, some have affirmed that Sir William did not see the putrid form of measles;—that what he saw was putrid *scarlet-fever*; and that, as he did not distinguish between the two affections, he called it "measles." Indeed Morton, who confounded the disease, wished the appellation "*scarlet-fever*" to be banished altogether. He conceived that the two diseases (measles and scarlet-fever) were but one; and he thought it a pity to use both terms;—the word "*measles*" being quite sufficient to designate the whole disease. Bateman thinks that the year 1793 was the first in which an accurate diagnosis was made. Dr. Withering published an essay on scarlet-fever, in 1788; of which essay the second edition appeared in 1793[d]; and Dr. Bateman considers, that the latter was the accurate date of the first correct division of these diseases. This must appear to us strange; now that the diagnosis between the two diseases is established with the most perfect facility. But so it is; and I trust that those who live a hundred years after us, will be satisfied that we were an ignorant set;—that science will so advance, as hereafter to make our knowledge appear perfect ignorance. At the present moment, people cannot settle how long cholera has existed;—whether it is a new disease or an old one. Some say that it sprung up a few years ago; and others assert that it has been known from time immemorial. It is just the same with scarlet-fever. Some say that it was not known more than two hundred years ago; that it is not mentioned in the Arabian, not to say the Greek, writers; and that it came from Africa, and broke out (for the first time in Europe) in Spain, in 1610. Willan says[e] it was known to the Neapolitans, before 1500, under the name of "rossalia", or "rossania"; and that Ingrassia describes it under that name; that others called it "rosalia", "robelia", "rubiola", "rubeola", "rubiolæ", and "rubeoli" (from "robia", *madder*; and "morbilli", *measles*); and that the French used all these words for scarlatina; and, in addition, even "rugeole";—terming measles "senepion." The word "*scarlatina*" was formerly "*scarlattina*"; and is derived from "*scarlatta*",—"a red-coloured cloth."

Symptoms.—This disease is characterized by a close and diffuse scarlet-coloured efflorescence of the skin, and likewise of the mouth and fauces. There are the usual symptoms of pyrexia, for about two days; and, on the second day of the pyrexia, the eruption generally appears in some part. In the greater number of cases, I believe this is true; but occasionally the eruption will not take place till the third, fourth, fifth, or sixth day; and when the eruption does take place, it continues about five days. The interval between exposure and the appearance of the affection, is greater in adults than in children.

Varieties.—[There are several forms of scarlet-fever; each of which requires a separate description. The poison of scarlatina usually exhibits its effects upon two membranes; namely, on the skin and the mucous mem-

[a] His "Opera Omnia" were published in 1641, at Paris, in three folio volumes.

[b] "Opera Omnia Anatomica et Medica, Isbrandi Von Diemerbroeck; emendata et aucta ab auctore; et recognita per Inn. de Diemerbroeck (Isbrandi filium)."

[c] "An Account of Experiments on the Inoculation of Small-pox. By William Watson, M.D."

[d] "Account of the Scarlet-Fever and Sore-Throat; by William Withering, M.D."

[e] See his "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 2. (Page 289 of the First Edition.)

brane of the fauces; to one or other of which, however, its action may be restricted. Hence arise the varieties of scarlet-fever;—in accordance with a well-established law of the action of other poisons,—"that they may exhaust themselves on one or more of the tissues they usually affect, without involving the whole series; and that they act with greater or less intensity, according to the peculiar idiosyncracy of the patient."[a]

In the most simple form of scarlatina, the fever is seldom of an active kind. The cutaneous efflorescence appears in the usual manner; but there is no inflammation of the mucous membrane of the throat ("Scarlatina *Simplex*").

In the second, there is greater febrile excitement; and the general symptoms are further complicated by inflammation of the fauces ("Scarlatina *Anginosa*").

In the third, the symptoms are of a more severe description. The fever —which is of a typhoid type, with great depression of the vital powers—is sometimes accompanied with diphtheritis[b], sometimes with gangrenous inflammation of the throat, and generally with tumefaction of the parotid and cervical glands, and acrimonious discharge from the nostrils and ears ("Scarlatina *Maligna*").

In a fourth variety, the efflorescence does not appear upon the skin; but is confined to the mucous membrane of the mouth and throat. Although this form has not been described by Dr. Willan, as a distinct variety, it was often witnessed by him.[c] Dr. Tweedie, in his valuable essay on scarlatina[d], has designated this variety "Scarlatina *Faucium*." Dr. Williams[e] has described it as "Scarlatina *sine Eruptione*."[f]]

1. *Scarlatina Simplex.*—In the most simple form of the disease (that called "scarlatina *simplex*"[g]) the feverishness is very moderate. On the day after the commencement of the feverishness, innumerable red spots appear on the face and neck; and these, in twenty-four hours, will spread all over the surface;—coalescing and multiplying. They thus increase and multiply; enlarging the redness, and uniting together; till they form large extensive patches over the trunk and extremities. On the third day, there is almost one diffuse and continuous efflorescence over the body; and especially around the fingers. The scarlet hue is usually most vivid on the flexures of the joints;—the skin there being very fine; and likewise on the loins. The patches are seldom universal on the trunk; but upon the extremities they are very continuous. If we turn aside the bed-clothes, we perhaps observe a continuous redness from the groin down to the foot; —the patient looking almost like a boiled lobster; and towards evening the redness is so intense, that the patient looks as if he had been smeared with raspberry-juice. On passing our finger carefully over the skin, we may find exceedingly minute asperities (resembling the "cutis anserina" of the cold stage of ague);—far more so than is observed in measles; but we do not observe the irregularity that occurs in measles. In measles the whole skin is raised in patches; and, besides that, we frequently feel small papulæ; but, in scarlet-fever, the patches are not at all elevated. The

[a] Dr. R. Williams's "Elements of Medicine"; Volume 1; Page 131.

[b] From διφθέρα, *skin* (or *membrane*), and "itis", *inflammation*.

[c] See his "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 2; Species 2. (Pages 273 and 274 of the First Edition.)

[d] In the "Cyclopædia of Practical Medicine"; Volume 3; Page 644.

[e] "Elements of Medicine"; Volume 1; Page 131.

[f] "Library of Medicine"; Volume 1; Page 335.

[g] See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 2; Species 1; Plate 23. (Page 254.)

distinction between the sensations given to the touch, in the two diseases, is very obvious.

It is usually upon the fourth day, that the eruption is at its height. On the second it comes out; and on the third it has spread all over the surface; if the lower parts were exempt before, it reaches them now; and, on the fourth, it is at its height of redness. On the fifth day it declines; and it declines by interstices;—so that the patches reappear. While the disease was increasing, the patches were lost in one continuous redness; and then, as the disease declines, the continuous redness becomes again divided into patches;—that is to say, there are intervals of paleness. On the sixth day, the eruption becomes very indistinct; and it is gone, generally, before the end of the seventh. Now and then, if the disease be severe (and sometimes when it is not) between the fourth and seventh day there are (as is sometimes observed in measles) little miliary vesicles. In acute rheumatism, also, I have seen the fingers beset with vesicles. About the eighth or ninth day, the cuticle comes off; in the form of scurfy desquamation.

The disease attacks the interior of the mouth and fauces; and it even affects the conjunctiva.[a] The papillæ of the tongue become enlarged; and we may see them through the white crust of dry mucus with which it is loaded. The tongue looks as if it had been slightly sprinkled with Cayenne pepper. If there be any cough, it is not that peculiar cough which I mentioned[b] as occurring in measles. In measles, there is a peculiarly sounding cough;—such as experienced women and nurses know to be the cough of measles; but that does not occur in scarlet-fever. If there be any cough at all, it is merely a short irritating cough; arising from irritation of the fauces, without any expectoration or hoarseness. The conjunctiva being affected, there is a redness of the eyes; but no intolerance of light, and no overflowing of the tears; and the ciliary glands are not affected.

If scarlatina be at all severe, we may have a discharge from the ears, both within and without;—a discharge both from the Eustachian tube, and the external meatus. It may also give rise to sores behind the ears;—and to glandular suppuration in various parts; as in the parotids, and the glands of the neck. It may give rise to pulmonary disease, or to diarrhœa. It may be followed by chronic pustular diseases of the skin (called "rupia" and "echthyma"); but they are much more common after small-pox. After mild scarlet-fever, there is very often general dropsy ("anasarca"). The other symptoms which I mentioned (such as discharge from the ears, suppuration of the glands, &c.) all occur after the most *severe* forms of the disease; particularly that called "scarlatina *maligna*"; but after the *mildest* form we may have dropsy. This dropsy usually occurs at the end of the second week; and after the rash declines. It occurs particularly in spring and in autumn; and, if I be not very much mistaken, it is generally owing to the patient having caught cold, in some way or other.

2. *Scarlatina Anginosa.*—Now and then scarlatina is accompanied with little or no affection of the throat. Perhaps there may be a slight affection; though frequently it is so slight, as to deserve no notice; but if it be very obvious, the disease is called "scarlatina *anginosa*."[c] There is then more violent inflammation of the fauces; which inflammation increases and

[a] From "con", *together*; and "jungo", *to join*.

[b] See Page 406.

[c] See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 2; Species 2; Plate 24.

decreases with the eruption; the general disease of the system, and the eruption, are altogether more intense; the heat may be 106 or even 112 degrees; and there is sickness, headach, restlessness, and delirium. The throat feels sore and straitened; and, on inspection, in various instances, a dark red line is seen along the velum, reaching down to the lower part of the uvula.[a] The patient is hoarse; experiences a difficulty in swallowing; and the tongue is very red, especially at the sides and the extremity. The papillæ are particularly affected; so that they are greatly increased in length.

In this more severe form of the disease, the eruption often does not appear till the third day; and very often the eruption is not so universal, but is in scattered patches; and very often it does not come out fully and remain so, but appears and disappears. Thus the whole disease is lengthened. From the eruption not coming out permanently, the disease is protracted. I mentioned[b] that when the measles recede, the eruption may last for some weeks. So, in scarlet-fever, if the disease comes and goes, then the period of the eruption is increased; although I do not know that it can be increased to the period to which I have seen measles extend. When the disease thus goes off, the desquamation is less regular; and, if the rash have been slight, (as it sometimes is, even when the throat is much affected,) there is perhaps no desquamation at all. Sometimes we see exfoliations of large portions of the skin, for many weeks; and these are usually upon the hands and feet. The nails have been known to crack and separate; and, now and then, superficial ulceration will take place on the tonsils. For the most part, there are shreds of viscid secretion; which are sometimes mistaken for sloughs; but they are merely vitiated secretions;—excessively thick portions of lymph. Now and then we have real sloughs; with great debility after the disease.

3. *Scarlatina Maligna.*—But we have another form of the affection; in which there is a great disposition to sloughing, to mortification of the throat, and to putrescency of the body; and this is called "scarlatina *maligna*."[c] With respect to scarlet-fever, the names of the species are not (as is the case in many other cutaneous affections[d]) unworthy of being remembered. The distinctions of this disease are very proper; but we have only to remember that there is a mild form of the disease; another in which the throat is much affected; and another where there are typhoid symptoms. In this violent typhoid form of the disease, the efflorescence is dark and livid. It comes out even still later than in "scarlatina *anginosa*" (where the disease is attended by an inflammatory sore-throat); and it is of uncertain duration. It is continually going and returning; and there is less heat of the body. In "scarlatina *anginosa*", I said the heat might be 112 degrees; but here there is less heat; and the pulse, although perhaps very quick, is languid. There is great affection of the head;—great delirium or coma. In fact there is encephalitis;—inflammation within the head; and sometimes other inflammatory affections are present. The eyes are red, and the cheeks darkly flushed. There are sordes of the tongue and mouth; dark sloughs (the bases of which are livid) in the throat; and great fœtor from the nose and mouth. There is an acrid discharge through the nostrils;—a discharge which irritates the skin upon which it flows. There is diarrhœa; and frequently there are petechiæ;—

[a] From "uva", *a grape*.
[b] See Page 412.
[c] See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 3; Genus 2; Species 3; Plate 24.
[d] See Pages 388, 389, 398, and 402.

black specks on the surface of the body. Hæmorrhage occurs; and death often takes place in two or three weeks. Sometimes the patient sinks suddenly, within the first four days. Occasionally the disease does not shew this malignant character at first; but goes on pretty mildly; and then, all at once, puts on these malignant symptoms. When the body is inspected, there are found to be various internal congestions, inflammations, and effusions; and inflammation of the surface (not of the *interior*) of the skin.

It is this frightful form of the disease which, when recovered from, leaves very severe complaints;—as ulceration within the ears, chronic diarrhœa, and such diseases of the skin as rupia and ecthyma. I do not know that this form of the disease is more frequently followed by anasarca than the others. So comparatively rare, however, is this species of the affection, that I have never yet had occasion to treat a patient with it. It is, perhaps, a singular thing, that I have yet lost only two patients with scarlet-fever. But it has solely arisen from this circumstance;—that they have always been *mild* cases which I have treated;—such cases as required cold washing, cold air, and occasionally the local application of leeches. I have heard other practitioners say, that they never lost a case of scarlet-fever.

We sometimes see that form of the disease which is called "scarlatina maligna", occurring generally throughout a neighbourhood;—at least generally during an epidemic. Sometimes we see one person in a neighbourhood affected with it; while other persons, or other children, are affected with other forms of the disease. Sometimes, even in the same house, we see all the three forms of the disease. It appears, therefore, that the cause of the disease's putting on this malignant character, is sometimes something general in the state of the season or place; and sometimes something altogether dependent upon the condition of the individual. It does not appear to be any thing peculiar in the contagion. We shall find, in the case of small-pox, that matter taken from a person labouring under a mild variety, will sometimes give to another person a malignant, confluent, violent form of the disease. So, in scarlet-fever, the *mild* form of the disease, is sometimes caught from a person labouring under a *malignant* form; and *vice versâ*; and although we see numerous cases of malignant scarlatina, during a particular epidemic,—and especially in a particular neighbourhood,—yet, at other times, we shall see the malignant form occur sporadically. It may occur only in one or two individuals in a neighbourhood; while the rest have the mild, or merely the inflammatory form; and we even sometimes see this peculiarity cease in one place, while another becomes filled with the inflammatory or mild form. I believe that the malignant form is more common in winter, than at any other period. The circumstances that give rise to it are not well known.

4. *Scarlatina Fancium.*—There is, however, another form of the disease; in which the *throat* is affected, and not the *surface*. Some, indeed, have denied this;—just as some have denied that measles are occasionally seen without catarrh. As, however, this disease affects both the surface and the throat; and as some have asserted that it frequently affects the surface, while there is little or no affection of the throat; so there is no reason whatever why the throat should sometimes not be sore, while the surface is scarcely or not at all affected;—while there is nothing upon the surface worthy of the name of an eruption. Dr. Willan mentions[a], that

[a] See Note (c) to Page 414.

in epidemic scarlatina, there are always many cases where the throat only is affected; and that these cases will communicate all forms of the disease, just as if the skin were affected. This, I think, is not at all surprising. In that form in which the throat particularly suffers, if we were to look over the skin from head to foot, two or three successive days, we might perhaps discover an eruption; but it would be so little, that we should be almost justified in saying there was none; and I have seen several in a family affected with the sore-throat only; and that mildly. Those who formerly had scarlet-fever, and even those that are recovering from it, if they be exposed to the contagion again, will sometimes have a little soreness of the throat, and even patches on the skin.

It may Occur more than Once.—It is a disease that usually occurs but once during life; but I believe the exceptions to this rule are more frequent, than in the case of small-pox. Small-pox occurs twice, more frequently than measles; and I believe scarlet-fever occurs twice, more frequently than small-pox. But I am not certain; for some persons do not make a sufficiently accurate diagnosis, between such a rash as roseola and scarlet-fever. Still, however, it is by no means uncommon for persons that have had scarlet-fever, to have a sore-throat, if they be exposed to the infection of an individual labouring under this disease. It is by no means unusual for those who have about them children labouring under scarlet-fever, to have a sore-throat, characterized by intense redness; and that sore-throat is sometimes very severe. Occasionally, persons who have had scarlatina formerly, or are recovering from it, have not only sore-throat (if strongly exposed to the contagion), but even spots like flea-bites, sometimes of a dark colour. Dr. Willan says, that he never saw the disease occur more than once; although he had witnessed two thousand cases of it. When I was a pupil, it was denied that small-pox or measles ever occurred twice; but now that there are so many persons capable of making good observation, cases have been sufficiently multiplied to settle that point.

Persons are not so liable to it.—It differs, however, from measles and small-pox in this;—that persons generally are not so liable to it. Almost every body has the small-pox, unless they have had the cow-pock, and are thus prevented; but we find a great number of persons that never had scarlet-fever. It is common to find persons that never had the scarlet-fever, although they have been exposed to the contagion; but it is very uncommon to find persons that have not had the small-pox (or the cow-pock) and measles. I have been exposed to scarlet-fever often enough; but I never had it; though I have had small-pox, measles, and hooping-cough; and the rest of the diseases which people usually have.

Causes.—Scarlet-fever arises solely from contagion. I use the word "*contagion*" in its generic sense. The disease may be caught by being near a person labouring under it; and therefore it is infectious. It may be caught, too, by touching any thing that the individual has touched; and it may be caught from a second person. If an individual visits a person labouring under the disease, and then visits another, the second person visited may catch it from him. It may be communicated too, it is said, by the exfoliated portions of cuticle. It may be conceived, that these are so abundantly impregnated with the perspiration, as to communicate the disease; but I do not know, from observation, whether this is the case. It occurs more frequently in children than in adults; but extreme infancy is least liable to it;—just as it is least liable to measles. Being of an infectious nature, the disease is often epidemic; but it is more prevalent at the equinoxes, than at any other period of the year.

Diagnosis.—[The only diseases with which scarlatina can be confounded, are measles and roseola. From measles it may be distinguished by the precursory symptoms; by the time intervening between the first accession of fever, and the appearance of the rash; by the character of the eruption; and by the sequelæ. Measles commences with coryza, sneezing, suffusion of the eyes, cough, slight dyspnœa, and other catarrhal symptoms; while, in scarlatina, the first sensation of uneasiness is referred to the throat. The eruption in measles shows itself on the fourth day of the fever; but in scarlatina it may usually be distinguished on the second. In measles, the rash is disposed in irregular portions, of a crescentic form, and is slightly elevated,—so as to be sensible to the touch; in scarlatina, the eruption assumes the appearance of broad patches, of an intermediate shape. The rash has a different tint in the two diseases; it is of a vivid red in scarlatina, but of a darker or raspberry-hue in measles. In scarlatina, the fever does not abate upon the appearance of the eruption to the same extent as in measles; the former is frequently succeeded by anasarca, inflammation of serous membranes, depositions in the joints, &c. The sequelæ of measles are principally affections of the respiratory organs; as bronchitis, pneumonia, croup, &c.

Roseola is distinguished from scarlatina by the partial and regularly defined rash, by the absence of angina, by the mildness of the febrile disorder, and by the short duration of the complaint. Deep rose-coloured patches, exactly like roseola, sometimes appear intermixed with the rash of scarlatina.

Prognosis.—The only danger to be apprehended in "scarlatina *simplex*", is the occurrence of some internal local inflammation, or the supervention of anasarca, when the desquamation of the cuticle is completed. It must also be borne in mind, when scarlatina prevails epidemically, that a mild case sometimes suddenly assumes a malignant type. The prognosis in "scarlatina *anginosa*" is influenced, chiefly, by the extent and severity of the local inflammation;—bearing in mind, however, that there is a natural tendency in angina to terminate in resolution. A bright florid appearance of the inflamed mucous membrane, is a more favourable symptom than when it presents a dark livid aspect. But if there is excessive tumefaction of the throat and surrounding parts, and especially if the inflammation has extended to the air-tubes, the disease is to be considered dangerous, and will probably terminate fatally. In some cases of this kind, œdema of the glottis[a] supervenes, and rapidly destroys the patient. The prognosis is also unfavourable if the delirium commences, as it frequently does in children and young persons, a few hours after the seizure: in these cases a fatal result often ensues in the course of two, three, or four days. Our prognosis may often be formed from the character of the eruption. A bright red efflorescence is more favourable than a pale rash, or a dusky red, or one of a raspberry-tint. When the eruption is partial and evanescent, or when its retrocession takes place suddenly at an early stage without reappearing, there is much cause for apprehension. Complete desquamation of the cuticle is a favourable sign. "Scarlatina *maligna*" being always attended with great danger, a guarded prognosis should be given.

Of the circumstances indicating a minor degree of danger, the following are the more important. It is generally supposed, that children withstand the virulence of this disease better than those of more advanced age. The absence of visceral inflammation, or of structural disease of any important organ, will also lessen the danger. A plentiful and florid eruption, a bright

[a] From γλωττα, *the tongue.*

red colour of the fauces, and a disposition of the exudations on the throat to separate, universal desquamation of the cuticle, the pulse falling in frequency and rising in power, the breathing becoming gentle and free, the countenance resuming its natural expression, and gentle perspiration, are indications of a favourable result.

Among the unfavourable signs are the existence of inflammation in an important organ, for the subduing of which active remedies cannot be employed; a dark or livid appearance of the eruption, more especially when intermixed with petechiæ; the sudden disappearance of the efflorescence; a small frequent pulse, with great prostration of strength; hurried respiration, not depending on active inflammation of the lungs; acrid discharges from the nose and ears; the admixture of blood in the urine or stools; involuntary evacuations; subsultus tendinum; hiccup; muttering delirium and coma; the appearance of gangrene of those parts subjected to pressure, or in the extremities.

In conclusion, it may be remarked, that it is often a fatal disease when it attacks pregnant or puerperal women; and that it is generally of a milder character in the spring and summer, than in the autumn or winter months.[a]]

Treatment.—The treatment of this disease is, for the most part, very simple. If we take care to do the patient no harm, he in general will do very well. In this disease, cleanliness and fresh air should be particularly attended to. If the season will allow it, the windows and doors should be opened; and only the slightest covering placed upon the patient. Cold water (or something nearly as simple as water) is the most eligible drink. No food beyond this, except it be milk-and-water, should be allowed. The bowels, of course, should be kept open. It is said that an emetic, given early, alleviates the disease. Some are of a different opinion; but many contend that, at the beginning of the disease, it is very good.

Cold Affusion.—The disease certainly has been cut short, by taking a patient out of bed, and pouring cold water upon him. The heat of the body is so great, in this disease, that no danger is to be apprehended from cold affusion. It is true, there are cases in which the patient is more or less chilly; but if, in this affection, the general rules which I laid down in the case of common fever be followed, there is no danger whatever, but the greatest advantage, in taking the patient out of bed (however hot he may be) and pouring cold water upon him. Those rules are,—that the temperature is steadily above 98 degrees; that there are no profuse general sweats; that there is no sense of chilliness; and no inflammation of the chest or abdomen. I presume this would be done oftener than it is, were it not for its appearing a violent measure, to take a person in fever out of bed, put him into a washing-tub, and souse him well with cold water. But, at any rate, no friends will object to washing a patient with cold water. It is a great comfort to the individual; and, as long as it is comfortable, it should be had recourse to. Sponging the hands, arms, face, and trunk, with cold water, is grateful to the patient; and is an excellent practice in the disease.

Bleeding.—If the inflammatory symptoms run high, it will be necessary to bleed in the arm. In general, it is only requisite to give the patient fresh air; to give him little better than water to drink, and nothing to eat; to keep him clean; to let him have but few clothes upon him; and to keep his bowels open. But if the symptoms should be violent,—that is to say, if any local inflammation come on in the head, chest, or abdomen,—it may

[a] "Library of Medicine"; Volume I; Pages 343 and 344.

be necessary to take blood from the arm. We are not to neglect local inflammation, because the affection under which the patient labours is scarlet-fever. For the most part, this inflammation may be subdued by local bleeding; and it is best to remove it by that means, if we can; because it produces less debility, than if we take blood from the arm with a sudden shock. It is to be remembered, however, that the case may be so severe, as to render general bleeding imperative.

Relieve the State of the Throat.—The chief parts that suffer, in this disease, are the throat and head. The throat suffers, because it is one of the seats of the disease. The application of leeches around it, is exceedingly useful;—far better than a blister; as I shall mention when I come to speak of common sore-throat. In that affection, blisters are frequently very severe; but leeches afford immediate relief; and plenty of leeches about the throat, or about the head, are often valuable in scarlet-fever. The tongue may be particularly foul in this disease; and that might give rise to the belief that there was great disturbance of the digestive organs; and therefore that emetics, calomel, and remedies of that description, were particularly necessary. But this, I think, is a wrong inference; for the tongue is one of the seats of the disease. It is not foul because there is intense feverishness of the system; but foul because it is in a state of inflammation. The papillæ are exceedingly red; the tip is red; and the secretion on the back of the tongue is diseased, both in quantity and quality. We may have, in fact, (besides the redness of the papillæ,) just such a tongue, with respect to the dorsum, that we have when a person is fully under the influence of mercury;—a tongue covered with a thick, yellow mucus. The tongue itself is swollen.

This state of the mouth is much alleviated, by allowing the patient cold drinks; or, if it be agreeable, he may have them iced; for the heat of the throat and mouth is very great. We continually see sloughs formed upon the throat. I mentioned[a] that it is not every thing which *looks* like a slough, that *is* one; because the disease produces the effusion of shreds of lymph; and they lie there as though it were a little ulcer; but occasionally we have dark and ash-coloured specks, which cannot easily be removed; and which are neither more nor less than so many sloughs. In the malignant form we have very considerable sloughs. These—whether they be mere shreds of lymph, or sloughs—are always best treated by gargles of the chloride of soda or lime. The more intense the gangrenous tendency, the stronger must be the gargle. In ordinary cases of scarlatina, a gargle composed of two ounces of the common solution, to half a pint of water, is found strong enough. It will produce a pricking sensation, and is even sometimes too strong; but in other cases, where the sloughs are very considerable, we may employ it much stronger than this. In the merest specks of the throat, this is one of the best applications that can be employed. However, there is frequently a difficulty in the application of gargles; and then it is better to use a syringe, and squirt the gargle at the throat; if any of it be swallowed, it is a good internal medicine, and will do no harm. I know no gargle to be compared with a diluted solution of chloride of soda or lime; both in cases of scarlet-fever, and in cases of thrush.

Stimuli.—If the disease shew a very considerable gangrenous tendency in the throat, and the pulse be very soft and feeble, we have only to treat generally, as we would treat any case of typhus-fever. Among the internal stimulating medicines, which it is found necessary to give in the latter stages,

[a] See Page 416.

sesquicarbonate of ammonia is the best; with the exception, perhaps, of wine; which generally answers better than any thing else. Patients will sometimes take a great quantity of wine, in this disease. Dr. Withering, who wrote on this disease, says that, in an epidemic which prevailed among a number of children (about twelve years before he wrote), each must have taken a bottle of the best port-wine in twenty-four hours, for several successive days. A quantity of wine is borne, on these occasions, which would intoxicate and destroy at other periods. The treatment is the same as for typhus-fever, where there is great debility, or a tendency to putrescency, or mortification.

Ammonia.—Some persons think that ammonia has a peculiar power in this disease; and they say they have given it in every case of every description, whether inflammatory or not; and that they never lost a case in their lives. I presume that very few of the cases which these gentlemen treated, were of a malignant character; and that if they had merely given all the children a piece of *sugar* once in the twenty-four hours, still the greater number would have done almost as well. This is a disease which, for the most part, terminates favourably, if the practitioner does no harm; and a little ammonia can do none; but, by rational treatment, it runs its course more mildly; and saves the patient a great deal of suffering.

Recession of the Eruption.—If the eruption recede, the best treatment is to put the patient into a hot-bath, several times a day; to rub the body with stimulants; and to give stimuli internally. But it is necessary here, as in other similar cases, to observe whether an internal inflammation has come on. It may be *that* which prevents the patches from coming out; and, in such a case, we must be careful not to give internal stimuli; but rather apply leeches, to remove the internal congestion and inflammation. We may stimulate the surface at the same time; but the great point is to alleviate the *internal* affection, which prevents the *external.*

Prophylactics.—As this is a disease which children do not *necessarily* take, as they do measles and small-pox, it is but fair to endeavour to prevent them from catching it; and, besides free ventilation and cleanliness in the house, the use of the chlorides may be proper, with a view of destroying the contagion. I do not know whether they *do* destroy contagion; because I have recourse, in addition, to fresh air, plenty of water, and cleanliness; and, as I feel it my duty to use the chlorides at the same time, it is impossible to say what is done by the one, and what by the other. I have no means, therefore, of drawing a conclusion. But it would be well to throw the dirty linen, taken off the patient, into water in which the chlorides have been introduced; to put the chlorides into various utensils which are used; and to sprinkle them about the room. In this way, we may possibly prevent other persons in the house from catching the disease.

Belladonna.—A German physician, however, recommends a medicine for the purpose of preventing the disease, which appears to me of a very fanciful character. Dr. Hahnemann, of Leipsic, says that belladonna will prevent the disease. He says, that if we take two grains of the extract of belladonna[a], and dissolve them in one ounce of cinnamon-water, or pure water (which is much the same thing), and give two minims of this solution to a child a year old (or another minim or two, according to the age of the child), we may prevent the disease. I never thought it worth while to try it; because I hardly think the observations which are published conclusive.

[a] From "bella donna" (Italian), *fine lady*;—so named from its employment by the Italian ladies, as a cosmetic.

I know that foreign physicians have since published accounts of the disease being so prevented; but it ought to be from hundreds of observations, that any one says the disease has been prevented; because it is an affection that will not attack every one in a house; and, every now and then, when the disease has been spreading for some weeks, all at once it will disappear, and no other persons have it. Inferences, therefore, ought not to be drawn without very numerous facts;—numerous coincidences, well ascertained.

Treatment of the Anasarca.—With regard to the anasarca which follows this disease, I have no doubt that it frequently arises from cold; for it either begins in the face, or the face is affected as soon as any other part. It may be attributable to exposure to cold when the disease is over, or declining; because it is an affection that does not take place *during* the disease, but *subsequently* to it. Rayer condemns the application of cold in the disease; because it is likely to produce anasarca. Now I have generally used cold ablution (not *affusion*) in this disease; and never, when I treated the case myself, has anasarca occurred. I do not believe that, if a low temperature be applied properly (that is to say, when the heat of the body is too great), there is any danger of the patient catching cold; but if it be used when the patient is not hotter than he should be, or after the disease has declined, then I have no doubt that it would lead to anasarca. However, this anasarca appears to be inflammatory; and for this reason it resembles the anasarca which is the effect of exposure to cold;—especially cold united with wet. It begins in the face; or it particularly affects the face; or it is seen in the face as soon as anywhere; and, in the next place, the urine is often albuminous. It will not merely contain *albumen*, however, but sometimes *blood*. In most cases of anasarca which I have seen, (and perhaps I have seen them only because they were intense,) there has been more or less internal inflammation, in the head, chest, or abdomen;—just as in acute anasarca from cold. In almost every case, it was in the chest; generally pneumonia or pleuritis.

The treatment of this anasarca is best conducted by antiphlogistic means;—by purging the patient well (which is an antiphlogistic remedy); and some say by giving digitalis[a]; but I know that it recedes best by purging; and by attending to any internal inflammation that may exist. It would be in vain to purge, in severe inflammation of the chest, unless we made use of leeches at the same time; and the same remark applies to the head. It is important, in all these cases of anasarca supervening on scarlatina, to examine whether there be inflammation; for if we neglect that, the anasarca will generally be tiresome; but if we treat that, it will go away. Occasionally the anasarca goes away of itself; but we may always expedite it by purging, or by briskly applying antiphlogistic measures, directed towards some internal part. I do not know whether it is mentioned by any author; but, besides phrenitis or arachnitis, rheumatism is not an uncommon sequela of scarlatina.

SECTION VI.—ERYSIPELAS.

The next disease which I shall describe, is one that I hardly know where to place;—I mean *erysipelas*.[b] Rayer places it with the rashes, because

[a] From "digitus", *a finger*";—from the shape of its flower.

[b] From ἑρυω, *to draw*; and πιλας, *near* or *adjoining*;—from its tendency to affect the neighbouring parts. Its common designation is—"St. Anthony's fire."

there is a continuous redness of the skin; but Willan places it among those which have a large collection of water ("bullæ").[a] The truth is, this disease may exist without the formation of any secretion,—without any collection of water, or even watery vesicles; yet I think that, in a great number of cases, it does produce an elevation of the cuticle (of smaller or larger size) containing water. Upon the whole, it may be right to place it with the rashes;—as the redness is diffused, and always exists, whereas vesicles, or bullæ, do not. But it is a matter of no very great importance.

Essential Characters.—Erysipelas is a very intense affection; of the same description as roseola and erythema. What roseola and erythema are mildly, erysipelas is severely. If there be a diffused redness of the skin, with heat and more or less smarting, without disturbance of the constitution, and without any swelling of any consequence, we may call it "erythema"; if the symptoms be equally mild, and the rash is rose-coloured, we may call it "roseola"; but if the part be much swollen, the inflammation very intense, the pain and heat very great, and the constitution be disturbed;—then we call it "erysipelas." It differs from erythema in this:—that while the inflammation of erythema may be *chronic*, (as in "erythema nodosum", or "erythema tuberculatum",) erysipelas is always an *acute* febrile disease;—attended with heat, swelling, pain (which erythema and roseola may not be), redness of some part of the skin in patches; and often united with vesication. The swelling is irregularly circumscribed; and is generally soft. Generally the redness disappears on pressure, and instantly returns when the pressure is removed; as in erythema and roseola.

Progress of the Disease.—Very often, before this inflammation comes out, there is a previous excitement of the constitution; as is the case in measles and scarlet-fever. Before tenderness of the skin is felt, the patient may be feverish; or he may have headach, nausea, vomiting, drowsiness, vertigo, or tenderness of the epigastrium; or he may have rigors. After these symptoms (more or fewer of them) have existed in greater or less intensity, for two or three days, some part of the skin will feel sore; and, on being looked at, it will be found a little swelled, and a little red and hot. All this increases. The skin becomes more swelled; very red and very hot; the patient experiences pricking or smarting pains; and the general excitement and feverishness are increased. Occasionally the local symptoms appear first;—the feverishness taking place exactly in the same degree that they do; but sometimes we have the feverishness first, and then the redness appears. Very frequently, after a little time, minute vesicles are seen here and there, in the inflamed part. Frequently there are no vesicles at all; and when vesicles do appear, they frequently occur only in some particular parts of the red patches. Sometimes they are not very large;—they are really vesicles; but sometimes they are as large as walnuts; and are then called "bullæ" in Latin, and "blebs" in English. These contain, at first, a clear fluid; but sometimes, after a day or so, it becomes turbid; and is more or less yellow. These burst, and the fluid oozes out; so that a yellow crust forms;—a crust which is made of this secretion dried, and the exfoliated cuticle. If the disease decline without forming any of these vesicles, or bullæ, the cuticle is sure to come off, and we have a scurf; but if there be vesicles, or bullæ, then we have crusts. Sometimes the surface under the elevated cuticle, after the bursting of the bladder, secretes pus;—more or less suppuration will take place; and sometimes the secre-

[b] See his "Description and Treatment of Cutaneous Diseases"; Order 4; Genus 1.

tion, be it pus or mere lymph, is very acrimonious; so that it produces great irritation of those parts over which it flows.

It has a Tendency to Spread.—This is a disease which has a great tendency to spread. It will sometimes spread over half the body. I have seen it spread from the occiput down to the toes. As it spreads, sometimes the part first affected recovers; at other times it does not;—so that we then have one immense sheet of red colour. It is sometimes very curious to see, as it spreads along, how the parts first affected become well.

Metastasis.—Now and then it will suddenly cease, and some internal part suffer. This change of situation is called "metastasis"; and if it only disappears in *one* part of the surface, to reappear in *another*, the French call the circumstance "delitescence"; but if an *internal* part be affected, it deserves the name of "metastasis."

Varieties.—When it extends slowly from one part to another (whether the part affected recovers or not), it is called "erysipelas *erraticum*";—wandering about. Sometimes there is very great swelling, and effusion of serum into the cellular membrane; and it is then called "erysipelas *œdematodes*";—being œdematous. Now and then, the irritation of the cellular membrane under the skin, is much more severe than to secrete mere serum. It is so severe as to secrete pus; and then it is called "erysipelas *phlegmonodes*";—it being the character of phlegmon to secrete pus. When this occurs,—when the cellular membrane underneath the skin becomes affected, as well as the skin itself, to a great degree,—there is extreme pain, extreme tension, extreme hardness. The limb feels as though it would burst; the patient is skin-bound; and the general symptoms, throughout the body, are excessively severe. Suppuration sometimes occurs only here and there; but sometimes it is very extensive. It is by no means uncommon, in partial phlegmonous erysipelas of the face, to see the affection suppurate in particular spots; as, for instance, at the orbit. The cellular membrane under the eyelids, is disposed to run into suppuration; when there is no suppuration in any other part of the face. But, besides this local "erysipelas *phlegmonodes*", a whole extremity will sometimes fall into this particular state.

Erysipelas Gangrœnosum.—The disease is very much disposed, in many cases, to produce mortification. Parts of the skin will often slough; the vesicles will become dark; and the fluid which is within them become bloody. But, besides that, the disease will frequently produce sloughing deeper in; and death will take place, to all appearance, from the gangrene. When this is the case, it is called "erysipelas *gangrœnosum*." Infants are very liable to this gangrenous erysipelas. New-born infants will frequently have it about the umbilicus and the genitals. I have seen this occur without any vesication. Round the umbilicus or the pudendum, in young children and infants, the parts will become very red, hot, and hard; the red will become dingy; and then gangrene take place, and the parts become perfectly black. In adults, this occurs very frequently in the extremities; but in the case of children, it is about the genitals and the umbilicus that it usually takes place.

We see, therefore, that this disease, (like continued fever, or any common inflammation, or like scarlatina,) runs from mere active inflammation with strength, on the one hand, down to the most perfect prostration of strength, and the most violent tendency to mortification, on the other. It is pretty evident, therefore, that no one mode of treatment can be adopted.

Not confined to the Surface.—Erysipelas is by no means confined to the surface of the body. We continually see the throat affected. If the inner

part of the throat and mouth are the seat of the disease, the throat and tongue are red; the patient complains of the mouth being exceedingly hot; perhaps there is a short cough, and difficulty of swallowing. In fact, there is a sore-throat. Very frequently, too, it will run down the membrane lining the tubes; so that there is a very severe cough, and a difficulty of breathing. We have more or less bronchitis; and sometimes there is really *severe* bronchitis; but, for the most part, it is only a *superficial* sort of inflammation;—erysipelas of the mucous membrane; and will go away without the adoption of any strong measures.

Complications.—Very frequently, besides the sympathetic effect occurring at the beginning of the disease, there is great tenderness of the epigastrium;—the patient complaining of intense heat there; and sometimes the same is felt all over the abdomen, as if the inner surface of the intestines were in a state of erysipelas; and then diarrhœa occurs. I have seen the disease spread down the air-passages, and then down the alimentary canal. But, besides this spreading from the skin through the ramifications of the trachea and bronchia, and through the pharynx [a] and œsophagus [b] to the stomach, and down to the intestines, we continually see the membranes of the brain affected, when the head and scalp are the seat of the disease. When the disease affects the inside of the head, (which it is much disposed to do, after it has attacked the face, neck, and scalp,) the danger arises from inflammation of the membranes of the brain; so that, as the disease advances, we have extreme drowsiness. The patient complains of internal pain of the head; delirium comes on; and, at last, there is more or less of an apoplectic state.

When the patient dies with symptoms of inflammation within the head (such as drowsiness, delirium, &c.), I have always found, within the skull, certainly not inflammation, but the *effects* of inflammation;—effusion. I have always seen an effusion of serum upon the brain, or in the ventricles, or in both situations; and sometimes great turgescence of the vessels.

Erysipelas of the Face.—When the face is affected, the eyes are closed and the features lost;—from the general swelling and effusion into the cellular membrane. The person becomes, in his appearance, as ill-looking a fellow as can be conceived. His nose is bottled, and is buried in his cheeks;—in fact, he looks as if he had been drinking hard, and had had a good drubbing. The features are set; the eyes closed; and there he lies;—not to be recognised by any one. I know this by my own case;—having myself laboured under the disease. My friends brought a looking-glass; and, on raising the upper eyelid, I took a peep at myself; but the sight was so abominable, that I begged the glass might be removed.

Causes.—The common causes of the disease, are vicissitudes of temperature, and exposure to cold;—especially when the person is heated. But it very commonly arises from some *local* cause;—mechanical injury, or any thing that irritates. It is much predisposed to by certain situations. There are certain situations, in which erysipelas is very common. There are hospitals, it is said, where erysipelas is more common than in others. It certainly appears to be dependent, in some measure, upon the season. At particular periods, in several hospitals in the same town, where there had been no erysipelas, the affection, will, all at once, become very common. These circumstances may be so strong that, without any local irritation, patients will be seized with erysipelas; and the slightest local injury will

[a] From φιρω, *to carry*; because it conveys the food into the gullet.

[b] From σιω, *to carry*; and φαγω, *to eat*; because it conveys the food into the stomach.

sometimes cause it. Erysipelas, in these particular seasons, or in these neighbourhoods, may be followed by the most violent inflammation. Persons of bad constitution are also very liable to it. Those who have been in the habit of drinking spirits, or have ruined their constitution in any other way, are very likely, from the least injury (even from leech-bites), to fall into this disease.

Is Erysipelas Contagious?—It is said, by some, that erysipelas is occasionally contagious. Dr. Wells (as I mentioned formerly [a]), published a number of cases to prove it contagious.[b] It does appear that, in the cases he mentioned, it was contagious. The instances were numerous; and they were cases of persons who went to visit others who had erysipelas; and then went back, and gave it to others in their own houses. I cannot exactly say that I have seen it contagious. In hospitals, I (in common, I suppose, with every other practitioner in similar circumstances) have seen patient after patient, in a ward, become affected; but whether it arose from local circumstances, or from emanations spreading from one individual to another, I cannot tell. I recollect once having had it, five days after stooping down over a patient, who had the disease in so violent a form that he died of it. I was looking into the state of his skin; and his breath came into my face. I turned away with a feeling of disgust; and said,—"I hope I have not caught it"; but, five days afterwards, having forgotten the circumstance, I was seized with erysipelas. I felt chilly, and my head was sore; and I had the disease violently. This was in the winter, when a person is liable to catch cold; and therefore I am not sure that I caught the disease from contagion; though, so far as I am aware, I never take cold. I have seen instances where the affection might have been contagious; but I am not sure that such was the case.

Treatment.—The treatment of the disease must be totally different in different cases. In the country, and in young, strong, healthy subjects even in town, there can be no doubt of the propriety of taking away blood from the arm. I have often bled patients, and was repeatedly bled myself; and with the best effects. On the other hand, if a patient have a shattered constitution, either in consequence of being half-starved, or of intemperance, or any thing else, then we must employ bleeding with great caution. But still, in the greater number of cases, antiphlogistics are the proper remedies; though perhaps they should not be carried to a great extent. Purging, and the other parts of the antiphlogistic plan, are necessary.

Cold Applications.—I have always found cold useful; and I never saw the disease recede in consequence of it, or internal disease produced by it. I employed it in my own case. The application of cold water, either directly, or by means of rags, is very uncomfortable to the patient, after a time; and as soon as this effect is produced, it is but common sense to leave off the application of cold. If fresh air can be obtained, it should be had recourse to in this, as in most other diseases.

Local Bleeding.—Frequently *local* bleeding will answer every purpose; but I should never shrink from *general* bleeding, if it appeared desirable. There is nothing to fear from it. With regard to local bleeding, we may employ it by means of leeches *around* the part; or we may put them *on* the part itself. There is no harm in adopting the latter plan. I was not aware of this at one period; but I have tried it; and now I know it by

[a] See Page 145.

[b] In the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge"; Volume 2; Page 213.

experience. Some think it is more eligible to take away the blood by means of needles, or the point of the lancet; because then there is not that irritation, which is occasioned by the bite of a leech. I have never seen harm result from leech-bites, when they were applied around the inflamed part, or to the part itself; but it is said there *never* is any danger, if we withdraw the blood by means of acupuncture. There is a vast collection of blood in the erysipelatous part; and, by puncture, we may frequently unload it to a great amount.

Nitrate of Silver.—We may put a stop to the progress of the disease, by the application of the nitrate of silver. I have done so very frequently. If we rub the nitrate of silver on the healthy part around the disease, or make a strong solution and apply it all round with a brush, we may generally prevent its farther progress. Some persons recommend blisters; but the nitrate of silver answers much better. I have stopped the disease, over and over again, by this means; and I should feel it right to have recourse to it, in every severe case. We are indebted for a knowledge of its use to Mr. Higginbottom, of Nottingham; who has written a work to shew the good effects of this remedy, not only *around* the part, in this way; but applied to the inflamed part itself.[a] It is necessary, however, that the application should be continuous; for if we allow a small place at which the disease can creep out, it will be sure to do so. I have seen cases where a portion was left unguarded; and I have seen the affection creep through there, and spread along the part. It is very important to stop the progress of the disease, if it be near the head; because if it should spread over the head, or even half over it, it is ten chances to one that we have delirium, and inflammation of the membranes of the brain; and the patient will die in an apoplectic state.

Incisions.—If there be much tension in the part, there is no impropriety in doing something more than merely emptying it by leeches. Indeed, it is very important to make an incision in it, by means of a lancet; and the tension will then sometimes cease immediately. It is in "erysipelas *phlegmonodes*" that this is particularly required. Generally, if we take away blood, purge, starve, and apply cold, the disease will give way; but if there be this extreme tension, and we make an incision, the wound immediately stretches;—just as it would if we had made a cut in a shoulder of mutton. The practice is now, I suppose, well established. Some surgeons make the incision a foot long; but others make half a dozen incisions, each an inch in length;—some doing it all at once; and others, as Mr. Lawrence once waggishly said, "by instalments." That, however, is a matter of surgical choice. But there can be no question, I think, as to the advantage of making incisions, for the purpose of letting out blood or pus; or (before pus is formed) merely to take off the tension, by allowing the blood to ooze from the part.

Treatment of Mortification.—In case mortification is threatened or occurs, we have to consider whether it depends upon the violence of the inflammation. If the inflammation be violent, we must not, because there is mortification, give wine, bark, and opium; but must strive to subdue the inflammation by antiphlogistic means. Again: if we see or fear a sinking of the constitution, even if there be no mortification, then wine, porter, opium, bark, and good food must be given;—just as would be the practice in any common case of inflammation.

[a] "An Essay on the Use of the Nitrate of Silver in the cure of Inflammation, Wounds, and Ulcers. By J. Higginbottom." Second Edition.

In doubtful cases, when we hesitate whether to bleed and put the antiphlogistic plan into force, or to stimulate and support, the best plan is to apply cold effectually; to unload the part by leeches or punctures; and to give beef-tea, milk, and quinina. I have never seen quinina do harm, even in active tonic erysipelas; and, in doubtful cases, I believe it always a safe and eligible medicine. In other cases of inflammation, I have thought that the time was arrived for this species of treatment, when it was not; and have been obliged to desist; but, in erysipelas, such a circumstance very seldom occurs. Dr. Heberden gave it as his opinion, that bark would not do harm in inflammation; and in a great many cases that opinion is true; but as to quinina, I have given it over and over again in inflammation, for some other reason (for example, in ague), and have not seen the inflammation increased by it; but in these cases I have always treated the inflammation, at the same time, by proper measures. Hence, in erysipelas, if we feel disposed, we may always give quinina, unless there should be vomiting; and even then, where the vomiting was not inflammatory, I have given it; and it has put a stop to the vomiting. Therefore, though this is a disease that is to be treated by decided antiphlogistic measures, yet it permits the exhibition of wine, bark, and porter; and though we adopt antiphlogistic measures, yet it does not bear those vacuations, which other inflammatory diseases do. It sooner requires supporting measures, and a larger number of cases require support, than perhaps in any other inflammation.

Bark.—Some old practitioners imagine (from having learned it in their youth) that bark is a specific for this disease; and in every case of erysipelas they give, or (as they call it) "throw in", the bark. It was at St. Thomas's Hospital that this practice was first established. Dr. Fordyce gave bark in erysipelas, with very great success; and his colleagues and successors, down to within a very few years, all adopted the same practice, and extolled it highly. But I never fell into the practice of giving bark universally, without regard to the state of the patient. Very often there is tenderness of the epigastrium; very often there is vomiting; very often there is a robust constitution and a strong pulse;—in short, a decidedly inflammatory state; and I could not, in my conscience, think of treating the case with bark. No doubt bark might be given, in many inflammatory diseases, without doing any harm, except so far as it prevented us from doing good; but there are many cases where antiphlogistic measures are decidedly required; and I could not bring myself to omit them. There are many gentlemen now in practice, who were educated under Dr. Fordyce,—the principal medical lecturer in London at that time; and they regularly give bark in this disease. I have no doubt that a number of their patients get well; because many cases are assisted by the bark; and many cases will get well of themselves, if we do not adopt any measures which do serious harm.

There is certainly a great peculiarity in erysipelas. Many cases do well, with little or no treatment;—without those evacuations that other inflammatory diseases require. I have seen cases neglected, which, had they been pleuritis or enteritis, would have proved fatal without vigorous antiphlogistic treatment; but which, notwithstanding they were neglected, did exceedingly well. Erysipelas is considered a specific inflammation;—not contagious, like small-pox; not limited in its occurrence to once during life; but still altogether of a peculiar nature. It will bear stimulants, and bark, and nourishment, in a way that other inflammations will not; nor will these things do the same degree of harm, that would ensue from their exhibition

in other inflammatory complaints. We may omit antiphlogistic measures, to an extent that we dare not in other cases; and it will require on the whole (however violent the inflammation) much more moderate evacuations, and will bear great evacuations less easily than other inflammations.

Local Applications.—Respecting local applications, I have found cold answer better than heat. Some practitioners sprinkle starch and other powders over the skin; and I do not know that it does any harm; provided the powder be of the lightest possible description,—so as not to lie heavy on the part. If there be vesication, it certainly is a good plan to sprinkle a little powder, for the purpose of absorbing any discharge that may have oozed out.[a] The oxide of zinc, or calamine-powder, either the one or the other, is as good an application as can be employed; but this should not prevent the application of cold water; which may still be done by means of cloths.

[a] The late Dr. Fletcher, of Edinburgh, used to relate that, in an attack of erysipelas under which he suffered, he derived the greatest comfort from the application of blotting-paper, to absorb the discharge.

CHAPTER III.

SQUAMÆ.

I NOW proceed to consider those inflammations which, although they are attended by no secretion under the skin, still cause such a disease of the cuticle, that a scale is produced. After those inflammations of which I have already spoken,—lichen [a], strophulus [b], measles [c], &c.,—there is, for the most part, a degree of scurfy exfoliation. The cuticle is separated, more or less; either in fine grains (so as to form a scurf), or in large portions. But the diseases we are about to consider, produce something more than a separation of the cuticle. The latter becomes somewhat diseased; and lies in plates upon the inflamed spot. That is the only difference. These thickened portions of cuticle are called "scales." Dr. Willan's definition of a "scale" is,—"a lamina of morbid cuticle; hard, thickened, whitish, and opaque." [d] A "*scurf*" is only a little exfoliation of cuticle [e];—the cutis not becoming diseased; but if the cuticle be not merely separated, but become "hard, thickened, whitish, and opaque", then it is called "a *scale*." Still, however, there is no ulceration. There is neither pus, nor serum, nor any other fluid effused under the cuticle; but the cuticle is separated; and not only separated, as in common inflammation, but thickened and diseased. In this order of diseases, there are three genera [f]; and they are of common occurrence. None of them are contagious. They may occur twenty times during life; and are all disposed to become chronic.

SECTION I.—PITYRIASIS.

Pityriasis Capitis.—I shall describe pityriasis first; because the scales are exceedingly thin, and the affection altogether very superficial. When it occurs in the head of children, it is called "pityriasis *capitis*";—"dandriff of the head." When a child's head has this disease, a fine powder falls off in all directions;—in fact, it is called "*pityriasis*" from its resemblance to *bran* (πιτυρον). It is a very common disease of children. Now and then the inflammation under these scales is considerable; and then it is called "pityriasis *rubra*." It is only worth while to remember that, according to

[a] See Page 390.
[b] See Page 388.
[c] See Page 405.
[d] "Description and Treatment of Cutaneous Diseases. By Robert Willan, M.D." Definition 2. (Page 12 of the First Edition.)
[e] "Scurf" (*furfura*); small exfoliations of the cuticle, which take place after some eruptions on the skin.—*Dr. Willan's "Description and Treatment of Cutaneous Diseases." Definition* 1. (*Page* 12 *of the First Edition.*)
[f] Dr. Willan has four:—1. Lepra. 2. Psoriasis. 3. Pityriasis. 4. Icthyosis. (See his "Description and Treatment of Cutaneous Diseases"; Order 2.) Dr. Elliotson places Icthyosis elsewhere.

the degree of inflammation of the skin underneath the scale, the part is either rather pale or pretty red.[a]

Treatment.—This is a disease which lasts only for a time in children. For the most part, it gets well; and, I dare say, sometimes spontaneously. It is best treated as inflammation;—having the parts pretty well moistened, twice a day; keeping them exceedingly clean; and depriving the child of stimulants. Small doses of Hydrargyrum cum Cretâ, I believe, are the best internal means that can be used; the best, at least, that I have found. It is said, by Bateman, to be removed by antimonials, with the decoction of woods[b]; but I have no faith in these; and I know, that the plan I have stated, answers better than any thing else. You may keep the parts soft by Unguentum Zinci, which is one of the best ointments: but it is well to know that, in diseases of the skin, ointment (however mild) may produce irritation. It is well to remember this; because we might imagine, that it was only something *stimulating* in the ointment that was injurious; and that a *milder* ointment would answer better; whereas it is the ointment *itself* which produces the mischief. I have seen the disease kept up entirely by the application of grease; and when the patients have exchanged it for calamine-powder, and kept the parts moist by rags laid on them, they have improved almost immediately.

Pytiriasis Versicolor.—Pityriasis is said to occur frequently in another form; but I am not sure that it is really the same disease. It occurs in young women, particularly about the breasts; and sometimes there are yellow patches of it on the neck. This disease is called by Willan[c] "pityriasis *versicolor*";—"*variegated* pityriasis"; but Rayer does not place it under "pityriasis." Now and then there is a little redness, a little heat, and a little scurf. I do not believe that this variegated pityriasis is under the influence of internal medicine. At least, I have tried a great many prescriptions without any effect. We may destroy it by the local application of acids. This remedy is painful; but we may apply it to a portion of the affected part first; and if that be cured, and the patient has no objection, we may go over all the rest. It is a complaint not attended by derangement of the constitution;—any more than the "scurf" of children. The causes of these affections, so far as I am aware, are not known. It may, now and then, arise in children from weakness; and it may be right to give tonics;—some preparation of iron or quinina; and good nourishment; but, for the most part, I believe the treatment I have mentioned (Hydrargyrum cum Cretâ, and mild diet) answers very well.

SECTION II.—LEPRA.

The two other diseases in this class occur every day. They are diseases to which a great number of young men and women are particularly subject; and I think they are more common in the latter, than in the former. These two affections are very similar to each other; they run into each other; and, indeed, I think they might be considered as the same disease in different forms.

The first of these is called "lepra."[d] "Lepra" does not signify "*leprosy*"; according to the meaning attached to the ancient term. It is a different affection. It is by no means a loathsome disease;—consisting

[a] See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 2; Genus 3; Varieties 1 and 2; Plate 17.

[b] "Decoctum Sarzæ Compositum."

[c] Order 2; Genus 3; Variety 3.

[d] From λεπρος, *scabby*.

merely of red spots or patches on the skin, covered with scales. For the most part it does not affect the health, except so far as it may sometimes be connected with an inflammatory state; otherwise it is merely disfiguring and inconvenient.

Distinctive Characters.—In the disease denominated "lepra", to distinguish it from "psoriasis" [a], the patches are circular, the margin is red, and elevated a little above the skin. The cuticle is sometimes very much thickened; and sometimes very white and silvery. The disease first appears in dots, varying in size from that of a pin's head, to that of a pea; and these dots become confluent, and form patches. It is about the outer part of the elbow, and below the knee, that these are most conspicuous. We see it also about the occiput, and behind the ears; and it will affect, more or less, the face and the whole of the scalp. The character of the disease is shewn more in one part, than in another; and it is a good general rule, when investigating cutaneous diseases, not to be satisfied with looking at one part of the body; for the disease may be *badly* characterized at one part, and extremely *well* characterized at another. It is best, in looking at cutaneous diseases, to examine the whole body; and, in doing so, we shall come to one part where the disease is so characteristic, that we may name it without any difficulty. The patches, in lepra, are sometimes as large as a crown-piece; and the disease much more frequently affects the extremities than the trunk; but we see it also very much about the head.

Varieties.—The most common form of the disease, is that which is called "lepra *vulgaris.*" In this form the eruption usually assumes a circular form; the large patches, which are made up of an aggregation of small ones, being still more or less circular, and having around them a red margin, which is elevated. When they heal, they generally do so from the centre. This is the most common form. But I mentioned [b], that now and then, the scales are very silvery. They are really as silvery as the scales of a fish; and then the disease is called "lepra *alphoides.*" [c] Now and then the scales are a little dark; and then it is termed "lepra *nigricans.*" In other words, it is sometimes very white; and sometimes black. That will do as well as remembering "*vulgaris*", "*alphoides*", and "*nigricans.*" [d] It is a great mercy that we have no other names given for the intermediate shades.

Period of Life at which it Occurs.—I do not think I ever saw this disease in an infant, or in a child. We seldom see the disease in patients under ten or eleven years of age; and even then it is not so frequent as in the first stage of adult life. From about seventeen or eighteen, up to thirty, the disease occurs more frequently than at any other period. Why this is I cannot tell.

Causes and Duration.—As to the cause, it is very common to discover none; but now and then it may be traced to a person having drunk cold water, or some other cold fluid, when overheated. This is a common cause of lepra, and a variety of diseases of the skin which are not contagious. It is a disease which will last a very considerable time;—perhaps two or three years; though sometimes it will go off in a few months. It is an affection which will recur; and now and then there is very great tingling, and very great heat of the skin.

[a] See Page 435.
[b] See the previous Paragraph.
[c] From ἀλφος, *white.*
[d] For these three different forms of the disease, see Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 2; Genus 1; Species 1, 2, and 3; Plates 8 and 9.

Contagious?—I stated[a] that these diseases are not contagious; and that is allowed to be the case; but, two or three times, I have met with the disease contracted, apparently, from communication with another person labouring under it. It has happened to me (I am quite sure *twice*, if not *three* times) to see persons have lepra after sleeping with others affected with the complaint, or using their towel. These instances occurred in St. Thomas's Hospital. It might have been chance; but it so happened that a person had lepra, about a week or a fortnight after employing a towel which had been used by a patient affected with that disease; and, in another case, a young woman slept with a female who laboured under it; and she had patches as large as a half-crown. I cannot venture, therefore, to say that the disease is not contagious.

Internal Symptoms.—I always make it a rule to inquire in this, as in other chronic diseases of the skin, whether there are not some internal symptoms; and, in a large majority of cases, the patient complains of drowsiness, heat and pain of the head, and giddiness; and if we take away blood, we find it buffed, and perhaps cupped. This is an every-day occurrence; but it is by no means dwelt upon by Willan and Bateman as it should be. In fact, they were only forerunners to better writers on the subject. They were occupied, as historians, in pointing out diseases; rather than pointing out the pathology, or the rational mode of treatment. But if we make inquiry in cases of lepra, as well as of other diseases of the skin, we find the head affected at first, and frequently throughout the course of the disease. There are cases where nothing wrong can be discovered about the head; but even there we find the irritation and tingling very much relieved by bleeding.

Treatment.—In the treatment of this disease, it is improper to begin with any empirical medicine, till we have ascertained whether there is a sufficiently inflammatory state of the skin, to justify the adoption of antiphlogistic measures. Many cases will be cured by putting persons on low diet, and bleeding them from time to time. I do not know that mercury is of any use. Lepra, however, is often a venereal affection; and so likewise is lichen; and, in such cases, we fail in doing good, unless we exhibit mercury. But when the disease is of a syphilitic character, the redness is of a coppery hue, and the spots are hard;—in consequence of the disease approaching to a tubercular state. When these appearances are seen, it is better, whatever may be the assertions of the patient, to give mercury; for, on this subject, patients will tell all sorts of untruths, without the least hesitation. The hardness of the parts, and the copper-hue, are sufficient to make us suspect that the lichen[b], lepra, or psoriasis, is of a syphilitic nature. But when there is no decidedly inflammatory state, sufficient to make us bleed the patient, or if we have already used antiphlogistic measures to reduce the inflammatory state, then other remedies may be employed; but of the mode of their operation I am ignorant.

Dulcamara and Arsenic.—There are some of these remedies which doubtless, deserve all the character that has been given them; and one of these is dulcamara. I have seen so many cases give way, under the persevering use of this medicine, that I have no doubt it is a remedy for the disease. A pint of the decoction may be given in the course of twenty four hours; beginning with two ounces, three times a day, and then gradually increasing the dose. Arsenic, also, has very great power over the

[a] See Page 431. [b] See Page 390.

affection. I have seen many cases yield decidedly, when a person took arsenic. I think that these two are, by far, the most useful remedies in the disease.

Pitch.—Some mention pitch as being serviceable; but I do not know that it has any particular power over the affection. If it has, I have not observed it; though I have made a patient swallow an ounce or two in a day. It is, however, perfectly harmless.

Warm-Bath.—The warm-bath is very useful; but if there be much irritation of the skin, the heat is unpleasant; and then I have not persevered with it. If the warm-bath be used, it should be in a decided manner. The vapour-bath is likely, on the whole, to be more beneficial than the warm-bath; but if either of them be used, it should be every day, or twice a day. There is nothing weakening in it, if patients do not keep themselves warm afterwards. The warm-bath is seldom used to the extent that is required.

Local Applications.—With respect to local applications, many persons wash the surface with a decoction of dulcamara; but we often find that the tar-ointment is very useful. If, however, there be much irritation, it is not proper; and zinc-ointment is better. Tar-ointment is certainly one of the best applications that I am acquainted with, in this disease;—provided it is not of a syphilitic character; and that we have employed antiphlogistic measures, as long as the blood was buffy and cupped, or the patient's pulse justified it. Dulcamara, or arsenic, should be united with it, as an internal medicine.

SECTION III.—PSORIASIS.

Characters.—The other squamous disease is called "psoriasis."[a] It bears a great affinity to lepra; and even runs into it. The difference between the two is, that in psoriasis the patches or spots are not circular, but more or less oblong; the margin is not raised; and it more frequently heals from the margin, than at the centre. In this disease the skin is very apt to crack: there are fissures in the skin, called "rhagades"[b]; and there is, for the most part, much more inflammation than in lepra. It is easy, in a great number of cases, to distinguish between these affections. In lepra the patches are circular, the margin is elevated, and there are no cracks; whereas, in decided psoriasis, the spots are oblong, the margin is not elevated, and there are fissures or cracks. But in intermediate cases, it is almost impossible to state, positively, whether it is lepra or psoriasis. They certainly run into each other. There is, very frequently, great irritation in this form of the disease. It tingles and smarts severely. We have only, then, to discover whether the disease is attended by scales; and if it be, it is one of the three species to which I have now adverted. If it be "pityriasis", the scales are very minute, coming as near to scurf as possible. If the scales be thick, the patches *circular*, the margin elevated, and there be *no* cracks, it is "lepra." If, however, the patches assume an *oblong* form, and there *be* cracks, it is "psoriasis."

In one form, there is little inflammation, which occurs in dots; it is called "psoriasis *guttata*." If it occur in patches, it is called "psoriasis *diffusa*." If any cause of irritation be applied to the skin, this may be aggravated. In washerwomen, for instance, the soap may produce this effect. Now and then it takes place, very locally, in the palms of the hands, or the soles of the feet; but chiefly in the palms of the

[a] From ψωρα, *a scab.* [b] From ρηγνυμι, *to break.*

hands; and it is then called "psoriasis *palmaria*." The patches are oblong, and the margins not raised; and there are rhagades and fissures, which are so common that we rarely see the disease without them. The more severe the inflammation, the greater is the disposition to crack. Now and then this disease appears in a form like that of worms; and then it is called "psoriasis *gyrata*."[a] I never saw this form of the complaint.[b]

Psoriasis Inveterata.—There is one form of the disease which might be considered a pustular affection; namely, "psoriasis *inveterata*." Psoriasis sometimes lasts a great length of time;—in fact, till the whole body is covered with scales; so that scarcely an inch is free from it. The disease being very severe, those cracks which are peculiar to it, or characteristic of it, become very large; and produce a degree of oozing. The irritation of the skin is sometimes so great, that it not merely produces a diseased cuticle, but perhaps an oozing of fluid under the cuticle; so that psoriasis runs into lepra, on the one hand, and into those diseases which are characterized by a morbid secretion, on the other. Still the cracks and the occurrence of a scaly cuticle, shew it to be a scaly disease. But we must look at these things as pathologists, and not as natural historians.

Treatment.—In psoriasis, we shall find antiphlogistic measures, particularly bleeding, of the greatest use. Many cases will be cured by moderate bleeding and low diet. I do not know that dulcamara is of the same use in this form of the disease, as in lepra[c]; but I have seen many cases cured by sulphuric acid, and by various other acids, perseveringly given. It is singular how large a quantity of the acids may be given. One would imagine that, being chemical substances, the quantity could not be increased to a great amount. It is commonly remarked how we may increase the dose of narcotics; but we know that the susceptibility of the body to any sedative agent, becomes less and less, the more frequently it is employed; yet we should not suppose that it would resist chemical agents. We may, however, increase the dose of sulphuric acid, properly diluted, to a great extent; and I have frequently done so in psoriasis with the best effect. But what I am anxious to point out is, the importance of antiphlogistic treatment, in all cases of this description, where it is needed; and to insist on the necessity of looking out for inflammation.

When the skin cracks, we sometimes find greasy applications of great use, in softening the affected part; but, in a large number of cases, they cannot be borne. It is of great use, in the treatment of psoriasis, to prevent the patient from taking stimulants; for the disease is often kept up by stimulants taken as articles of diet. It is in vain to give acids, to bleed from time to time, or to give specific remedies (such as arsenic or dulcamara), unless the patient will submit to proper diet. If patients will take so many glasses of wine a day, they must expect the disease to be so much the worse. Alkalies, as well as acids, are said (and, I have no doubt, with truth) to be useful in this disease. The treatment of the disease, so far as the parts are concerned, is empirical. I have no idea how arsenic, and the other remedies mentioned, can act; but the treatment by bleeding (local and general), by low diet, and by the use of the warm-bath, is very rational.

[a] From γυρος, *curved*.

[b] For these different species of the affection, see Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Order 2; Genus 2; Plates 11 to 16. In common language, the disease is called "dry or scaly tetter."

[c] See Page 434.

CHAPTER IV.

VESICULÆ.

We now enter upon the consideration of those inflammatory diseases of the skin, which are characterized by the secretion of fluid under the cuticle. I shall begin with the description of those which are characterized by the secretion of a thin *watery* fluid; and, among these, of such as exhibit very *minute* collections. These diseases are termed "vesiculæ." If the liquid be not water, but *pus*, the diseases are called "pustulæ"; if the secretion be water, and the collections are *large*, the affections are called "bullæ." "Vesiculæ" and "bullæ" merely differ in point of size. The contents of a vesicle, therefore, are serous. They are also called "limpid"; but "*limpid*" is an indefinite word; and it is therefore better to say "serous."

Definition.—A vesicle[a] is defined, by Dr. Willan[b], to be "a small orbicular elevation of the cuticle; containing *lymph* [we had better say—"serum"]; sometimes clear, transparent, and colourless; but often opaque, whitish, or coloured." The serum may be quite clear, or it may be rather opaque, or purple; and such an eruption as this may be succeeded, either by scurf, or by a scab. If the fluid be absorbed, and the cuticle which is detached rub off by degrees in minute portions, it is called "scurf"; if, on the other hand, the fluid be not absorbed, but the cuticle is ruptured, a "*scab*" is formed by the drying of the fluid, as it exudes. A scab may be formed either by serum, or by pus; therefore we may have a scab in vesicular diseases. A scab is defined, by Dr. Willan[c], to be "a hard substance, covering superficial ulcerations, and formed by a concretion of the fluid discharged from them."

SECTION I.—MILIARIA.

Characters.—The first disease among those which are characterized by a minute collection of watery secretion, and of which I shall speak as having the most minute vesicles, is the "miliary eruption"; called, in Latin, "miliaria." In this disease the vesicles are exceedingly numerous, and exceedingly minute,—about the size of millet-seeds (whence their name[d]). There is a slight inflammation of the skin, and a slight rash;—sometimes a little more; and then the disease is called "*red* miliary eruption." If there be scarcely any, or what there is disappears, and there be only white vesicles, then it is called "*white* miliary eruption." Some imagine, that the red variety is neither more nor less than scarlet-fever. Formerly the diagnosis was so imperfect, that many cases of *miliary* fever, were called *scarlet*-fever. However, if there is much inflammation, the

[a] The diminutive of "vesica", *a bladder*.

[b] See his "Description and Treatment of Cutaneous Diseases"; Definition 3; Plate 1; Figure 10.

[c] Definition 3; Plate 1; Figure 4.

[d] From "milium", *millet*.

skin will be red; if not, it will look white, from the number of these little vesicles. These miliary eruptions are, very frequently, nothing more than attendants upon other diseases. They will come on at an uncertain period of various cutaneous diseases. In measles [a], and in scarlet-fever [b], we continually see a little miliary eruption. I have frequently seen it on the hands, in the case of acute rheumatism. This eruption is most abundant on the breast, neck, and back; on the face and extremities it is less copious; and it will appear and disappear in uncertain order.

It is a thing of common occurrence; and the disease is easily recognised, in consequence of the extreme minuteness of the vesicles.

Progress of the Disease.—If the eruption be very copious, it is preceded by an unusual degree of languor and faintness, and a profuse perspiration; which perhaps accompanies it during the whole of its course; and which has a sour odour, or smells like rotten straw. There is sometimes a sense of heat, pricking, and tingling in the skin, before the eruption comes out; and even during its continuance. The vesicles at first are exceedingly small, and filled with transparent lymph; but, in about thirty hours, the lymph will become more or less opaque and milky. The tongue may be affected. It may be dark and red at the edges: and the papillæ [c] may be elongated. There may be aphthæ of the mouth and fauces. The duration of the disease is very uncertain. It is said to last from seven to ten days, or longer; but crop after crop may come out, and protract the case for six or seven weeks.

Causes.—This disease is supposed, by Bateman, to be nothing more than the effect of bad treatment. It was very common formerly, when lying-in-women were kept in a heated room; when a number of blankets were placed upon them, thick curtains were drawn around the bed, and a fire was kept blazing in the apartment. Under all this it would have been strange if they had not sweated, and had a miliary eruption of the skin. It is supposed that there never was a specific disease of this kind; but that it was the result of over-excitement of the body, when there was more or less feverishness. There can be no doubt, I think, that there *is* such a specific disease as "miliary *fever*"; besides the "miliary *eruption*", which may be produced by improperly stimulating a person by heat. Formerly in this country, at different times, there was a disease called "sweating sickness", which was characterized by these very symptoms; and this disease now prevails, from time to time, in some parts of France; as in Languedoc, and Normandy. The disease has frequently prevailed in those places;—not sporadically, but as an epidemic. These are moist places; and the disease is there thought to be (as old writers in this country declare it was) contagious. The fluid from a vesicle has been inoculated without success; but, in the places I have mentioned, people declare there is no doubt of its being contagious. It affects adults, and particularly women. It is said to prevail only between forty-three and fifty-nine degrees, north latitude.

Progress of Epidemic Miliaria.—When it comes on in the epidemic form, it may (like most other diseases) be either mild or severe; so that it is divided into "benign" and "malignant." The "miliaria *benigna*" is preceded by lassitude; frequently by pain over the eyes, and loss of appetite; but sometimes persons go to bed well, and wake in a profuse sweat. Very soon vesicles appear; and they sweat on till they die, or the symptoms cease. Now and then, before the eruption comes on, they complain (as people do in this country) of a sense of heat along the skin; and the

[a] See Page 407. [b] See Page 413. [c] From "pappus", *down*.

sweatings are so profuse, that the patient is actually steaming. In the *violent* form of the disease, all the symptoms are intense; but the stomach is found to be particularly affected. What is called "gastro-enteritis" (an inflammation of the mucous membrane of the stomach and intestines) takes place; the sweats are very fœtid, and the patient smells exactly like rotten straw. The eruption generally comes out on the second or third day; and continues from two or three days, to two or three weeks. There may be merely scurf afterwards; the contents of the vesicles being absorbed. Or there may be an oozing from the vesication; and extensive desquamation may ensue. There may be violent headach, with giddiness and delirium. Such is the disease as it prevails in many parts of France. Several persons, in Paris, deny that there is any such disease;—exactly as other people will sometimes deny the existence of things, which they do not happen to see themselves.

Treatment.—The treatment of this disease, when it occurs (as *we* see it) from the effect of hot regimen, or a violent inflammatory complaint, consists simply in keeping the patient cool; and the whole will then subside. But *abroad*, when the disease prevails epidemically,—when they have what is called "the sweating sickness", then it is frequently necessary to take away blood, to give a patient fresh air, and (I should think) to sponge him well. It is also necessary to pay attention to the inflammatory state of the stomach and intestines; and to take especial care not to give any thing that will irritate those parts;—to give neither emetics nor purgatives. I should presume that other cases might occur, in which it was necessary to support the patient well.

SECTION II.—HERPES.

Characters.—The next disease of this description, is one of very common occurrence; but, as far as I know, is without any danger whatever. It is called "herpes."[a] It is a vesicular disease, characterized by a great degree of inflammation at the base of the vesicles. It may be distinguished from some other vesicular diseases, by the great degree of inflammation with which it is attended. It is a disease on which we are continually consulted. Patients are very much frightened, and fancy they have some terrible disease coming; but we may easily quiet their fears. For the most part, very little treatment is required.

Progress of the Disease.—In most of its forms, it is an acute affection. It begins, perhaps, with general feverishness; and a great degree of smarting and tingling of the skin. The skin looks red, and clusters of vesicles then appear. It generally lasts from eight or ten days to a fortnight. There is not a large number of vesicles diffused over different parts; but they occur in clusters, and cluster after cluster will appear. Those eruptions which appear suddenly, on the chin (for example), are of this description. At first, the contents may be clear; but they soon become opaque and yellow. The scabs often seen about the mouths of children, are nothing more than herpes. Now and then it will occur around the whole body.

Herpes Zoster, and Phlyctænodes.—The patient is seized with a violent pricking, tingling, and smarting; and then there are seen vesicles, which form a cluster. This will go on, cluster after cluster being formed, till a

[a] From ἑρπω, *to creep.*

belt is made. In common language this is called "shingles"; but in medical language it is called "herpes *zoster*."[a] Now and then, the patient is a little indisposed at first; he has a little headach, and feverishness. But, frequently, there is no previous indisposition. The disease, when it occurs in separate clusters, is called "herpes *phlyctænodes*"[b], but when it extends round the body, it is "herpes *zoster*." That is the only difference in the two forms of the disease. In that form which runs round the body, there is a high degree of redness, and the vesicles are larger than in "herpes *phlyctænodes*." It can make no difference, as to the nature of the affection, whether it occur in clusters or mere patches. There is, at first, smarting and tingling in both; and when this is all over, there is great itching.

Herpes Præputialis and Labialis.—This disease frequently appears in a very local manner; for instance, about the prepuce of the male. On the pudenda of women, also, little vesicles (which are herpes) will sometimes appear. They occur, too, about the lips and angles of the mouth; and children, from picking them, raise a scab; and thereby induce a sore, which lasts for a considerable time. If it occur on the prepuce, it is called "herpes *præputialis*"; but if it take place on the lip, it then receives the name—"herpes *labialis*." Moderate antiphlogistic treatment, purging, the application of cold water, and some moderate astringent powder (to absorb the discharge), is the best mode that can be adopted. On the prepuce, it is frequently mistaken for a venereal affection; and patients often go to medical men in a great fright.

Herpes Circinatus.—Sometimes the patches will assume a circular form, with the vesicles only on the circumference; and then it is called "herpes *circinatus*."[c] It is merely a number of vesicles spreading on the outward boundary. The great use of knowing the disease is, that we may not mistake it for a serious affection;—that we may be able to give a good prognosis.[d] The patches heal in the centre, and are commonly round; and hence it is called, by the common people, "*ring*-worm." The same treatment is applicable to this as to the preceding species; and, indeed, to every form of this disease.

Herpes Iris.—There is one curious species of the disease, where all the colours of the rainbow are present;—for which reason it is called "herpes *iris*." I have not seen it above two or three times. It occurs in circular patches; and each patch is of rather a different hue. It is generally seen on the back of the hands; and it occurred there in the cases that came under my notice. It is well described in Dr. Bateman's work. He says,—"The central vesicle is of a yellowish-white colour; the first ring surrounding it is of a dark or brownish red; the second is nearly of the same colour as the centre; and the third, which is narrower than the rest, is of a dark colour. The fourth and outer ring, or areola, does not appear until the seventh, eighth, or ninth day; and is of a light red hue, which is gradually lost in the ordinary colour of the skin. The iris has been observed only in young people; and was not connected with any constitutional disorder; nor could it be traced to any assignable cause." In fact, it is only inflammation of various hues. When speaking of inflammation in

[a] From ζωστὴρ, *a girdle.*

[b] From φλύκταινα, *a pustule.*

[c] From "circus", *a ring.*

[d] This variety of herpes, if it appear on the forehead and roots of the hair, may be mistaken for "porrigo scutulata"; but the vesicular character of the eruption, the regular course which it runs, and the hair not falling off, very readily enable us to distinguish it from the "contagious ring-worm of the scalp" (as "porrigo scutulata"[e] is called).—"*Cyclopædia of Practical Medicine*"; *Volume* 2; *Page* 422.

[e] See Page 453.

general, I said that it assumed different hues[a];—a remark which is illustrated by the appearance of this affection. It is a very *pretty* sort of disease. There is no difference in its cause from the others, and no difference in its treatment. Sometimes we can discover no cause for this affection; but it will come on after some little error in diet. There are concentric circles;—so that there may be a succession of these inflammations. Each of these forms of herpes may last a long time.

Treatment.—There is not the least danger in this disease; and the patient would do well if we gave him nothing. In that species of the affection which encircles the body, however, I believe it is a very good plan to cut the patient off from a little of his diet, and to give him a gentle dose of physic. One of the best applications to the part, is the oxide of zinc. It is well not to apply grease; for it irritates the part very much; but if we dust it with oxide of zinc, the fluid is generally absorbed, and the disease goes away. We may thus lessen the smarting, and the irritation; and lessen the duration of the disease. It would go away of its own accord; but we may mitigate it, and give considerable comfort to the patient.

SECTION III.—ECZEMA.

Characters.—The next disease to which I will direct your attention, is very much like herpes,—so far as it is a vesicular eruption; but it differs from it, in having little or no inflammation. This disease is called *eczema.*[b] The decided difference between the two affections is, that herpes has a great degree of inflammation, and eczema none. We frequently see an eruption of vesicles on the skin, without any inflammation; they are larger than miliaria; therefore they are not miliaria, but eczema; and if there be inflammation attending them, we call it "herpes." That is all the difference. This eruption is very frequently seen on the neck or hands in summer. It may last only two days, or it may last a considerable time. Any irritation of the skin may produce it. Intense solar rays may give rise to it; and stimulating acrid substances will have the same effect.

Eczema Rubrum.—The disease, however, is sometimes very severe;—extending over the whole body, and proving fatal. Perhaps we should hardly say it was the same disease; however, it is so considered by Willan. This form, called "eczema *rubrum*", is chiefly induced by mercury. Every now and then, when persons have taken mercury, they have been seized with great heat of the skin and feverishness. A number of vesicles, larger than the miliary eruption, have appeared. They have spread all over the body; the cuticle has come off; fluid has exuded; and the irritation been so great, as to make the patient quite wretched. At the same time, the mucous membrane has become affected; and there is almost always cough. This however, is not all. I have seen more or less disease of the throat; and frequently vomiting and purging;—owing to the mucous membrane, which runs from the fauces down into the abdomen, having also been affected.

Treatment.—In this severe form of the disease, which generally arises from some peculiar susceptibility of the constitution to mercury, it is necessary (of course) to leave off that medicine. It is well to give the patient the utmost supply of fresh air; to open the windows and doors; and to ventilate the room as much as possible. The smell from the discharge is

[a] See Page 68.

[b] From ἑκζειω, *to boil out.*

exceedingly disagreeable; and it is necessary to apply something to absorb it. Nothing answers better than powdered zinc or calamine.[a] The latter is exceedingly mild, and never produces irritation;—so that we may sprinkle the patient well with it. It is also necessary to support the strength; to give nutritious broths, plenty of milk, frequently porter, and even wine. There is extreme debility of body induced; and I have seen several die from it. Inflammation will come on; and a difficulty arises between supporting the strength on the one hand, and subduing the local inflammation on the other;—so that we have to give, not wine or beer, but good broths; and to trust, on the other hand, to the depleting effect of leeches. The case is one which it is very unpleasant to treat; for, after giving the patient the utmost support we can,—tranquillizing his system by opium, and anxiously doing every thing possible,—after the lapse perhaps of six weeks, he dies; and it is not to be wondered at, when we consider the extent of skin which is in a diseased condition. It is not *always* mercury which produces this disease; but by far the most *violent* form is that induced by mercury. All the cases that I have seen, arose from that source. Other cases will occur, in which mercury has nothing to do with it.

Eczema Impetiginodes.—This affection is sometimes attended by the formation of a puriform serum. The disease runs into a pustular form; and is then likely to be chronic, and may last a considerable time. The divisions of the disease, therefore, are more or less arbitrary; for here we have a species of eczema which might, with equal propriety, be called "impetigo"; and therefore it is termed "eczema *impetiginodes.*"[b] There is scarcely any inflammation, compared with the intense redness of "eczema *rubrum*"; and sometimes none at all. In this local form of the disease, occurring acutely, the only measure requisite is to give the patient a dose of physic that will do him no harm. This form of the disease is really so nearly allied to pustular diseases, that it will save confusion if I defer further mention of it till we come to impetigo.[b] Every now and then we see a patient with vesicles in one part, and pustules in another; and therefore I think it better to describe it under the head of "impetigo."[b] If we think proper, we may call it "impetigo eczematodes";—just as we have "eczema impetiginodes."

SECTION IV.—SCABIES.

Another disease which occurs more frequently in the form of vesicles than otherwise is "itch." It is spoken of by Willan and Bateman as a *pustular* disease, and it sometimes is so; but generally it is *vesicular.* Every body knows it by the watery heads; and therefore it may come under the head of "vesicles."

Parts of the Body most Liable to it.—The itch is called, in medical language, "scabies"[c]; and occurs chiefly about the wrists and ancles, the roots of the thumbs, and between the fingers and the toes; but if it be anywhere, we are almost sure to see it about the thumb. It occurs, too, on the front of the body, on the chest, and in the axilla. I do not recollect having seen it in the face. These are all curious circumstances, and the reason of them I cannot tell; but it is far more frequently seen at the roots of the thumbs than anywhere else; then at the wrist; next between the fingers, at the ancles, and between the roots of the toes; and next on

[a] From "calamus", *a reed*;—so named from its appearance.

[b] See Page 450.

[c] From "scabo", *to scratch.*

he front of the chest. The disease is attended by an incessant itching. A Scotch king[a] is alleged to have said, that no subject deserved to have it, n account of the great pleasure derived from scratching the affected parts.

Its Progress and Symptoms.—I do not know how long the disease may ast; it appears never to wear itself out. It is attended with no danger, xcept to young children. I have seen it excite such great feverishness in hem, that if they had not been cured, it is possible that derangement of he alimentary canal, or of the head, might have been induced. If the atient scratch himself, the vesicles are ruptured. They then get dirty; a ttle blood (probably) exudes; and, between the dirt drying with the uid, and a little blood oozing, we have small black heads. In children, ve may often be mistaken as to this disease; for the irritation is such, hat superficial inflammation to some extent occurs. Besides this, between nd around the vesicles there is frequently common inflammation of the kin; and it will cause desquamation of the cuticle; so that the appearnce of the disease is much disguised. In infants, too, the intense itchng makes them rub their legs against each other; and that occasions the lisease to be recognised with difficulty; but by looking at the roots of the humbs, we shall see the vesicular form of the disease, and ascertain its ature.

Its Varieties.—If the eruption be of a watery character, the disease is alled "scabies *lymphatica*"; if it be very rank,—resembling pimples, it s called "scabies *papuliformis*.". These distinctions are not very imortant. It is of importance, however, to know that the disease is someimes characterized by pustules;—large, full, flat-looking pustules; reembling any thing but the little vesicles which are seen in other cases. This is called, in common language, "*pocky* itch"; and is well known to he common people. In refined *medical* language, it is called "scabies *urulenta*." This is a species of the disease often mistaken;—from its eing so unlike the common form of the affection. It occurs between the ingers, and at the back of the hands and wrists; where may be seen large ustules, of that description called "phlyzacious", attended with an inamed base; and containing a thick yellow matter. When we have once een the disease, there is no difficulty in recognising it again. When there s great inflammation, we necessarily have suppuration induced. Even vhen the affection occurs in this severe form, it is generally found that, in ther parts of the body, the vesicles are very small. It is only where there s great irritation, that this pocky form of the disease occurs. The general rule I formerly laid down[b], is here applicable;—that by looking all ver the body, we shall see the true form of the disease, in some part or ther.

Occurring after Fever.—It is very common for itch to take place after ever. I have frequently seen this occurrence; but whether it came on pontaneously, or whether contagion had been applied before the fever ccurred, I cannot tell. The *lymphatic* form is that which generally occurs n such cases.

Causes.—Some have imagined that this disease arose from a small inect; but that is only a part of the doctrine, that all contagious diseases lepend upon animalcules. Some deny that there is any insect; some declare that they have picked an insect out, and seen it through a microcope; but others declare that they never could do so.[c] Though this is

[a] James the First of England.

[b] See Page 433.

[c] The immediate cause of the itch is now ascertained to be the presence of an insect,—the "acarus scabei";—at least, the existence of this insect is now placed beyond

not a dangerous disease, yet it is a very troublesome one; and is held in great abhorrence. If we tell parents that their child has got the itch, they hold up their hands as if it had got the plague.

It is Contagious.—This is a contagious affection. The two last diseases which I have described (eczema[a] and herpes[b]) are not contagious; but the itch is very much so. It is, however, contagious in the *limited* sense of that word;—it cannot be communicated by the atmosphere. We may go as near to a patient labouring under itch as we please, without the least fear of imbibing the affection; provided we neither touch nor handle him. But the itch is not so easily caught by contact as might be imagined. I have frequently touched people,—taken them by the hand or wrist (not knowing that they laboured under the itch), without catching it. I once caught the affection; but then I was a little boy, and obtained it from the nursery-maid. By washing my hands after touching patients, I have always escaped contracting the disease. It is only by remaining in contact for some time, by sleeping with a person affected with it, or using something that the patient has touched for some time, that there is any chance of catching it. It is more commonly caught by sleeping with a person labouring under it, than by any other means. It is common for working men who come to London, and sleep in beds where the sheets have not been changed, to catch the disease. It is very common, also, among children who sleep together. It is said that this disease is sometimes caught from brutes which have the mange.

Treatment.—I need scarcely say that the great remedy for this disease is sulphur; but why, no one can tell. I do not believe that it has any effect when given internally. When I have employed it externally, I never found the cure accelerated by its internal exhibition. It may be employed in the form of vapour; or by means of baths, or in unction. In the latter form it should be rubbed in night and morning; and if a person do that, he will soon get rid of the disease. Some employ sulphur-baths. Some have impregnated water with sulphur; and say they have cured the disease in that way rapidly, and in a more pleasant manner than by rubbing in the ointment. It is said by some, who have had great experience in the disease among the lower orders, that it is more readily cured by what is called "sulphur *vivum*", than by pure sulphur; if so, it is probably from the acrid matters which the former contains. If there be no great inflammation of the skin, the sulphur produces more effect if we add hellebore, or some stimulating substance. If the "sulphur vivum" answer better than pure sulphur, it is on account of some stimulating property.

[Scabies never tends naturally to a cure, but may last for years. The treatment consists in destroying the acarus as soon as possible. According to experiments made by M. Albin Gras, a concentrated solution of the

doubt by the recent researches of M. Renucci; which confirm the former assertions of Avenzoar, Hafenreffer, Bonomo, Cestoni, Ingrassia, Joubert, and Moufet. The acarus is to be found, not in the vesicle, (as Gale asserted, and thus misled observers,) but at the end of a small reddish furrow, sometimes straight, sometimes crooked, about two lines in length; which begins at the vesicle, and finishes with the insect. A minute subcuticular spot is often perceptible near a distinct vesicle: on raising the cuticle with a pin, a small white corpuscle, which moves when lifted with the point of the pin, becomes visible; this is the acarus. The serosity contained in the vesicles does not appear sufficient to produce the itch, whilst the acarus immediately produces the vesicles; but it yet remains to be explained, why the itch is so easily caught by only touching the hand of a person infected with it; for it is difficult to extract the insect furrowed under the cuticle.—"*Library of Medicine*"; *Volume* 1; *Page* 885.

[a] See Page 441.

[b] See Page 439.

hydriodate of potash kills this insect in the shortest time. It lives sixteen hours in vapour of burnt sulphur; three hours in water; two hours in olive-oil; one hour in the acetate of lead; one hour in pulverised brimstone; three quarters of an hour in lime-water; twenty minutes in vinegar and spirits of wine; twelve minutes in a solution of sulphuret of potash; and only from four to six minutes in a solution of hydriodate of potash. The ointment of this latter substance, in the proportion of about half a drachm to an ounce of axunge, may therefore be considered as the best application to the affected parts. Half a drachm of the sulphuret of lime, mixed with a little olive-oil, and rubbed upon the palms of the hands twice a day, for ten or fifteen minutes each time, proves also an efficient remedy. Helmerich's ointment—composed of one part of the subcarbonate of potash, two of sublimated sulphur, with eight of axunge—generally effects a cure in ten or twelve days. The sulphur-water-bath generally proves effectual in about twenty-five days, on an average. The fumes of the sulphur should be avoided: they may however become a useful auxiliary in aged persons. Should much inflammation occur, or if vesicular or pustular eruptions complicate the itch, all irritating frictions must be suspended, and tepid emollient baths employed. Even after the cure is effected, a few tepid baths will be useful.

To disinfect the woollen clothes of patients, they may be subjected to the fumes of sulphurous acid gas;—easily procured by the ignition of a rag dipped in melted sulphur.[a]]

SECTION V.—POMPHOLYX.

Classification.—The last disease which we have to consider, among those that are characterized by vesication, is what is called "pompholyx"[b] ("water-blebs"). Willan places this disease in a separate order[c]; and so does Rayer; while the only real difference is that, in those of which we have been speaking[d], the vesicles are very *small*; while here they are very *large*. I cannot myself see the reasonableness of making a distinct order of diseases, when the symptoms are precisely the same, and the only difference is a difference of size. One might as well call a tumour by one name if it be as big as a nut, and by another if it be as big as the head. However, if the vesicles be very large, they are called "bullæ"[e]; and because there are sometimes large vesicles in erysipelas, Willan and Bateman have placed that disease in the order "bullæ"; but as there are frequently only *small* vesicles (and indeed vesicles do not appear essential to erysipelas at all), I have considered it, as Rayer does, under the order "exanthemata."[f]

Characters of.—When there is a very large elevation of the cuticle,—a large collection of water, the disease is called "pompholyx." A vesicle appears on the skin out of health; which, instead of being small,—as in eczema,—is large; and sometimes there is inflammation with a smarting and tingling sensation round it, as in herpes.[g] When it breaks, an excoriated surface is exposed; and a scab is formed of the fluid and cuticle together.

[a] "Library of Medicine"; Volume 1; Page 386.

[b] From πομφος, *a bladder*.

[c] Order 4 ("Bullæ").

[d] Miliaria (Page 437); Herpes (Page 439); Eczema (Page 441); and Scabies (Page 442).

[e] From "bulla", *a bubble*.

[f] See Page 423.

[g] See Pages 439 and 441.

Causes.—It was imagined, formerly, that there was a particular fever attended by an eruption of large bullæ; and it was denominated "pompholyx"; but it is now doubted whether there is a distinct fever of that description. In common continued fever, and in other fevers well known, there may accidentally be a large bulla;—just as, in other cases, there are vesicles not larger than a millet-seed (miliary vesicles[a]). However, this disease—which is characterized merely by large blebs of water upon the skin—is not very common; and yet it can hardly be called uncommon. I may, probably, have seen about twenty cases of the disease. In many instances, it is really nothing more than large "eczema"[b], or large "herpes."[c] All at once, a person will have one of these on his face or head, or both; and be much frightened. Here there must be something more than an inflammatory state; because I have treated them with antiphlogistic measures, and have failed entirely.

Pathology.—[The pathological condition giving rise to this form of eruption, consists (as far as has been ascertained) in an inflammation of the *rete mucosum*, or upper surface of the cutis; by which a more copious secretion of serous fluid takes place, than can be transmitted by the cuticle;—thus causing its separation and elevation. In proof of this we may mention, that the rete mucosum remains adherent to the cutis; and is not detached with the cuticle;—as happens when this latter is forcibly torn off. The inflammation which gives rise to the formation of bullæ, may also be considered to exist in a higher degree than in erythema; for a higher degree of irritation converts erythema[d] into bullæ.[e]]

Varieties.—Bateman describes three varieties of this affection:—1. "Pompholyx *Benignus.*" There is no great harm in that. 2. "Pompholyx *Solitarius*"—because there is only one. 3. "Pompholyx *Diutinus*"—because it is chronic. It is almost a pity to make these names; for who would conceive that there was much difference between "pompholyx *benignus*" and "*solitarius*"? If it be "solitarius", it is likely to be "benignus"; and it is not easy to see why sometimes it should have one name, and sometimes another. It is well to recollect, simply, that the disease may come on with only *one* vesicle; or that there may be *several*; and it may last for a *short* time only, or for a *long* time. It is very properly called "diutinus"; but we might as well call many other inflammations by the same term; for many last a long time. I do not know why the term "*chronic*" should not be employed. Remember, then, that large vesicles on the skin, occurring as an idiopathic affection, are called "pompholyx." Sometimes there is only one of these bullæ; and sometimes a succession of them; and persons will have them month after month. I have seen all these forms of the disease. A patient in the hospital for some other complaint, all at once, has a great bleb on his foot; and we have only to prick it, and away it goes. There is no other treatment necessary. But "pompholyx *diutinus*" is a very obstinate sort of complaint; and I never saw any thing do good in it. I have seen it occur under two forms;—the one in a worn-out constitution; where bleb after bleb appeared on the skin, which cracked and oozed like a sore; and then, when the body was one mass of these, the health gave way, and the patient died. In the other cases which I have seen, it came on in regular succession. I recollect the

[a] See Page 437.
[b] See Page 441.
[c] See Page 439.
[d] See Page 398.
[e] "Cyclopædia of Practical Medicine"; Volume 1; Page 334.

case of a woman who, once a month, had some large bullæ on her face. They were attended with considerable smarting. The fluid which oozed from them, produced inflammation wherever it went; it then dried up; and the cuticle healed.

Treatment.—That form of the disease which occurs in a worn-out constitution, requires to be treated by soothing measures. We must exhibit opium and moderate astringents; sprinkle calamine (to suck up the discharge); and support the patient well, by means of wine, bark, and good nourishment. In other cases, where there is no debility, we should attempt to treat the patient on antiphlogistic principles. I did so in the case of the woman, where the disease came out once a month; but the success was very limited. The irritation certainly was diminished; but the eruption came out again. By looking out for local disease, and attempting to cure it; applying the warm-bath; and, if any phlogistic state of the system occurred, taking away blood,—we should be doing what reason dictated; but more than that I cannot say.

CHAPTER V.

PUSTULÆ.

We now proceed to another order of diseases of the skin; in which the secretion that takes place under the cuticle, is pus.[a] Several important diseases are found in this order. There is one, for the most part, of a chronic nature;—"impetigo."[b] There is another like that I have just mentioned; only it is contagious;—"porrigo."[c] Then there is another, called "ecthyma"; and there are also "*cow*-pox", "*chicken*-pox", and "*small*-pox." Thus we see that, except in the formation of pus, there is no agreement among these diseases: Some are *acute*, and some are *chronic*; some are *simple* diseases, and some are *contagious*; some of these contagious diseases occur but *once* during life, and others occur *frequently*. Porrigo may occur over and over again; but small-pox, as a general rule, does not occur more than once.

a. Chronic Pustular Eruptions.

SECTION I.—IMPETIGO.

Characters.—The first disease of the order "pustulæ", of which I will speak, is called "impetigo." I speak of it first, because it is closely connected with eczema.[d] Eczema, which is for the most part a chronic disease, is characterized by small watery vesicles; and frequently, instead of clear lymph, the fluid is almost puriform. Sometimes it is *altogether* puriform; and, in this latter case, we call it "impetigo." The two diseases run completely into each other.[e] Neither eczema nor impetigo is in the least contagious. We may touch or sleep with a person labouring under them, or inoculate with the fluid; and no disease will arise from it;—at least, nothing more than irritation.

Varieties.—This disease will occur, sometimes, in circumscribed patches,—just as in the case of herpes[f]; and then it is called "impetigo *figurata*"; and frequently there is inflammation around,—as in herpes.[g] Now and then the affection is very much extended over the surface; and is called "impetigo *sparsa*" ("sprinkled"). Now and then there is a thick scab;

[a] Pustules are divided into four kinds; according to their size and figure. If a pustule be small and conically pointed, it is called "achor." "Achor" is said to take its name from ἀχνη, *bran*;—on account of the branny scales thrown off in the disease; but probably (as suggested by Blanchard) it is derived from α, *without*, and χωρος, *space*;—owing to the small size of the pustules. If, on the other hand, it be small, but flat, it is called "psydracium" (from ψυδραξ, *a small blister*); if it be larger, and have a sort of cellular appearance, it is called "favus" ("a honeycomb"); but if it be a fat, large, well-fed pustule, with an inflammatory base around, it is called "phlyzacium" (from φλυζω, *to inflame*). See Dr. Willan's "Description and Treatment of Cutaneous Diseases"; Definition 10; Plate 1; Figures 13, 14, 15, and 16.

[b] "Running Tetter."

[c] "Scald-Head."

[d] See Page 441.

[e] See Page 442.

[f] See Page 440.

[g] See Page 439.

and then it is called "impetigo *scabida*." The affected parts look like the bark of a tree; only it is not a diseased cuticle, but a real scab formed of dry pus. Now and then there is so much inflammation around, that it is called "impetigo *erysipelatodes*"; and, occasionally, there is such irritation, that it is denominated "impetigo *rodens*" ("gnawing"). It is only worth while to remember, that it may occur in clusters; that it may occur with scabs, with a great deal of inflammation; and that it may occur with ulceration. I mentioned that, now and then, the fluid is watery, here and there, instead of purulent; and then it is called "eczema impetiginodes"[a]; and as there is pus in other parts, we shall be justified (if we think proper) in calling it "impetigo eczematodes."[a] These are the same diseases; only, according to the severity of the irritation, we have either pus or water poured out.

Kind of Pustule in Impetigo.—In the disease that I am now describing, the pustules are small;—just as the *vesicles* are small in herpes.[b] They are of the kind called "psydracia." It is of some use to remember this variety of pustules; because *one* disease has *one* species of pustule, and *another* a *different* kind. When the itch has pustules, they are of that description called "phlyzacia." The names given to these pustules are very hard words; and it would have been well had some others been devised; but we must suffer through our forefathers. It is of use to remember the appearance of the pustules in this disease; because it is sometimes difficult to distinguish the pustules of porrigo from these; and the difference in the pustules, is the principal means of diagnosis.

Parts which it Attacks.—This disease, which is easily recognised,—on account of its being a pustular affection, and being characterized by the formation of pus in small flat pustules,—occurs particularly on the extremities. We continually see both men and women with this disease on the front of their legs; sometimes running all around, and sometimes upon the arm. If it be not properly treated, it will sometimes last for a very considerable time,—even for years. Sometimes there is a great degree of inflammation attending it.

Treatment.—The best mode of treating the disease, and the one that I have adopted, has been to regard it as an inflammation;—taking blood from the arm; applying leeches around the inflamed part, applying cold water, as long as that was agreeable; and then exchanging it for warm; and exhibiting mercury. This is an affection in which, I am sure, a moderate use of mercury is necessary. All this, however, will be of no use, if the patient do not limit his diet. If he do not leave off wine and beer, and in some cases meat, the disease will not go away. It is a disease which, if not well treated, is exceedingly obstinate. If we adopt the plan I have laid down, although we may not *eradicate* the disease, yet we shall *lessen* it to a very great degree.

Local Treatment.—The chlorides are sometimes useful, and likewise the yellow-wash; but I have frequently seen them irritate the part. Altogether, the best local treatment is the application of some absorbent powder, (such as calamine or oxide of zinc,) and the constant application of cold or warm water. In the case of the leg, it is indispensably necessary that the patient should keep it, as much as possible, in a recumbent posture;—just as he would do in any other inflammation of the lower parts of the body. In the way of medicine, I am quite sure that mercury, exhibited very gently, is exceedingly serviceable.

[a] See Page 442. [b] See Page 439.

Treatment of Impetigo Eczematodes.—In that form of the disease which is the link between impetigo and eczema [a], the treatment would be precisely the same. We frequently see eczema of this kind behind the ears; running over the face, and down the neck; sometimes attended with a discharge of water, and sometimes with a discharge of pus. In fact, it may be either eczema or impetigo. When there is merely eczema, there is a great deal of scurf upon the part; so that when the secretion is stopped, the patient looks almost well; and then, when the part begins to run again, we have the neck looking moist and nasty; and having quite a different appearance. Whether it is eczema or impetigo, I believe antiphlogistic treatment, with the moderate exhibition of mercury, and the application of an absorbent powder, answers far better than any thing else.

Impetigo cannot be mistaken for any thing else except eczema; and they run very much into each other. It is a common disease. We cannot go into an hospital, without seeing cases of it. We might almost as well give different names to rheumatism, if it ran down one shoulder, or occurred in both shoulders, or in one shoulder and one knee, as give different names to many of these cutaneous affections. It is very well to mention that they may occur in this way or that way; but to give them distinct names is quite absurd. In Plate 38, in Bateman's work, there is a representation of the disease called "porrigo"; which representation is nothing more than one of eczema; and the same may be said of the representation of "psoriasis", in Plate 11, Figure 2. If there be a watery discharge, it is called "eczema"; if it be matter, it is called "porrigo." Psoriasis [b], eczema [c], and porrigo [d], run into each other.

SECTION II.—ECTHYMA.

Circumstances Favouring its Occurrence.—I now proceed to describe another disease, which also is not contagious; and is characterized by pustules called "phlyzacia";—the large, round, well-fed pustules, with an inflamed base.[e] This is a disease which very frequently takes place in a bad habit of body. The disease which I last mentioned (impetigo) takes place, occasionally, in a cachectic state of the system; but frequently it takes place in persons who are in other respects very well. The disease which I now describe (ecthyma [f]), is one which commonly occurs after small-pox, measles, and scarlet-fever; and now and then after syphilis. Occasionally, I believe, it is itself syphilitic.

Characters. — It is characterized by pustules which are all distinct. In impetigo the pustules cluster; and when they are aggregated, they sometimes form clumps or clusters; and now and then they are diffused over a great extent. But in ecthyma, the pustules are all pretty distinct, and sometimes very large. Without knowing any thing of his history, we might think that the patient had small-pox. We continually see this affection in patients in the venereal wards;—it having come on in consequence of taking mercury. The pustules are all distinct, large, circular, and full of matter; not flat on the top, but globular. I have seen cases exactly like small-pox; and indeed I once knew a case sent to the hospital for small-pox, merely in consequence of the resemblance of the pustules. Now and then the pustules are remarkably large. When I say they are

[a] See Page 442.
[b] See Page 435.
[c] See Page 441.
[d] See Page 452.
[e] See Note (a) to Page 448.
[f] From ἐκθύω, *to break out.*

"*full*", I mean they are *distended*. Whether they be large or not, the discharge concretes into a dark-coloured scab. I recollect having had this disease when a child;—for I have had a taste of most diseases. I remember being very scabby for many months;—so that I was quite ashamed to be taken out for a walk. It is a disease which lasts a considerable time. Persons who say they have merely had gonorrhœa, frequently have an eruption exactly of this description.

Diagnosis.—It is very easily recognised. In the first place, there are *pustules*; therefore the affection belongs to the order "pustulæ."[a] We also see that they are *phlyzacia*[b]; that all of them are distinct; and that some of them run into scabs. For the most part they are not very numerous; but, when they are small, they may be so. In impetigo[a] they are circular, and not so distended; and have little flat tops. Sometimes in impetigo, they will congregate into one large mass; but in ecthyma the scabs are all distinct, though they may be large.

Varieties.—One of the varieties of this disease is called "ecthyma *vulgare*"; and it certainly gives a person a very vulgar appearance; but if it be a little darker, it called "ecthyma *luridum*." (If lepra be dark, it is called "lepra *nigricans*"[c]; and it is a pity that the same adjective is not employed here.) If it occur in children, it is called "ecthyma *infantile*." We might as well apply a separate epithet to measles, accordingly as the affection occurred in infants or adults;—but this fondness for subdivision runs throughout Willan's arrangement. I mentioned[d] that the disease generally occurs in a bad habit of body; and if it take place in a very bad habit, it is called "ecthyma *cachecticum*." It will now and then occur (as is the case with almost all cutaneous diseases) with a sharp inflammation; and may last for a short time;—just like herpes[e], or some other inflammations which produce mere serum, or which cause no secretion at all, but constitute a mere redness. They begin with inflammation of the skin, and feverishness; but the result of this disease will be suppuration. For the most part, however, ecthyma is a *chronic* affection, and lasts a considerable time;—the patient being very much out of health.

Treatment.—In these circumstances, the most eligible treatment is to strengthen the patient, in the best mode we can. Allow him wine, porter, meat, and fresh air, every day; and the warm-bath. If there be strength enough, I know that the employment of the *cold*-bath is very good. I would use the cold-shower-bath in cutaneous diseases, when the patient's strength is able to bear it. Very frequently the disease is syphilitic; and, although the body is feeble, we find it necessary to give mercury, as well as to employ tonic medicines. Because we give mercury, it is no reason why we should not strengthen the patient, as much as possible. It is frequently a good practice to allow wine, porter, and meat in abundance; and to give tonics,—such as wine and bark; while, at the same time, we employ mercury. Sometimes we may alternate them.

SECTION III.—RUPIA.

Analogous to Ecthyma.—This disease[f] very much resembles ecthyma; and, indeed, it appears to me to be exactly the same; but it is placed by Bate-

[a] See Page 448.
[b] See Note (a) to Page 448.
[c] See Page 433.
[d] See Page 450.
[e] See Page 439.
[f] Deriving its name from ῥυπος, *filth*.

man in the order "vesiculæ"[a], merely because the disease is serous instead of pustular; and Rayer places it in the order "bullæ", because the vesicles are large. It is called "rupia." It occurs in the same circumstances as ecthyma; the secretion soon becomes purulent; and, after a time, there are the same large black scabs; and no one could then tell whether the disease was rupia or not. For the sake of consistency, it may be necessary to make two diseases of these; but I am satisfied that rupia is nothing more than ecthyma;—that they are varieties of the same affection. All that is necessary to be remembered is, that ecthyma sometimes begins with serum; which soon becomes thick and turbid. There is another reason for making the two the same. In rupia there is frequently a scab, which becomes conical; so as to have exactly the shape of those shell-fish which stick to the rocks. This form of it is called "rupia *prominens*." In ecthyma there is frequently the same occurrence; the scab will assume exactly the same appearance; and the treatment of the two diseases is exactly the same. I cannot but think it trifling to separate them in this way. Although Rayer finds fault with Willan for subdividing these affections, yet he is over minute himself.

Characters.—The affection will occur in little children, particularly if they have been thrown out of health by measles or small-pox; and sometimes it will even occur after cow-pock. The vesicles are circular, with inflammation around them; and they have a black scab. They are distinct, too (just like the pustules of ecthyma[b]); and they are globular; only the contents are watery. Where the disease has been purulent from the beginning, I have seen dark scabs. Rupia is as frequently syphilitic as ecthyma; and just as frequently requires mercury. I would put ecthyma and rupia together;—just as I would put together lichen and strophulus[c], erythema and roseola[d]; and just as I would make no distinction between the orders "vesiculæ" and "bullæ."[e] I would have some one word to signify all the eruptions comprehended in those terms; from the size of a millet-seed, to that of a hen's egg. There are two kinds of rupia:—"rupia *simplex*", and "rupia *prominens*"; but it is quite enough to recollect the word "*rupia*." It is a very common affection.

Treatment.—When this affection occurs in adults, they require support; and now and then we have to give mercury. With respect to local applications, I have never seen them do any good. The parts should be kept clean; and, when the scales come off, it is well to use a dressing of oxide of zinc, or Unguentum Hydrargyri.

SECTION IV.—PORRIGO.

The next disease that I will mention, and which is also a chronic affection, is of a contagious character. The three last mentioned diseases (impetigo, ecthyma, and rupia) are perfectly free from contagion[f]; but there is another,—a chronic disease, called "porrigo", which occurs particularly in the head; and is one of the most contagious diseases of the skin.

Characters.—In porrigo, the pustules are different from what they

[a] Order 5.
[b] See Page 450.
[c] See Page 390.
[d] See Page 399.
[e] See Page 437.
[f] See Pages 448 and 450.

are in the two former diseases. In impetigo they are little pustules, and flat[a]; in ecthyma they are large globular pustules (phlyzacia)[b]; but in porrigo (or "scald-head", as it is sometimes called) they are either small, with pointed tops; or large and flat;—that is, they are either acores[c] or favi.[c] I have no doubt that many diseases which occur in the head, are called "porrigo", which are not. I think I have seen enough to justify the opinion, that many cases of *eczema* are called "porrigo."[d] But this disease, though it usually affects the head, may occur in various parts of the body.

It is Contagious.—The disease is *contagious*, but not *infectious*. It is commonly caught by children sleeping in the same bed, rubbing their heads upon the same pillow, or wearing the same night-cap. Frequently it is caught at school, by children putting on each other's hats or caps. Drinking out of the same mug, or giving a kiss (if any one could be tempted to do so) would, I should think, communicate the disease.

To shew how very contagious these diseases are, I may mention the case of a barber, who had a child with a scald-head, and who kept a razor specially for shaving it. One day, by mistake, he shaved himself with it; and, though he had washed and stropped the razor well, and (like a true barber) put it into hot water first, yet, in consequence of using it to his own beard, the disease came out upon his chin, about a week afterwards. I saw it distinctly; and he told me the history of the case. Small circular pustules came out. We cannot too strongly impress upon the minds of people, the necessity of a child's dress being kept isolated in this affection; lest the disease should spread.

Varieties.—It sometimes occurs in distinct patches, and is then called "porrigo *scutulata*."[e] Now and then it occurs, with a great deal of inflammation, in distinct pustules,—not clustering together so much; and, these pustules being favi[c], it is called "porrigo *favosa*." Sometimes it is dry laminated scabs, of a yellow-whitish colour, containing a white chalky powder; and, from their resemblance to lupin-seeds, it has been called "porrigo *lupinosa*." In this form of the affection, the pustules are often very dry. The patches are full of hard grains, which are found to contain a great deal of lime; so that an earthy secretion takes place. They are not little globular pustules, but large and flat; and therefore they are called "favi."[c] A variety is mentioned by Bateman, under the name of "porrigo *furfurans*";—where there are no pustules, but laminated scabs. I believe this is nothing more than eczema[f]; and I do not think it at all contagious.

Porrigo Decalvans.—This disease will sometimes occur without an eruption;—so that we have an affection classed with those that are pustular; in which, nevertheless, there are no pustules; but this inconsistency we cannot avoid. The hair will sometimes drop off here and there in patches, leaving the surface smooth; and this disease is said to be contagious. It is a very common affection; and is called "porrigo *decalvans*." I believe it is very common in the West Indies; and I have seen it in children who have come from thence. It is said to spread in schools (just like the other forms of porrigo) from the children wearing each other's caps. There is a doubt as to whether this should be called "porrigo." The skin is smooth; and I am sure, in many cases, this is the entire disease. Here is baldness without any reference to pustules, or vesicles, or an inflammatory affection.

[a] See Page 449.
[b] See Page 450.
[c] See Note (a) to Page 448.
[d] See Page 450.
[e] From "scutellum", *a little shield.*
[f] See Page 441.

Sometimes half the head will be bared in this way; and sometimes the whole head. I once had a little patient, whose head was becoming perfectly smooth all over. I could do nothing with her.[a]

Diagnosis.—When an eruption occurs in the head, of a pustular kind, and lasts some time, we may be almost sure it is porrigo; but if we ascertain that the pustules are small (acores[b]), or large and flat (favi[b]), then we may be sure of the nature of the disease. It is said to occur in other parts of the body; but I do not recollect seeing it. Impetigo[c], eczema[d], and ecthyma[e], are common enough on the extremities; but porrigo is much more particularly found on the head.

Period at which it Occurs.—Porrigo takes place far more frequently in children than in others; and it very often cures itself, when it is thought to be cured by medical means. It lasts for a certain time, and gradually declines. Children have it for a great number of years; and then, as they grow older, it ceases. There are diseases which are common to infancy, which gradually disappear as the subjects of them grow older; and scald-head is one of them; but I have seen persons labouring under it, who have attained their twentieth or twenty-fifth year; and who said they had had it all their lives.

Treatment.—As to the treatment of this disease, it is one of the most obstinate that can be taken in hand. There is often great inflammation;—so that, on placing the hand near the patient's head, we find great heat. We should therefore commence our treatment with antiphlogistic measures;—taking blood from the neighbourhood of the head, and applying cold water. These things are certainly useful, and appear to be indicated by common sense; but they are only useful to a limited extent; and, as I just now said, the affection is very obstinate. It is sometimes of great service to give mercury. "Plummer's pill"[f] first obtained its credit by curing a disease of this description. Dr. Plummer (Senior) of Edinburgh, states[g], that he had a case of scald-head, for which he gave some common form of mercury; but the patient was no better. He then gave it mixed with a little guaiacum and antimony; and the patient presently got well. This pill was much employed by him afterwards, and others also used it; till at last it became well established; and "*Plummer's* pill" is now as well known as "*Dover's* powder." I much doubt whether it has any efficacy

[a] The case is described in the "Medical Gazette"; Volume 7; Page 639.

The difficulties encountered in the study of the pustular diseases of the hairy scalp, have been greatly increased by the descriptions given by Willan and Bateman, under the titles of "porrigo" and "porriginous eruptions." They have described porrigo as a contagious pustule; and, at the same time, and under the same head, various eruptions, many of them not contagious, are jumbled together. Biett, in his valuable oral lessons, delivered for the last twenty years, has unravelled the mystery. It is due to this eminent dermatologist to make this announcement; as others have not scrupled to publish, as their own opinions, the statements he delivered publicly many years ago. The "porrigo *lupinosa*" and "porrigo *scutulata*", as Biett rightly observes, are alone contagious diseases, with peculiarly formed pustular eruptions. The others, termed by Willan "porrigo *favosa*", "porrigo *larvalis*", "porrigo *decalvens*", and "porrigo *furfurans*", are merely impetiginous or squamous affections of the hairy scalp. The denomination "*favosa*" was given by Biett to one of the varieties of contagious porrigo, on account of the remarkable honeyed yellow colour of the incrustations, much more striking than any other; and it corresponded also with the name "*tinea* favosa", given by Alibert to that disease.—"*Library of Medicine*"; *Volume* 1; *Page* 400.

[b] See Note (a) to Page 448.

[c] See Page 448.

[d] See Page 441.

[e] See Page 450.

[f] "Pilulæ Hydrargyri Chloridi Compositæ."

[g] In the "Edinburgh Medical Essays and Observations"; Volume 1; Page 46.

beyond an equal proportion of calomel. At any rate, I do not think that a grain of guaiacum can make any difference in a pill; and as to antimony, I believe, unless it produces nausea, it does not deserve to be considered a medicine. I have made comparative trials with calomel and "Plummer's pill"; and I can say that I never found the latter at all superior to the former. However, mercury is often useful; and so also is sarsaparilla; as well as other medicines of that description.

External Remedies.—As to external remedies, besides antiphlogistic measures, astringents are very useful;—such as oxide of zinc and calamine. If there be but little inflammation, tar-ointment, united with that of nitrate of mercury[a], is very serviceable; and sometimes an ointment of the red oxide of mercury.[b] These stimulating applications are often exceedingly useful. I have seen cases get well under the use of cocculus indicus. It is used to destroy vermin in the heads of children; and a drachm mixed with an ounce of lard makes a stimulating ointment, which is often beneficial. Sulphur, too, has been employed. A wash of the sulphuret of potassium is sometimes found advantageous in this disease. But, among external applications, when there is no great inflammation present, tar and citrine ointment[a] are among the best. I need scarcely say that the head should be closely shaved, and kept very clean.

[Internal remedies are generally useless, unless the state of the constitution should require some gentle tonic;—such as infusion of gentian-root, taraxacum[c], or hops, &c. When the disease has existed some time, blisters on the arm, and gentle aperient medicine, may be advantageously employed. When it is recent, and there are few pustules, it has been immediately arrested by cauterizing (with the nitrate of silver) the slight erosions of the skin, after the favous scab has been detached. But when the disease is of long duration, and of some extent, the appropriate means are alkaline and sulphurous washes, and acidulous lotions. The alkaline washes are made stronger or weaker according to circumstances. Ten or twelve grains of the Potassa Fusa in an ounce of distilled water, or one or two drachms of subcarbonate of potash dissolved in a pint of tepid water, are the best alkaline applications. The first lotion should be applied for a short time only; and the latter by means of moistened linen, constantly kept to the part. Alkaline ointments (one drachm of subcarbonate of potash to an ounce of fresh axunge) are also useful, and may be rubbed on gently after the wash. The ointment may be omitted, if it appear to soften the parts too much. Lotions of the sulphuret of potash[d], containing one, two, or three drachms to a pound of distilled water, with an ounce of alcohol, may be substituted for the alkaline washes, should these prove inefficient. Gentle sulphurous douches, every morning, are also of great service. The acidulated washes consist of muriatic, nitric, or sulphuric acids, more or less diluted.

Solutions of the sulphate of zinc, of copper, of the nitrate of silver, or of the deuto-chloruret of mercury[e], have been sometimes used with the best effects. The Unguentum Hydrargyri Nitratis, in some cases, improves the condition of the affected parts. Biett has lately employed, in "porrigo larvosa", an ointment of the ioduret of sulphur, which merits the greatest confidence. We[f] have seen it, in long-standing cases, greatly improve the state of the diseased skin, prevent the formation of fresh pustules, and

[a] "Unguentum Hydrargyri Nitratis."
[b] "Hydrargyri Binoxydum."
[c] From *ταράσσω, to alter.*
[d] Now considered to be a sulphuret of *potassium*;—the "Potassii Sulphuretum" of the Pharmacopœia.
[e] "Hydrargyri Bichloridum."
[f] Dr. George Gregory.

cause the hair to be reproduced with the same appearances as that of the sound portions of the scalp.

During the treatment, tepid baths, and sometimes sulphurous water-baths, are useful adjuvants. The greatest care is to be taken to prevent the fluid which is exhaled from the excoriations being carried over the adjacent parts;—the contagious nature of this fluid having certainly some influence on the obstinate reappearance of the favous pustules; and this is only to be prevented by great cleanliness, and the repeated use of weak alkaline washes. Should the irritation be intense, all stimulant applications ought to be suspended, and emollients substituted.

In very obstinate cases, the cauterization of the diseased surfaces, with some concentrated or rather diluted acid, has effected a cure. The acid should be passed over quickly with a feather, and water poured immediately on the parts, before the action of the caustic becomes too deep. We have lately seen kreosote succeed, when many other means had failed. The diseased parts are to be touched with a small hair-pencil dipped in kreosote; and dressings, with an ointment of a scruple of kreosote to an ounce of axunge, afterwards applied.[a]]

[The following aphorisms, by Dr. Graves, contain many valuable hints on the cure of this intractable disease.

"1. When the disease is of long standing, always insert an issue in the arm, before you attempt its cure. I have seen water on the brain, and other fatal consequences, from the neglect of this precaution.

2. If this disease has clearly originated from contagion, and no other evidence of derangement of the general health can be detected, we must not, from the mere presence of the cutaneous affection, infer a constitutional taint; and must avoid the common error, of making the poor children undergo a course of alterative medicines.

3. This affection, originating in contagious matter directly applied to the skin, cannot, like some varieties of lepra and psoriasis, (to which it often bears a great resemblance,) be cured by internal medicines; such as mercury, arsenic, and iodine, given separately or in combination (as in Mr. Donovan's new preparation).

4. When it occupies the hairy scalp, the common procedure of shaving the head is injudicious, for it adds to the irritation of the skin; and the scalp can be sufficiently exposed by cutting the hair as closely as possible, with sharp scissors.

5. The great object is to get rid of the morbid action which is going on, and which consists in an inflammation of the external surface of the corium;—an inflammation occurring in spots, and giving rise (in the first place) to an increased secretion of epidermis, which produces the scaly appearance of the parts affected; and (in the second place) to a very slight and scarcely perceptible oozing of moisture, which immediately dries into scales, and thus escapes notice;—being mingled with the scurf formed by the detached portions of morbid epidermis.

6. The cure must be accomplished by removing these scales, as far as that can be done by diligent ablution, without using any irritating degree of friction; and when the diseased portion of the skin has been thus exposed, we must next have recourse to some application which will destroy the morbid secreting surface. Formerly this was attempted by means of an endless variety of complicated formulæ, each of which had its advocates. The list may, however, be now reduced to a few simple remedies; and, in

[a] "Library of Medicine"; Volume 1; Pages 401 and 402.

truth, with nitrate of silver, sulphate of copper, or strong tincture of iodine, every case of this disease may be cured.

7. I never use the solid lunar caustic, or sulphate of copper; but prefer a solution of ten, fifteen, or twenty grains to the ounce,—as the case may require. As to the application of this solution, it will not do to apply it (as is generally done) with a camel's hair pencil, *for it must be strongly rubbed into each spot*; for which purpose a small bit of sponge, covered with fine linen, and tied to the end of a quill or slender stick, should be employed. When a large portion of the scalp is affected, it will require some perseverance to apply this lotion in an effectual manner.

8. An application of this nature, when effectually done, must not be repeated oftener than once a week.

9. Immediately after it, the whole scalp must be covered with a dressing of spermaceti; which must be renewed at least four times daily;—so as to keep the head constantly moistened with it. The head is not to be washed for three days after the application of the caustic, or of the tincture of iodine; but then it may be well, but very gently, washed with yellow soap and water twice a-day;—taking care to cover (as before) with a spermaceti-dressing, after each washing.

In scaly diseases of the skin, it is quite surprising how much the cure is facilitated by keeping the affected parts constantly smeared with spermaceti, oil, melted suet, or even candle-grease. Without this aid, the use of caustics will often disappoint the practitioner.

10. When the above precautions have been taken, the cure will advance rapidly; and each succeeding application of the caustic-solution, or of the tincture, may be less severe." [a]]

Treatment of Porrigo Decalvans.—Stimulating applications are among the best. I should recommend the use of red oxide of mercury [b], and other remedies of a similar description;—in fact, to treat it like the other forms of porrigo.[c] The head must be kept well shaved all round, and very clean; and, by applying stimulating applications, the hair will at last be brought on. It is said that there is no doubt as to its being contagious; but I have not seen it so. It is by no means uncommon; but, like the other forms of porrigo, it will cease after a time. I need not say that, in the various other forms of porrigo, when there is a scab, in order to employ the ointment with effect, we should put on plenty of it; and the scabs, when softened, must be taken off. They should, however, be softened as much as possible at first; and, for this purpose, a poultice is sometimes necessary.[d]

Acute Pustular Diseases.—These [e] may be said to be all the *chronic* pustular diseases. Those which I mean next to speak of, are *acute*; and occur but once during life. They are diseases which we see every day; namely, chicken-pock, cow-pock, and small-pox. It is now believed, by a great many, that the two latter of these affections are one and the same; and some go farther, and think that even the chicken-pock is only a modified form of it. However that may be, these diseases are all exceedingly similar;—so far as they are *pustular*; so far as they are all highly *con-*

[a] "Dublin Journal of Medical Science"; Volume 18; Page 239. (November, 1840.)

[b] "Hydrargyri Binoxydum."

[c] See Page 454.

[d] We would here direct the attention of the reader to "A Practical Treatise on Porrigo (or Scald Head), and on Impetigo (Humid, or Running Tetter); with Coloured Engravings illustrative of the Disease. By the late Robert Willan, M.D. Edited by Ashby Smith, M.R.C.S."

[e] Impetigo (Page 448), Ecthyma (Page 450), Rupia (Page 451), and Porrigo (Page 452).

tagious; so far as they are *acute* diseases; and so far as, for the most part, they occur but *once* during life.

b. Acute Pustular Diseases.

SECTION V.—VARIOLA.

Its History.—I will now consider a very important pustular disease; called, in English, "small-pox"; but, in medical Latin, "variola." I understand that the word "*pock*", or "*pox*", is of Saxon origin; and comes from the word "*poccadl*"; which is derived from the word "*pocca*", —a "bag" or "pouch"; or "*pochcha*", which means the same thing,—a "little bag." The term "*small*" was added to it in the third or fifth century;—I suppose to distinguish it from "the *great* pox." Some etymologists say it is called "variola" from the word "*varius*",—"spotted"; or else that it comes from the Latin word "*varus*",—"a pimple." How the point is to be settled I do not know. The disease is called, in Spanish "viruelas"; and some derive this from the Latin word "*virus*." The etymology, like the disease, is a mass of corruption. Mr. Moore has written an admirable history of the small-pox[a], and another of the cow-pock[b]; both of which works are exceedingly interesting, and well worth reading. He says that the word "*variola*" was first found in an old Saxon Chronicle, ascribed to Marius (Bishop of Vaux, in Switzerland); who says that a violent malady, attended with purging, broke out in Italy and France, in the year 570.

Premonitory Symptoms.—The disease, before the eruption appears, is marked by certain premonitory symptoms. The patient, first of all, is generally seized with languor, drowsiness, vomiting, and pain of the head and loins;—just as might occur in any other fever. Here the head is affected ("drowsiness" and "languor"); the stomach is affected ("vomiting"); and "the loins" are affected; as almost always occurs in common continued fever. There is pyrexia, universal feverishness, quickness of pulse, and also tenderness of the epigastrium; but the pain in the loins, and the tenderness of the epigastrium, are frequently most intense; being very marked in this disease.

Appearance of the Eruption.—After these symptoms have prevailed a day or two, there appear, first on the face, and then successively throughout the body and extremities, small red spots (papulæ[c]); and these rise into elevated pimples, and these again into hard tubercles,—in the common acceptation of the word.[d] So that, first of all, you have mere red *spots* on the skin; these spots rise into what are commonly called "pimples"; and then these pimples become very hard (*tubera*). These pimples become pellucid; and, on the fifth day (counting from the first attack of feverishness, headach, and so on), they become pustules. From being pellucid, they have purulent contents opaque and white; and those which are large, are at first generally depressed in the centre. This is worthy of notice. They are not perfectly filled at first; but are filled in the circumference more than in the centre.

When this eruption is taking place, if the individual be an adult, there is frequently a great tendency to profuse sweating; and if the patient be a child, there is a great tendency to epileptic fits. It is said that one fit

[a] "The History of the Small-Pox. By James Moore."

[b] "The History and Practice of Vaccination. By James Moore."

[c] See Page 387.

[d] See Pages 211 and 386.

forebodes a mild disease, whereas several forebode a severe one. Where there is but one fit, there is so little mark of severity of disease, that it often has been deemed a favourable symptom; but I should suppose, that if the child had no fit at all, it would forbode something better still.

Period of Maturation.—On the eighth day,—counting always from the first,—if there be much eruption, the face swells from the inflammation. If the disease be pretty severe, the cellular membrane beneath falls into more or less irritation, and secretes abundantly; so the face swells on that account. The same circumstance causes the eyes to close; and the continued extension of the irritation causes the mouth to "run", and the fauces to inflame. On the eleventh day, the pustules are at their height;—as full and as numerous as they will be; and the swelling of the face, the "running" of the mouth, and inflammation of the fauces subside; and then the hands and feet swell;—first the hands, and afterwards the feet. The spots spread down the body and arms, towards the hands and feet; and, as these parts *suffer* the last, so they *swell* the last; and when the swelling commences in them, the irritation has already begun to subside in the parts originally affected. The pustules are then said to "maturate"; that is to say, they grow ripe and perfect.

Secondary Fever.—When this general suppuration has occurred, and the formation of pustules is perfect, then a fresh attack of feverishness occurs; and this is called the "*secondary* fever." That which occurs in the beginning,—ushering in the disease, and continuing for a little time,—lessens when the eruption comes out, and is called "the *primary* fever"; and when the eruption has gone on for a certain number of days, and the general irritation is lessened, a second attack of feverishness takes place. The eruption is now perfect;—all the pustules having attained their full development, and each pustule having become filled with matter, and of its full size.

Decline of the Eruption.—When the pustules begin to diminish, and the matter to be absorbed, the common people, especially old women, call it "the *turning.*" We continually hear, in practice, that the disease has "turned"; and the meaning of that is, that the pustules have begun to subside. The pustules on the extremities, as I have said, appear later than those on the face and trunk; and their contents, I should also mention, are more limpid. There is not that excessive inflammation which produces *pus*; but only a *puriform fluid* is secreted;—a limpid fluid rather than perfect pus; and in them the fluid is frequently absorbed altogether, without any exudation occurring. In the other pocks, throughout the body and the face, the matter very frequently *exudes*; but those upon the extremities, particularly the hands and feet, lose their contents entirely by *absorption*;—so that the elevated cuticle remains flaccid and empty. The pustules on the extremities, as they *come out* last, also "turn" last.

Pits and Cicatrices.—The pustules, too, when the matter escapes, generally dry into hard scabs. The matter exudes; a scab is formed of this dry pus; and frequently a little ulceration is found to take place;—so that a pit is left. The secretion is not merely superficial and cutaneous; but ulceration of the cutis, and even of the cellular membrane underneath, takes place;—so that marks are left. These pustules are nothing but so many minute abscesses; and, of course, there is more or less destruction of the parts, and a cicatrix is left on a small scale. If many of these run together, then a person is said to be "seamed." There are whole tracts of loss of substance.

Critical Days.—The days, then, on which the changes take place, are

first according to the *tertian* type, and afterwards the *quartan* type. The day on which the disease begins is the first day; then on the third (which is according to the *tertian* type) the pustules make their appearance; and on the fifth day (still according to the *tertian* type) perfect pustules are formed. The eruption begins as a little spot. This is succeeded by an elevation, which afterwards becomes hard, and contains a limpid fluid, which, on the fifth day, becomes perfect pus. From that time the *quartan* type commences; on the eighth day, if there be much eruption, the face swells, the eyes close, and the mouth "runs"; and on the eleventh day the pustules are all at their height, and there is no farther aggravation of the eruption. This enumeration will assist the memory.

Variola Discreta.—The disease is generally divided into two varieties; the one called "distinct", and the other "confluent." In what is called "distinct" or "discreet" small-pox, the pustules do not touch each other. The pyrexia, or feverishness, is of that kind called "inflammatory"[a]; and is attended with a pretty strong pulse, and great heat of the body. The pustules are comparatively few in number; and are all detached. Perhaps there may be very few pustules;—only one, two, three, half-a-dozen, or a dozen; but if there be more, still they are detached. They all look healthy, and have a rose-coloured base;—showing a healthy inflammation. Their contents are good, "laudable", "praiseworthy" pus.[b] The fever, in this form of the disease, lessens when the eruption comes out; and when the eruption is complete, the feverishness is nearly gone. The disease is mild but perfect.

Variola Confluens.—In the other form of the affection, however, (which is called "variola *confluens*",) the pustules are very numerous, and run together. The feverishness is infinitely more violent, and rather of a typhoid character; the pulse is not so strong; the patient is exceedingly weak; and there is delirium. There is often so violent an affection of the head, that it produces coma; and the eruption not unfrequently begins early,—even on the second day. The pustules are not only far more numerous, but they are smaller, flaccid, and not filled as they should be. Their quality also is bad; for, instead of containing a creamy "laudable" pus[a], the contents are brown,—perhaps thin and serous; and perhaps there is a brownish ichorous fluid, rather than genuine pus. They not only run together; but, from not being well filled, they appear more or less flat.

Attendant Symptoms.—The feverishness, in this form of the disease, is very little lessened on the appearance of the pocks; and at the end of the eruption it is aggravated very much. Secondary fever, of a very violent character, comes on. The symptoms occurring in other parts, are also very severe. There is much more "running" of the mouth, and much more inflammation of the fauces, than in the distinct form; and, in infants, there is sometimes violent diarrhœa. In this latter instance, the lower part of the alimentary tract suffers great irritation. Frequently, too, between the pustules, there are petechiæ, vibices, and ecchymoses;—there are, in short, red, dark-coloured spots, of various sizes. Sometimes there is bloody urine; and sometimes blood appears in the motions. The secretions are very unhealthy; and there is an exudation all over the body; so that the person emits a very offensive smell. Now and then, patients labouring under this form of the disease die rather suddenly. The consequences of this species of the disease, too, are more severe than in the other form. In fact, it is "variola *confluens*" that, for the most part, leaves such terrible

[a] See Page 263. [b] See Page 103.

consequences; such as blindness, phthisis, and diarrhœa;—the latter of which ends in ulceration of the intestines.

In Negroes.—It is said (but I do not know the fact from experience) that negroes generally have a horny, warty, small-pox; and that the eruption is minute in size. Fibrin is effused into the pocks; which gives them a hard warty appearance.

Complications.—[Such are the ordinary phenomena of the natural small-pox, in its distinct and confluent forms, when it occurs to persons previously in good health, and of sound constitution. But it must be remembered, that this disorder may attack those who may be labouring, at the time of seizure, under some other disease;—such as pneumonia, hooping-cough, hepatitis, or consumption; and, further, that these and other disorders may come on, unexpectedly, at any period (early or late), during the progress of small-pox. An infinite variety of accidental symptoms, may thus be superadded to those regular symptoms already enumerated. Besides which, small-pox may occur to persons of a weak habit, or in constitutions exceedingly exhausted, and unable to cope with a disease of such severity. It may occur, for instance, to those who have but recently recovered from a severe typhous or scarlet-fever. In these circumstances, we observe a very tardy eruption; collapse without advance of eruption; or, in a case somewhat more favourable, an abundant formation of large blebs, containing a thin ichor, with a very tedious and hazardous period of convalescence. To this latter form of the disease, the old writers gave the name of the "*watery* or *bladder*-pock."[a]]

Occurs only Once.—The disease rarely occurs more than once during life; and, although we may all see instances of its secondary occurrence, yet these are exceptions to the general rule. Like measles, however, and scarlatina, it *may* occur more than once.

Co-existent with Measles.—It was a dogma of John Hunter (an assertion without proof) that no two specific diseases could exist, at the same time, in the same body; but this is untrue. We see persons labouring under itch and syphilis at the same time; and there are plenty of instances on record, of small-pox co-existing with measles and cow-pock; though, in general, one disease runs its course in the body, and then the other. It is mentioned, in the "Edinburgh Medical Commentaries", that measles and small-pox occurred simultaneously in sixteen children. Out of forty-three children who were inoculated, sixteen were at the time labouring under measles; and both the diseases went on together. This occurrence took place at the Foundling Hospital in Dublin.

Effects.—Pustules frequently form around the eyes, and on the cornea itself; and there is often ophthalmia;—which not unfrequently (in the violent form of the disease) produces albugo, or staphyloma. Formerly, a great number of persons were rendered blind through the small-pox. When the disease is over, it frequently leaves scrofula. Persons may have enlarged glands of the neck; or they may have enlarged mesenteric glands; or they may have phthisis. Frequently it leaves rupia and ecthyma. Diarrhœa, too, is not unfrequently left after it; and the mucous membrane of the intestines sometimes falls into chronic inflammation.

Among the mucous membranes, those of the larynx and trachea frequently suffer much. Many children die from the upper part of the trachea being blocked up with a thick tenacious mucus, and much swoln. It is a point to which Mr. Alcock, the surgeon, has particularly attended; and

[a] "Cyclopædia of Practical Medicine"; Volume 3; Page 740.

in consequence of having had my attention directed to it by him, I have frequently examined the larynx of children who have died of this disease; and its state has been such as to astonish me. There has been great inflammation; and so great an effusion of thick stuff, as very nearly to block it up.

Morbid Appearances.—[The following is a summary of the principal results deducible from the investigations of Dr. Petzholdt, into the morbid appearances found in the bodies of persons dying of small-pox:—

"1. There occurs softening of the undermost layers of the cuticle; and, at a later period, destruction of the connexion with the cutis.

2. Orifices are never observable in the cuticle covering pocks.

3. What is called the 'pit', or 'umbilicus', is produced by the retention of the cuticle by the excretory ducts of the cutaneous glands.

4. All pocks have not a pit or umbilicus.

5. The pit, or umbilicus, never exists in pocks seated on the palm of the hand or sole of the foot.

6. On the base of the pock, and consequently on the surface of the cutis, the orifice of the gland can be seen; except in the palm of the hand or the sole of the foot.

7. The portion of the surface of the cutis not covered with pocks, is also in a morbid condition.

8. The vessels at the base of the pock exhibit marks of inflammation; those at its circumference, marks of congestion only.

9. The (so called) '*wind*-pocks' are by no means empty.

10. The cutaneous glands are generally swollen in small-pox.

11. The excretory ducts of the glands, when destroyed, as well as the hairs that fall out, are regenerated.

12. The mucous membranes of persons affected with small-pox, often exhibit inflammation, with the formation of vesicles and ulcers.

13. Vesicles and superficial excoriation are met with on the tongue.

14. On the pharynx and back part of the mouth, there are never pocks; but the glands there seated are much distended, and have very wide orifices.

15. There occurs softening of the epithelium of the œsophagus, rising into pustules.

16. At a later period, the epithelium is completely destroyed.

17. Ulcers are met with in the œsophagus; but never with *perforation* of the proper mucous coat.

18. No pocks are found in the stomach and intestinal canal; but there occurs destruction of the papillæ of the mucous membrane, particularly in the small intestine.

19. There is often dendritic vascular injection of the mucous membrane of the alimentary canal.

20. Ulcerated parts are occasionally found in the mucous membrane of the nasal fossæ.

21. Vesicles form in the trachea.

22. Ulcers occur in both larynx and trachea.

23. The mucous membrane of the genital organs is free from pocks; except at its junctions with the external skin.

24. On the serous membranes nothing more is (in general) to be seen, than what is found after their inflammation in other diseases.

25. In a few cases, an eruption was found on the serous coverings of the spleen and liver." [a]]

[a] "British and Foreign Medical Review"; Volume 5; Page 479.

Causes.—The cause of this disease, I believe, is in most instances a specific poison, generated by an individual labouring under the disease. Children sometimes have it without there being any possibility of tracing infection; but for the most part we can do so. It is a disease which is *infectious* as well as contagious.[a] There is no occasion to touch the patient labouring under it, or any thing he has touched; to be near him is quite sufficient. One reason for thinking that it always arises from another individual labouring under it is that, in Denmark, the disease was made to disappear for many years, by practising vaccination on every individual; but at last the inhabitants grew careless; and, on their being visited by persons labouring under the affection, it again broke out. If, however, the two diseases be the same, the argument falls to the ground; for if the cow-pock be merely modified small-pox, then these are merely instances of the disease occurring but once.

All Persons Liable to it.—Almost all persons are liable to take the disease;—so liable, that it is hardly right to say that a predisposition is required. From the few who escape if the poison be applied, it is a better mode of expression to say, with regard to those who will not take it, that "they are *indisposed* to it", than to say that "they are *not predisposed* to it." The only thing wanted, is the absence of an indisposition. Persons have been known to escape this disease for forty or fifty years, and then to have it. The same circumstance occurs with regard to hooping-cough, and other contagious diseases. It is supposed that the predisposition to it, is strongest in early life; but I mentioned formerly, that this is hardly proved; because most persons take the disease, if they have not had the cow-pock, in infancy or childhood; and therefore there are but few adults left to have it.[b]

Its Occurrence in the Fœtus.—Like syphilis, it may occur in the fœtus. The mother may give syphilis to a child in utero, and also the small-pox; and, in the latter affection, it is singular that the mother may communicate it to the child, without having it herself. Dr. Jenner published[c], instances of two women who were exposed to the contagion of small-pox, a few days before delivery. Both women were, I believe, exposed to it by *infection*; but one woman had had the affection formerly, and the other had been inoculated;—so that both had acquired an immunity. Neither of the mothers had the disease a second time; and, therefore, they served merely as transmitters of the poison to their children. In the one instance, the disease appeared in the child on the seventh day after birth; and the other female brought forth a child covered with the small-pox. Dr. Mead, in his "Treatise on Variola", mentions a similar fact. However, this has not always been the case; for Sir George Baker mentions that two women, who took the disease during pregnancy, brought forth children perfectly healthy; and the latter never had small-pox till they were inoculated; which did not take place till they were three years old. I do not know whether a woman can give syphilis to a child, without the disease affecting herself;—whether she can have the poison conveyed to her system by a man, and yet have no symptoms of the disease, and nevertheless produce a child affected with syphilis. In my experience, wherever syphilis has appeared in a child at its birth, or soon afterwards, the mother has shewn syphilitic symptoms, either then or soon after. It is to be remembered, however, that we have no immunity from syphilis. We have immunity

[a] See Page 341.
[b] See Page 408.
[c] In the first volume of the "Medico-Chirurgical Transactions"; Page 271.

from small-pox and cow-pock, in consequence of the disease having occurred previously; and when immunity can be produced from a poison, then the system may transmit it, though perfectly safe itself.

Period of Incubation.—As to the period at which the disease appears after exposure to the poison, the late Professor of Botany in Edinburgh (Dr. Rutherford) used to say, that a party of soldiers were exposed to it, in the natural way; and that the interval between their exposure, and the appearance of the disease, varied from twelve to fourteen days. Dr. Fordyce, who paid great attention to this subject, said that the period which I have now stated was the common interval. However, it is certainly known sometimes to come out earlier.

It is frequently Epidemic.—Like other infectious diseases, it is very frequently epidemic; and it is more frequently so at the vernal equinox, than at any other time. It is said, by Sir Gilbert Blane, to resemble measles and hooping-cough, in being more fatal during an epidemic than at any other time. After it has been absent some time, it is also more severe than at other periods. It is also observed to be like all other epidemics in another respect;—those who have it first, have it most severely.

Opinions of the Ancients on the Contagion of Small-Pox.—It is said that this was not known by the ancients to be a contagious disease; and, indeed, they confounded measles, scarlet-fever, and small-pox together.[a] Rhazes, an Arabian, and one of the oldest writers on the subject, ascribes it to the fermentation which the blood undergoes, when the youth is becoming a man. Sydenham (who has given so perfect a description of small-pox, that it can never be surpassed) had no idea that it was a specific contagion. He thought that scarlatina was most prevalent in the autumn; and ascribed it to a moderate effervescence of the blood, arising from the heat of summer. He entertained much the same opinion of measles and small-pox. I mentioned[b] that Gadbury, the astrologer, wrote (without fear of being laughed at) that plague was not more infectious than the small-pox. Then another worthy man (Etmuller) who is much quoted by German writers, says that no doubt small-pox and measles take place from the child drinking morbid nourishment in the uterus; and from sucking it in the milk after birth. He says,—"It is not probable that those who assert that measles and small-pox arise from copulation after conception has taken place, are correct; and therefore I suppose that the foundation of measles and small-pox lies in the milk, which the child takes first when in utero, and then afterwards when born."

Influence of the Atmosphere.—Small-pox was distinctly declared to be contagious by Boerhaave; who mentioned contagion as the only cause of it. But though nobody now doubts that it is contagious, yet its spread is greatly influenced by certain states of the atmosphere. Violent cold will check an epidemic small-pox. The wind called "harmattan"[c] stops small-pox, just as it does the plague; and it is said to prevent the effects of inoculation; so that if we inoculate when that wind is blowing, it is a fruitless task. I mentioned[d] this particular circumstance, when speaking of contagion in general; in order to shew what influences are exerted on it. Sir John Pringle says, that the small-pox was carried by some troops, on one occasion, to the camp; but, in consequence of some peculiar state of the atmosphere, it would not spread. Van Swieten mentions a similar fact. Dr. Odier, a physician at Geneva, mentions that when this disease was not epi-

[a] See Page 412.
[b] See Page 349.
[c] See Page 289.
[d] See Page 352.

demic, it would not spread by contagion. When children had the disease by inoculation, if they were carried about the streets, and brought into contact with other children, during the eruption, there was not a single instance of a child catching the disease. Sir James M'Grigor says, that when the disease was prevailing extensively at Bombay, in the neighbourhood of his barracks, although there was the freest communication between the inmates of the barracks and the surrounding population, yet no person about the barracks caught the disease. When we are considering whether a disease is contagious or not, we must set no value upon the circumstance of certain states of the atmosphere putting a stop to it. Contagious diseases, in this respect, are in the same predicament as those which depend altogether upon atmospherical influence. That it is a contagious disease cannot be doubted, when we reflect that it will habitually occur to children, when their parents will not allow them to have the cow-pock.

Inoculation.—Small-pox is communicated artificially by inoculation; because the disease which then arises, is much more mild than that which occurs naturally. The effect of inoculation is to lessen the number of pustules; and thus to lessen the general violence of the disease. The effect of vaccination upon the disease, if it do not prevent it altogether, is rather that of lessening its duration. Inoculation produces the disease with a far smaller number of pustules, and less general irritation; whereas, if a person have small-pox after vaccination, the disease goes on in the usual way for a certain time; and then, all at once, the feverishness ceases, and there is rapidly an end to it. It will terminate, in fact, on the sixth day, instead of the eleventh.

It appears sooner after Inoculation.—It is found, also, that the disease appears much more quickly when it is communicated by inoculation, than when it is communicated naturally. The affection usually appears on the seventh, or at the latest upon the eighth day, when it is communicated by inoculation; whereas, when it occurs by infection, it is generally from the twelfth to the fourteenth day before it appears;—and consequently we may, by inoculation, anticipate infection. If a person has been exposed to the infection of small-pox, and has great chance of having a severe disease, it is right (if we do not vaccinate him) to inoculate him immediately; because we then produce the disease more quickly than it would otherwise occur. The artificial form gets the start of the natural; and the patient has the former, instead of the latter.

The Quantity of Matter Influences its Severity.—Dr. Fordyce also mentions, that the quantity of matter applied, greatly influences the severity of the disease. He says, that if we introduce only a small quantity of matter, a less severe disease is produced, than if a considerable quantity be employed. On this account, the quantity of matter should be as sparing as possible. It should only be just sufficient to produce the disease. In cow-pock, however, a different rule must be observed; because the object, in that case, is to have the affection as complete as possible; and therefore a considerable quantity of matter must be introduced. We must not be contented with making one insertion; but must make several.

History of Inoculation.—The fact of inoculation rendering the disease milder, appears to have been communicated to the Royal Society of Edinburgh in the eighteenth century; and the knowledge of it to have been brought to England from Constantinople. The knowledge of this fact is said to have existed in China, and Hindostan, for a great number of years. The Chinese were in the habit of placing the crusts taken from small-pox patients in the nose;—having frequently kept them in jars for some years

previously. Sometimes they reduced the crusts to powder, and made the children snuff them up;—this was called "sowing the small-pox." The Brahmins are in the habit of scratching the surface of the skin, and then binding upon the scratch a piece of cotton moistened with the pus. It is said that a particular caste has the charge of this practice. They, however, prepare the patients for this process by some months' abstinence;—even from milk and butter; and this would be pretty low diet; for they have no animal meat at any time. This mode of inoculation appears to have been long practised in Persia, Armenia, Georgia, and Greece; but its origin is unknown. Some imagine that it arose in the deserts of Arabia; where there were no physicians or priests;—nothing but old women; and that the knowledge of the fact was acquired by the vulgar. However, the practice appears to have been very long known, among the peasants, in the provinces of Italy, in France, Germany, Sweden, Denmark, and even in Great Britain. In the north of Scotland, the people were in the habit of giving the children the disease, by putting them to bed with others labouring under the affection; or tying threads soaked with pus upon their wrists. But although it was known in this way, among the lower orders, before the enlightened part of the public were aware of it,—just as we shall see was the case with regard to cow-pock preventing small-pox [a],—the practice ostensibly came to us from Constantinople. Dr. Timoni wrote to Dr. Woodward on the subject, from Constantinople; and the letter was published in the "Philosophical Transactions" the year after. Pylarini, a physician, also wrote on the Turkish practice; and sent his communication home in 1715; and this was likewise given to the public in the "Philosophical Transactions." Lady Mary Wortley Montague was at Constantinople with her husband, who had been appointed ambassador to the Ottoman court; and she there learned the practice; and, being a courageous woman, tried it (with success) on her own son. On her return to England, she had her daughter inoculated. Caroline, Princess of Wales, wished to have her children inoculated; but was desirous that the experiment should first be made on six felons in Newgate. She obtained the consent of George the First; and the operation was performed. Five of the felons did well; but the sixth did not take the disease;—having, in fact, had it previously. On account of being inoculated, they were all saved from hanging. Inoculation was now thought favourably of in England; and it appears that, in the first eight years, eight hundred and forty-five persons were inoculated; of whom only seventeen died. At Boston, only one out of forty-five died.

As this was a new practice, it excited opposition. Whether the practice was good or bad, its novelty was sufficient to account for this; and many clergymen and dissenting ministers raved against it from the pulpit, and called inoculation "the offspring of atheism." Those who performed it, were called "sorcerers"; and the whole thing was said to be "a diabolical invention of Satan." Others, however, were of a different opinion; and Bishop Maddox and Dr. Doddridge defended it; and, in doing so, employed scriptural quotations. The devil can quote Scripture, to suit his own purposes; and therefore it was very fair for good men to quote Scripture too. However, the reasonable side of the question at last prevailed.

After a time, the practice was nearly relinquished throughout Europe;—just as we saw [b] was the case with regard to the use of Peruvian bark.

[a] See Page 478.

[b] At Page 309.

After the practice of exhibiting bark had been approved, the good opinion formed of it was entirely lost; so that it became "a *drug*" in the market; and inoculation was almost disused in England, from 1730 to 1740; and in France it was absolutely forbidden. The truth was, however, that inoculation caused a great loss of life. It saved the lives of a great part of those who were inoculated; but it kept up the pestilence to such an extent, that far more caught it than otherwise would have done so; and it increased the general amount of the disease.

Success of Inoculation.—With regard to the success of the practice, I may remark, that those who were not medical men, were frequently the most successful. Some Carmelitish friars inoculated the Indians of South America, very successfully; and the most successful inoculators, in every part, were non-medical men. A planter, at St. Kitt's, is said to have inoculated three hundred of his slaves himself; without having lost one. Medical men made a great preparation for inoculation, by purgatives, emetics, and various drugs; and employed all these things also in the course of the disease. They likewise confined their patients to bed, and kept them in a hot room, with a view to encourage perspiration. This practice aggravated the feverishness, and increased the mortality from the disease. Great fury prevailed against it; when, in 1754, the London College of Physicians published a declaration in its favour. Inoculation, however, met with but slender success, till the time of a person named Sutton. This quack used purgatives, and common-sense treatment, and succeeded wonderfully; so that he spread inoculation, more than the College of Physicians and all the doctors together. Sydenham practised free ventilation and refrigerants; but Sutton omitted the opiates which Sydenham was in the habit of giving; and gave calomel and tartar-emetic. Sutton also restored the Turkish practice of making only a slight scratch with a lancet. The practice, indeed, fell very much into the hands of quacks. Medical men ceased to have recourse to it; but quacks took it up, and endeavoured to "turn a penny" by it.

Such is the curious history of inoculation. Its efficacy was first doubted; the practice was afterwards approved; then violent disunion and party-feeling were excited; the most virulent abuse was poured forth; and the plan was dropped altogether. Then it was taken up by quacks; and quacks were frequently much more successful than the doctors; because they did not employ a number of medicines, which did harm. When inoculation was first practised, it is said that only one patient out of fifty died; but now, not above one in two hundred dies; and some have calculated it at not more than one in five hundred; whereas the mortality from natural small-pox was as much as one in six, even where medical aid was rendered; and where there was no medical assistance, the mortality was frightfully great. In fact, at one time, nearly all died where medical aid was not resorted to. The annual deaths from small-pox in England, during thirty years of the last century, were from thirty-four to thirty-six thousand. Before vaccination was practised, and after inoculation was established, one child in seven throughout Russia, is said to have died from small-pox; whereas Spain, which did not trouble herself about inoculation, suffered far less than any other country;—the disease having been kept up in others by inoculation.

Diagnosis of Small-Pox.—[Before the appearance of the eruption, the diagnosis of small-pox is always liable to uncertainty, even with every attention to the character of the prevailing epidemic: for the precursory symptoms

are common to other diseases. The grounds on which we attempt, at this early period, to determine the nature of the approaching disorder are:—1. The suddenness of the attack. 2. The absence of previous ailment. 3. The exposure to variolous contagion. 4. The having previously undergone one or more of the exanthemata. The diseases with which, after the occurrence of febrile eruption, small-pox may be confounded, are measles, febrile lichen, varicella, and secondary syphilis.

1. The papulæ of true small-pox are firmer than those of measles. They feel granular, like hard bodies, under the finger. In measles, too, there is accompanying cough, and watering of the eyes. Further: forty-eight hours elapse, in small-pox, from rigor to eruption; seventy-two hours in measles. 2. Febrile lichen is the disease from which small-pox, at the onset of eruption, is with most difficulty distinguished. The aspect of eruption is in both cases nearly alike. The surest and safest grounds of diagnosis are based on the interval which has elapsed from rigor to eruption, and the seat and extent of eruption. In febrile lichen, twenty-four hours elapse from sickening to eruption; in small-pox, as we have said, forty-eight. Small-pox almost always appears first on the face; the eruption of lichen is equally developed, from the first, on the trunk and head. 3. The diagnosis of small-pox and chicken-pox will be pointed out by and bye.[a] 4. There is a form of secondary syphilis, in which an eruption appears on the face and trunk, very similar to distinct small-pox. This eruption passes through the several grades of papula, vesicle, and pustule. It is preceded by a febrile attack of variable duration. This circumstance has, in many instances, given rise to the notion of small-pox occurring twice. A case of this kind fell under our own observation[b] very recently. The diagnosis is to be effected by accurate inquiry into the prior history of the case, and the further progress of the eruption. The pustular syphilitic eruption runs a tedious course, exceeding ten days; and the pustules are developed, not simultaneously (as in small-pox), but in successive crops.

Prognosis.—The danger, in small-pox, is dependent on a variety of circumstances; but chiefly on the following:—1. The quantity of the eruption. 2. The condition of the mucous membranes. 3. The state of the fluids. 4. The state of the nervous system. 5. The age of the patient. 6. His habit of body. 7. The circumstances in which he is placed, and the treatment adopted.

1. Distinct small-pox is a disease of little or no danger. Confluence is always unfavourable, especially on the face; nor is the nature of the danger always understood. A confluent case sometimes appears to progress favourably; when, unexpectedly, a convulsive fit occurs, and the patient is destroyed. The drain which confluence necessarily occasions in the system is sometimes the obvious cause of danger. Nevertheless, if the pustules on the extremities acuminate well, and are surrounded by a crimson areola, a good ground of hope exists. If the vesicles on the trunk and extremities, on the other hand, be flat, with a clarety areola, while the eruption on the face is white and pasty, no reasonable hope of recovery can be entertained.

2. The condition of the mucous membranes, especially that of the larynx, is equally important with reference to prognosis. Hoarseness at an early period of the disease, is always unfavourable. A natural tone of voice, again, is a good omen; even though the eruption be full and con-

[a] See Page 480.

[b] That of Dr. George Gregory.

fluent, with a disposition to cellular inflammation. The appearance of the mouth and throat will also serve as a useful guide to the probable state of the larynx and trachea.

3. The condition of the fluids is a circumstance by which the physician will, in a great degree, be guided in his prognosis. Every thing which indicates malignancy and putrescency is highly unfavourable. Petechiæ, menorrhagia, mucous hæmorrhages, and vesicles filled with a bloody ichor, are therefore among the worst signs that can occur. Recovery from the petechial small-pox has been recorded; but it is among the rarest events which the history of this disease presents.

4. A tranquil state of the brain and nervous system is particularly favourable; and is the circumstance to which the recovery of all severe confluent cases is mainly attributable. Quiet nights, composure of manner, a contented disposition, and confident hope of recovery, are good signs; restlessness (on the other hand), a continual moaning, despondency of mind, and a succession of sleepless nights, afford but little hope of recovery. Children who grind their teeth seldom do well.

5. Age is a point of great moment, in estimating the comparative degree of danger in confluent and semiconfluent cases: the extremes of life are those on which small-pox always falls the heaviest. Persons above forty years of age, seldom recover, even from semiconfluent small-pox; infants are in danger, even from a moderate quantity of eruption: in both, the process of cicatrization is attended with great exhaustion of nervous power; the result of which is, that some internal organ necessary to life (the larynx, brain, or lungs) takes on acute and rapidly destructive inflammation. The arteries here act without the due control of the nerves. The most favourable age for taking small-pox, is from the seventh to the fourteenth year; when the powers of life are in full vigour, without the risk of plethora.

6. The habit of body is, of course, also to be taken into account. Small-pox is always aggravated by its concurrence with a *plethoric* habit. Great constitutional debility is equally to be dreaded. In the strumous habit, the sequelæ of small-pox are peculiarly severe, and often bring life into danger after the crisis has been passed.

7. The probability of recovery must depend, lastly, upon the circumstances in which the patient is placed; on the possibility of applying remedial measures effectively; on the treatment which has been pursued in the early stages, and other contingencies which scarcely admit of enumeration. In hospitals, the danger of contracting fever and erysipelas, during the later stages, is never to be lost sight of. In private life, small rooms, superabundant bed-clothes, and ill-timed cordials, may aggravate or bring on local congestions and inflammations, from which the hospital patient is exempted. In certain seasons and states of the air, small-pox is more to be dreaded than at other times.

These principles of prognosis will lead naturally to the consideration of the average mortality in small-pox, the usual sources of death, and the morbid appearances.

Mortality.—The average mortality by small-pox is usually stated as one in four of those attacked, or twenty-five per cent. At the Small-Pox Hospital, the extremes have been fifteen per cent. and forty-two per cent. The average of twenty-five years prior to the introduction of vaccination, gave thirty-two per cent. The proportion which the mortality by small-pox bears to the total mortality in any town or district, has been a favourite subject of inquiry with all writers on medical statistics. Prior to 1800,—

that is, before the period when vaccination influenced the results,—the deaths by small-pox were to the total deaths, both in town and country, as sixteen to one hundred. It has been observed, by all writers, that in the unprotected the greatest mortality takes place in the early periods of human life. Dr. Haygarth computed that at Chester, in the latter part of the last century, one half of the deaths in children below ten years of age, was due to small-pox. The mortality is heaviest from the second to the fifth year. From the "First Report of the Registrar General of England", it appears that in 1837 there were only five diseases more fatal in England than small-pox; and that the deaths throughout England and Wales, by that disorder, amount now annually to about 12,000.

Small-pox may prove fatal at any period from the first invasion of fever to the fortieth day. Death may even take place prior to the development of eruption; but such cases are rare. In all countries it has been observed, that the eighth is the day of greatest danger, and the second week that which exhibits the greatest amount of mortality. The following table, extracted from the records of the Small-pox Hospital for 1828-9, showing the period of eruption at which 168 patients died, and the days on which the disease proved fatal, illustrates this; while it points out how little importance can be attached to the doctrine of critical days in small-pox.

Of 168 fatal cases of small-pox there died on the

	Day.	Cases.
First week.	3d	1
	4th	5
	5th	10
	6th	5
	7th	11
		32

	Day.	Cases.
Second week.	8th	27
	9th	15
	10th	14
	11th	16
	12th	11
	13th	11
	14th	5
		99

	Day.	Cases.
Third week.	15th	7
	16th	5
	17th	3
	18th	3
	19th	1
	20th	2
		21

	Day.	Cases.
Fourth week and later.	22d	3
	23d	1
	24th	3
	25th	1
	27th	1
	28th	1
	29th	1
	31st	1
	32d	1
	35th	1
	38th	2
		16

The mortality varies, of course, with the character of the eruption. The subjoined table shews the proportion in which each variety of small-pox proved fatal at the Small-Pox Hospital, during the epidemic of 1838.[a]

[a] TABLE exhibiting the Comparative Mortality in the several Varieties of Normal and Abnormal Small-Pox at the Small-Pox Hospital, during the Epidemic of 1838.

	Unprotected.		Vaccinated.	
Normal Small-Pox.	Admitted.	Died.	Admitted.	Died.
Confluent	295	149	56	21
Semiconfluent	78	8	42	4
Distinct	19	0	20	0
Total Normal	392	157*	118	25
Abnormal Small-Pox.				
Confluent Modified	2	0	38	4
Semiconfluent Modified	1	0	28	1
Varicelloid	1	0	114	1
Total Abnormal	4	0	180	6
Grand Total	396	157	298	31†

* Of these there died of fever and superadded erysipelas, 14.
† Of these there died of fever and superadded disease, 10.

The concluding table will complete this branch of the subject, by pointing out the comparative mortality of small-pox at different ages;—distinguishing the vaccinated from the unvaccinated.[a]

The immediate causes of death, in small-pox, are various;—as the preceding detail of symptoms will have shown; but it may be useful to exhibit them in a condensed form:—1. Prior to the maturation of the pustules, (that is, from the invasion of fever to the seventh day of eruption,) small-pox proves fatal by that general derangement of the system which occurs in *malignant fever*. Such a condition of the body is well designated by the term "*acute malignancy*." 2. During the second week of eruption, the chief cause of death is to be found in affections of the larynx and trachea, and consequent suffocation. 3. During the third week (that is, during the stage of secondary fever) death may happen either by general excitement,—leading to effusion of the brain; or by supervening pleurisy, pneumonia, or laryngitis; or, lastly, by extensive sloughy or gangrenous destruction of the skin. 4. During the fourth week, and at still later periods of the disease, death may take place from mere exhaustion; or it may be the result of erysipelas, or of some other disease excited by the small-pox, or engendered by that constitutional debility which such a disorder in any of its severe forms so frequently leaves.[b]]

Treatment.—There is nothing peculiar in the treatment of this disease. It is only the treatment of any ordinary fever. The utmost cleanliness should be observed; the patient should have plenty of clean linen; and mild antiphlogistic diet will be proper;—at least in the first instance. There is no harm whatever in cold or tepid ablution; provided the body is hot. Some say that they have stopped the disease by affusion; but we may have recourse to tepid ablution, if there be any objection to cold; and, as the fœtor is very great, it would be well to wash the patient with a solution of the chlorides, and to use them freely around the bed. Now and then it may be proper to bleed. The head is sometimes so much affected that, in the case of adults, general bleeding may be premised; or, at any rate, the application of leeches to the temples. The pain in the loins, which characterizes the disease, generally goes off very soon; but the oppression of the head may require local bleeding; or, in adults, *general* bleeding. Usually the latter is not necessary; but every practitioner must judge of that for himself. Purgatives are proper; for the bowels should

[a] TABLE exhibiting the Mortality of Small-Pox at different Ages, and in different Circumstances, as displayed at the Small-Pox Hospital of London, in the Epidemic of 1838.

Ages.	Unvaccinated.		Vaccinated.	
	Admitted.	Died.	Admitted.	Died.
Under 5 years of age . . .	42	20	0	0
From 5 to 9 inclusive . .	37	11	5	0
„ 10 to 14 „ . .	30	8	25	0
„ 15 to 19 „ . .	104	32	90	6
„ 20 to 24 „ . .	115	50	106	16
„ 25 to 30 „ . .	45	23	55	8
„ 31 to 35 „ . .	12	7	13	1
Above 35 years of age . .	11	6	4	0
Total . .	396	157	298	31

[b] "Library of Medicine"; Volume 1; Pages 303 to 306.

be kept freely open. By cleanliness, the employment of the chlorides, purging, bleeding (general or local), and low diet, the disease will be got through in the most favourable manner.

After a time, if the patient's pulse become weak, or if the pustules be not well filled, and there be no violent local disease;—if, in short, there be any signs of debility, and of the disease assuming a typhoid type,—then wine and stimulants should be given. Sydenham was in the habit of giving opium at first; and I certainly think, in that respect, his practice was bad. In confluent small-pox, when the patient is covered with pustules, so great a number of little abscesses must be considered equal to one large one. There is universal suppuration of the surface; and the patient requires to be supported;—just as he would in the case of a common abscess. It is frequently necessary, also, towards the close of the disease, to give wine, ammonia, and sulphate of quinina; together with good nourishment. But there may be, on the other hand, such sharpness of the pulse, and such general irritation, that measures of this nature are improper; and we must be contented with giving the patient, perhaps, no more than milk or whey, and keep him cool. There is, as I have already said[a], nothing peculiar in the case; it is only the treatment of fever.

Some have advised the letting-out of the matter from each pustule. It is an old practice; but it has lately been talked of again. This might be done with a needle; and it is said there is some utility in the practice. Any inflammation that may occur (whether in the head, eyes, bronchia, or intestines) requires to be attended to. We must constantly be on the look out for these affections; but the treatment is certainly to be conducted altogether on general principles. We have only to remember that we are treating, not merely an *inflammatory*, but a *specific* disease;—a disease attended by suppuration on the surface. Fresh air, cleanliness, and the chlorides, are very proper;—just as in other cases.

SECTION VI.—VACCINIA.

Nature.—The next disease which I shall describe, the cow-pock, was placed, by Drs. Willan and Bateman, in the order "vesiculæ"[b]; but although there are only vesicles at first, the contents become so turbid that, at last, there is genuine pus; and I think it is much more consistent altogether to put it in the same order with small-pox. Indeed the cow-pock (called "vaccinia", from "vacca", *a cow*) is believed, by many, to be nothing more than a modification of small-pox;—to be merely the small-pox, modified by passing through the cow. There can be no doubt that small-pox is an affection which cows, and perhaps other brutes, may have. Accounts have been published, in different journals, of experiments made with a view of ascertaining this point. Clothes have been taken from patients labouring under small-pox, and laid on cows; and they have had the disease called "cow-pock." If the disease be really small-pox, modified, we then see no wonder in the circumstance that *cow-pock* generally affords an immunity from *small-pox*. Cow-pock, however, is a far milder disease than small-pox; and is strictly contagious. It cannot be communicated by *infection*, as small-pox may; it is only communicated by palpable matter.

Are Variola and Vaccinia Identical?—[The answer to this interesting

[a] See Page 471. [b] Order 5.

question, is to be found in the late very interesting researches of Mr. Ceeley, published in the last volume of the Transactions of the Provincial Medical and Surgical Association. In the report on this subject, we are informed that Mr. Ceeley—

"Resolved to attempt to ascertain whether he could, by inoculation, impregnate the cow with human small-pox. Twice he has succeeded in accomplishing this important object, after many previous fruitless trials. His experiments were conducted in the presence of five medical men and one veterinary surgeon. He produced five vesicles on the cows; from which source several hundred patients have been vaccinated, and have exhibited all the phenomena of vaccination, in the most perfect form and complete degree. There was no attendant eruption; nor any thing that could lead him to suspect, that he had not in this manner propagated the genuine 'variolæ vaccinæ.' He kindly transmitted portions of this lymph to the President of the Section, who immediately committed it to the care of Mr. Coles and several other gentlemen; in whose hands it produced regular vesicles, which in every respect corresponded with those so beautifully delineated by Dr. Jenner, in his first publication.[a] This circumstance forcibly arrested the attention of every one who saw the vesicles; and that too, in several instances; though the source whence the lymph was derived was not known. The correctness of the vesicle formed by it, exhibits a marked contrast to that which we have seen produced by other virus now in use; and we fear that the local as well as general disturbance occasioned by the latter, so far from being a source of protection, will be found to be the reverse.

"On the first of February, 1839, he inoculated with small-pox matter ('variola discreta') of the seventh or eighth day, three young heifers; a fourth was, at the same time, vaccinated. The reporters limit their account of what happened to the first.

"Mr. Ceeley made seven punctures, and introduced fourteen points near the left *labium pudendi*; and, on the same day, inserted two setons with matter from the same subject. On the ninth day after this process, he vaccinated the same animal on the right *labium pudendi*, with fifth, sixth, and seventh day's lymph from a child, in seven punctures with fourteen points; and below the pudendum, in four punctures with eight points. On the tenth day after the insertion of the variolous matter, one of the punctures, near the posterior margin of the left *labium pudendi*, had assumed the form of the natural vaccine vesicle. By gently removing the central irregular crust, and carefully puncturing the cuticle, he was able, in the course of an hour, to charge thirty-eight points with lymph, and on the same and subsequent days to use part of it on children and adults. On the thirteenth day the small-pox vesicle was more inflamed and florid; this was the fifth day after the insertion of vaccine lymph, at which time all the eleven punctures were converted into effectual vesicles; from these he took fine clear lymph, and used it on children and adults. Both the variolous and vaccine vesicles subsequently ran nearly a parallel course; so that, on the twenty-sixth day of the former, and on the seventeenth day of the latter, the scars of both appeared perfectly similar.

"To obviate objections which might arise from the insertion of the vaccine

[a] "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ;—a Disease discovered in some of the Western Counties of England, particularly Gloucestershire; and known by the name of the 'Cow-Pox.' By Edward Jenner, M.D." See, also, his "Further Observations on the Variolæ Vaccinæ"; and "Continuation of Facts and Observations relative to the Variolæ Vaccinæ, or Cow-Pox."

lymph on the ninth day after the inoculation with the variolous matter, Mr. Ceeley re-inoculated a sturk on the fifteenth of February with small-pox matter, of the seventh or eighth day, on the *labium pudendi*. He made eight punctures; which were deluged with the variolous fluid from capillary tubes. On the fifth day, the four upper punctures were enlarged and elevated; the other four were less so. On the sixth day all presented the appearance of the vaccine vesicle. From one of them he took lymph with difficulty, and scantily charged thirty-nine points. On the eighth day, he again took lymph from the vesicle opened on the sixth. On the ninth day, the vesicles were enlarging; and he again opened carefully the first vesicle and charged twenty points. On the tenth day, the four lower vesicles were increasing; and from them he charged twenty-seven points. After this time the brown crusts appeared, and the disease gradually declined. This animal was subsequently inoculated, both with variolous and vaccine matter; but no result followed.

"The practice of inoculating the cow with vaccine virus taken from man, was very early attempted. It is not to be overlooked, that the difficulty of accomplishing this is almost as great as that of inoculating the animal with small-pox. It succeeded, however, in the hands of Dr. Waterhouse; who, in 1801, impregnated one of his cows; and obtained from her a 'crop of matter on the ninth day, which produced the disease in the human subject to perfection.' Mr. Fox, of Cerne Abbas,—who has paid great attention to this subject, and seen the disease, as well among the cattle as on the hands of the milkers,—has also successfully vaccinated the cow.

"The same experiments have been performed at Passy, in the neighbourhood of Paris. The lymph found there in 1836, among the cows, has been recently again passed through the animal; and this is called 'retro-inoculation.' Mr. Ceeley, too, has often been enabled to communicate the vaccine disease from man to the cow. He has observed, that good human lymph, when transmitted in this manner, loses some portion of its activity. It rises late, and produces smaller vesicles; but ultimately, *after successive inoculations on man*, it resumes its activity.

"The reporters rightly designate this a triumphant conclusion of an investigation of more than fifty years' duration; and the best monument to the sagacity of Jenner. They deduce from what has been done the following aphorisms; to which they entreat the attention not only of the profession, but of the public:—

"1. Cattle, in many ages and different countries, have been afflicted with small-pox.

"2. This disease among the inferior animals has simultaneously existed with the small-pox in man, and pursued its victims through every quarter of the globe; and it exists at this time in Asia, in a fatal and pestilential form.

"3. It appeared among the cattle in England in the year 1745, and again in 1770, and continued its ravages up to the year 1780; and the local remains of this epizootic still occasionally show themselves, with considerable severity.

"4. The casual transmission of this disease to the milkers in the dairies of Gloucestershire, and their subsequent immunity from human small-pox, first led Dr. Jenner to the investigation of this singular affection, and ultimately to establish it as a substitute for the more pestilential and fatal form of the disease.

"5. When the disease appears among the inferior animals in a malignant form, it produces, by inoculation, a disease of similar severity in man.

"6. As man has received this affection from the cow, so likewise has the cow received it from man.

"7. The direct inoculation of the cow with human small-pox, has produced a mild and mitigated disease; and such disease, reproduced by inoculation on man, accords entirely in its character, in its progress, and in its protecting influence, with the 'variolæ vaccinæ', as described by Dr. Jenner[a];—thus irresistibly proving his fundamental proposition, that cow-pox and small-pox are not *bonâ fide* dissimilar, but identical; and that the vaccine disease is not the preventive of small-pox, but the small-pox itself;—the virulent and contagious disease being a malignant variety."[b]]

Phenomena.—The disease, given artificially, begins a few days after the poisonous matter has been inserted into the body. By a slight scratch, or by a wound of any description, a small transparent pearl-coloured vesicle is formed, with a circular or somewhat oval base. The upper surface is more elevated at the margin than at the centre, till the end of the eighth day;—the margin itself being red, turgid, shining, and roundish; so that it often extends a little over the line of the base. The vesicle contains clear lymph, in little cells that communicate with each other. About the eighth or ninth day, it is surrounded by an areola, varying in diameter (in different cases) from a quarter of an inch to two inches; and is usually attended with considerable swelling, and hardness of the adjoining cellular membrane. The areola declines from the twelfth day. The surface of the vesicle then becomes brown in the centre; and the fluid concretes into a hard round scab. The colour afterwards becomes black; and so it may remain for two or three weeks. It is important to remember, that there is left a permanent cicatrix, about four or five lines in diameter; the surface of which is marked by pits, denoting the number of cells of which the vesicle has been composed.

The vesicle is formed about the *sixth* day after the insertion of the virus. About the *seventh* or *eighth* day, there is an inflamed areola;—a swelling and hardness; and it is on the *eleventh* day that all the symptoms decline. The vesicle then becomes muddy, and darker. If there be any pyrexia of the system, it occurs about the *eighth* or *ninth* day. Now and then (and I have seen such a case myself) the disease has not appeared for two or three weeks after vaccination; and then suddenly the disease has begun, inflammation has taken place, and the affection has gone through its regular process.

Indications of Perfect Vaccination.—If there be a violent degree of inflammation, or if the disease vanishes too rapidly, or if there be any variation from its proper course, we must not imagine that any security from the small-pox is afforded. If, on the one hand, there be too little inflammation,—so that the affection soon subsides, and no genuine vesicle is formed; or if, on the other hand, there is too violent an inflammation; then, in either case, we may doubt whether the disease will be of any use. Nay, more: if the cicatrix, after the disease has appeared to go through its stages properly, is not of the description which I have now mentioned;—if there be not a permanent cicatrix, about five lines in diameter (a little depression, with very minute indentations), we may then suspect that the

[a] See Page 473.

[b] "Medico-Chirurgical Review"; October, 1840; Page 399. This extract has come to us through the medium of Braithewaite's "Retrospect of Practical Medicine and Surgery, for the year 1841." (Pages 259 to 262.) As a work of reference and record, this is a very useful publication; since it gathers into a small compass the most valuable medical communications, scattered through the different periodicals, in the course of the year.

disease has not been perfect. In the case of all contagious diseases, we may have a disease of the greatest mildness, or the greatest severity. A contagious disease will not only vary as to the time at which it appears after the virus has been applied, but it will vary as to the time at which it goes through its course [a]; and it will vary as to its degree;—so that I am satisfied that the plague will sometimes occur with only a slight indisposition; and we continually see gonorrhœa so mild, as to last only twenty-four hours; whereas, in other cases, it will be so severe as to last some weeks. Now this general fact is strikingly shewn in cow-pock. It continually dies away, from the disease not being fully formed; and, on the other hand, it sometimes is so very violent, that the whole course of the affection is disturbed. Nothing should occur for twenty-four, or perhaps forty-eight hours; and then there should be a little irritation. A vesicle ought to be gradually formed; on the seventh or eighth day there should be an areola; and all the symptoms should decline on the eleventh day. When it is all over, a dark and hard scab ought to be seen, for two or perhaps three weeks; and then a permanent cicatrix should be left; with little indentations, arising from the cells of which the pustule has been composed.

Small-Pox Modified by Vaccination.—This disease, in the greater number of cases, gives immunity from the small-pox; and where it fails (which it frequently does) the small-pox is, in the greater number of instances, milder than it otherwise would have been. In general, when that disease occurs after cow-pock, it suddenly stops; it is ushered in by great pyrexia; and then, about the sixth day, it suddenly declines.

I mentioned [b] that the effect of inoculation for small-pox, is not of this description;—that it causes the disease to be produced with a smaller number of pustules; whereas vaccination does not lessen the number of pustules, but shortens the course of the disease; so that, about the sixth day, all the violence generally ceases. This, however, is not a universal occurrence; because some patients die of the small-pox, after they have had the cow-pock. At first, it was imagined that cow-pock was a *certain preventive* of the small-pox. That, however, was a hasty conclusion. Because it prevented the disease for a certain time, and in the majority of cases, that afforded no solid basis from which to infer, that it would prevent it in *all* cases, and for the rest of life. Further experience was necessary, before such a conclusion could with propriety be drawn. But we may now safely assert, that a great number of persons who are vaccinated escape the small-pox; and where persons do *not* escape, the greater number of them have the disease very *mildly*. I believe the whole of the matter comes to that.

Circumstances Influencing the Protective Power of Cow-Pox.—[Among the circumstances that materially influence the protecting power of cow-pox, is time. In the early periods of vaccination (1800 to 1805), the practice of inoculating after cow-pox,—so as to test its prophylactic power,—was carried to a great extent; and many thousands were exposed to the variolous effluvium, with impunity. Since the year 1808, these experimental testings have almost entirely ceased; and, consequently, we know very little concerning the effect of inoculation at long intervals from the date of vaccination. But it is a matter of general notoriety, that small-pox taken casually after vaccination is very rare under the age of eight years. The protective power may be considered as nearly complete for that period.

[a] See Page 354. [b] See Page 465.

About the ninth or tenth year of life, small-pox after vaccination begins to be met with. It increases in frequency at the period of puberty, and is still more common between the ages of 18 and 25. With these facts before us, it is impossible to conceal the apparent conclusion, that time lessens the power of resistance to the variolous germ.

The influence exerted by an atmospheric constitution over the power of variolous resistance, opens a wide but hitherto neglected field of inquiry. Having now witnessed in London two severe epidemic visitations of small-pox, we[a] have no hesitation in stating, that such influence is undoubted. The fact does not, from its very nature, admit of direct proof; but the number of persons attacked during epidemic seasons, after having successfully resisted small-pox contagion *communibus annis*, offers an argument in favour of the position, which to our minds is irresistible.

We[a] come now to apply these views of vaccine pathology to the examination of the two practical measures suggested, of late years, to remedy the acknowledged defects of vaccine influence. The first of these is recurrence to the cow, for supplies of primary lymph. The second is revaccination, at distant intervals from the date of the primary process.

1. *Recurrence to the Cow for Primary Lymph.*—The impression that vaccine virus decays in power in proportion to the number of times that it makes the circuit of the human body, has long prevailed, and is steadily gaining ground. In all parts of the Continent, and in England, it has led to frequent trials of lymph recently obtained from the cow.

Persons vaccinated by Dr. Jenner himself, in the very infancy of the practice, before such deterioration could possibly have taken place, have undergone small-pox in after-life. Such occurrences are now more common than formerly; but much may be attributed to the extension of the practice of vaccination. The Royal Jennerian Institution of London employs, now, the same lymph which has been in use since the year 1806, when the Institution was founded. According to this authority, lymph recently obtained from the cow, does not generate a vesicle in any way superior to that produced by the old lymph. ("Report of the Royal Jennerian Institution", for 1836.) The same result was obtained in Italy, in 1829; when the alarm of epidemic small-pox induced the Piedmontese physicians to try a variety of new stocks of lymph. We are informed by Dr. Griva ("Epidemia Vainolosa del Torino," 1829), chief of the Vaccine Establishment at Turin, that "no perceptible difference was to be traced between the aspect and progress of the old and the new, the primitive and the long humanized, virus." In Germany, the plan of recurrence to the cow has been largely tried of late years. In Wirtemberg alone, between 1831 and 1836, forty varieties of primitive lymph were successfully employed. The notion of superior efficacy attaching to the new lymph was, however, not generally entertained. (Heim's "Historische Kritische Darstellung der Pockenseuchen.") On the other hand, we are bound to acknowledge, that the Small-pox Hospital of London, changed its old stock of lymph for more recent matter in 1837; and that a marked improvement was perceived in the resulting vesicles. The local inflammation was more severe; the constitutional symptoms were more violent; the virus was more energetic; the most minute incision took effect; and the lymph given out on the ninth and tenth day was still in an active state. The National Vaccine Establishment has also, on several occasions, varied its stock of lymph with advantage. In France, a new variety of vaccine

[a] Dr. George Gregory.

lymph, obtained from the dairies of Passy, near Paris, and called "*Passy* lymph", was brought into use in 1836; and is considered by many as superior to the old stock. In 1838, Mr. Estlin, of Bristol, opened a new source of lymph from a dairy in that neighbourhood. It has been found very energetic; and is now employed in many parts of England, in preference to the lymph of the National Vaccine Establishment.

2. *Revaccination.*—By many of the physicians of Germany, this measure is extolled as scarcely less important in its effects, nor less widely applicable, than vaccination itself. The authorities in Paris, on the other hand, have reported to the French government against the necessity of revaccination; and there is really some difficulty in deciding on the actual merits of the plan. The Germans aver that few, if any, of the recently revaccinated have fallen under the influence of small-pox; but the time which has elapsed since the general adoption of the measure, detracts from the value of such a statement. The practice may be recommended for its safety, even if it be much less serviceable than the Germans contend for. We have sufficient facts before us to state, with confidence, that it need never be recommended prior to the tenth year of life; and that the age best fitted for it is from the period of puberty to that of confirmed manhood.[a]]

Mode of Operating.—This disease produces only a single vesicle or pustule. It does not produce a number all over the body; as small-pox, and other pustular diseases, do. As it is very desirable that the disease should be fully formed, and the constitution thoroughly affected by it, it is the practice to make several insertions of the matter; perhaps two in each arm. The arm is as convenient a place as can be chosen; and it is usual to make two wounds in it. The lancet should be held so that the matter may gravitate into the wound. There is no treatment required in this affection, unless we think it advisable to give the child a mild aperient.

History of Vaccination.—As to our knowledge of the effect of this disease, in preventing the common form of small-pox, I may mention, in a few words, that we are indebted for the publication of the fact to Dr. Jenner. In 1768, when he was an apprentice, he learned by report that the cow-pock, on the hand of milkers, prevented them from having the small-pox; and he very frequently, at his master's, had to dress the hands of such persons. From his inquiries, he satisfied himself that the ulcers he dressed, were derived from the teats of cows. He learned, too, that it was very well known among the peasants, in that part of the country, that persons who had these sores upon their hands, could never be made to take small-pox by inoculation. In the further prosecution of his studies, he came up to London; and having returned to the country, and settled there as a surgeon, he commenced a series of inquiries into this matter. He found a very considerable number of persons insusceptible of the small-pox; and, in all these cases, he was assured that the persons had had the cow-pock. The oldest farmers, however, said that the idea was not known in their younger days. Notwithstanding this insusceptibility which he found among so many persons, he met with exceptions; and he found some who had had those sores, and yet afterwards had the small-pox. Some medical men, of whom he made inquiries, believed the fact; and others disbelieved it. He found the difficulty cleared up, in a great measure, by ascertaining that there were several sorts of sores, arising from cows' teats, which were communicated to those who milked them; but that there was only one which

[a] "Library of Medicine"; Volume 1; Pages 325 and 326.

was the genuine cow-pock. He likewise had to encounter another obstacle. From the influence of external circumstances, the pock among the cows ceased; and he was unable to make any experiments on the subject. I mentioned[a], when speaking of contagious diseases in general, that affections, respecting the contagion of which there can be no doubt, will sometimes cease, and sometimes cannot be made to spread;—merely (as it would appear) from certain external circumstances. Now cow-pock—which is only *contagious*, not *infectious*—is said to have ceased for a time; so that it was impossible for Dr. Jenner to get matter with which to make experiments.[a] However, in 1796, the cow-pock broke out in a dairy-maid, whose finger had been scratched. From this finger he vaccinated a boy; and regular cow-pock was produced. He repeated the experiment on another;—taking the virus from the human subject; and he then likewise produced the disease. He mentioned the facts to several of his medical friends; and prepared a document to lay before the Royal Society; but he was advised, in kindness and true friendship, not to expose himself by communicating any such nonsense, merely because it was new. However, he persevered. He did communicate his knowledge to others; and just the same fury was excited among medical men, that had been excited formerly, when inoculation was first made known to them.[b] It was said that it was taking the power out of God's hand; that God gave us the small-pox; and that it was impious to interrupt it by the cow-pock. When I was a boy, I heard people say that it was an irreligious practice; for it was taking the power out of God's hand;—forgetting that it is merely *using* that power which God has given to us. Sermons were preached for it, and against it; and hand-bills were stuck about the streets. I recollect seeing it stated, in a hand-bill, that a person who was inoculated for the cow-pock, had horns growing in consequence of it. Many were said to have died of mortification, produced by this practice. One of the surgeons at St. Thomas's Hospital[c],—there being no clinical lectures then,—used to give gratuitous lectures against the cow-pock; in which he advised the students not to resort to such a practice. He was interred in London; and, by his direction, a tablet was erected to his memory; on which was inscribed the fact, that he was all his life strongly opposed to *cow-pocking*. His rancour did not cease even with his death. It appears that a great want of candour and of principle was manifested; and that an account was forged, setting forth a number of deaths as having arisen from the disease. After a time, however, all this ceased; and now, I need not say, it is a regularly established practice; although it certainly does not deserve such encomiums as Dr. Jenner supposed it did. It is not an absolute preventive of the disease; but it does prevent it in a large number of cases; and where it does not, it generally makes it much milder. I will not take up more time with its details; because Mr. Moore's "History and Practice of Vaccination"[d], (which is almost as amusing as a novel,) contains every thing that can be said respecting it.

SECTION VII.—VARICELLA.

There is another disease, very much allied to all these; and called "the *little* small-pox", "varicella" (the diminutive of "*variola*"), or (in common language) "the *chicken*-pock", or "*swine*-pock." In general, it requires no

[a] See Page 352.
[b] See Page 466.
[c] Mr. Birch.
[d] See Note (b) to Page 458.

treatment; any more than *cow*-pock. It is only important to know that there is such a disease; because people frequently think that their children are going to have the small-pox, when they are not. [a]

Diagnosis.—The affection begins as a vesicular disease; but there are generally some pustules. There are, however, fewer pustules than in small-pox; and, for the most part, they do not amount to more than two hundred. They go through their course, too, with far greater rapidity than small-pox; and there is very little irritation of the system; frequently none at all. It is sometimes a difficult matter to distinguish between it and small-pox; but when we consider that the disease has far fewer pustules, that it generally runs through its course with great rapidity, and with scarcely any disturbance of the system, there is no great difficulty in making the diagnosis;—more especially if we know that the child has had the small-pox before. [b] It is said that, in chicken-pock, there is always cough;—that a case never occurred, without being attended by some degree of cough.

Symptoms.—It is a contagious affection; and there is a little feverishness before the disease takes place; but in about six days the whole is over. I believe there is never any internal affection, of any consequence, when this disease exists. In very rare cases, there are violent pyrexia, headach, delirium, and even convulsions; but they are all transient. There is no severe affection of the larynx, of the bronchia, or of the intestines; as there is in many other cutaneous diseases.

Identity with Small-Pox.—Some have imagined that this disease is only a modification of small-pox;—that it is only a milder form of the disease called "*modified* small-pox"; but I will not give any opinion on the subject; because I do not think that we have sufficient observations, on these various diseases, to enable us to speak with any degree of certainty. After this disease, just as after small-pox [c], I have frequently seen ecthyma and rupia take place; and sometimes, as in small-pox [d], there have been scars. I had the small-pox myself, and was not pitted at all; but the chicken-pock came afterwards, and left several pits;—so that the disease occasionally produces pitting, here and there;—the same as small-pox.

[Dr. Thomson maintains, that varicella is nothing more than modified small-pox; and supports this opinion by the following arguments:—1. Persons placed in contact with patients affected with chicken-pox, have contracted variola; and the contagion of the latter affection has given rise to varicella. 2. Wherever small-pox is epidemic, varicella is also observed. 3. Chicken-pox is never developed, except in persons whose constitutions have undergone some modification from vaccination, or a previous attack of small-pox. This opinion of Dr. Thomson, however, is far from being generally adopted, even by those who coincide with him entirely respecting the varioloid nature of the vesicular eruptions observed in small-pox epidemics. The following are the arguments they use:—1. The true vesicular varicella cannot be transmitted by inoculation; and never, in any circumstances, gene-

[a] The best description of this disease, is contained in Dr. Heberden's "Commentaries", Chapter 96; and is well worth reading. The appellation he gives it, is "variolæ pusillæ"; and he states his belief, that the "*chicken*-pox" and "*swine*-pox" differ only in name.

[b] "In the true chicken-pox, the vesicles have not that regular organization, which we have described as belonging to, and actually essential to the existence of variola, even in its mildest aspect. (See Page 460.) The vesicles of chicken-pox have neither a hard papuliform base, nor cells, nor central depression. They are mere elevations of cuticle, of irregular and undetermined shape." ("Cyclopædia of Practical Medicine"; Volume 4; Page 434.") This eruption is well represented in Willan's work on Vaccine Inoculation.

[c] See Page 461.

[d] See Page 459.

rates small-pox. 2. Those persons who regard varicella as contagious, have confounded it with the modified small-pox. 3. Chicken-pox may occur in persons who have not been vaccinated, and who have never had small-pox; in whom, therefore, it cannot be regarded as the modified disease. 4. Vaccination practised shortly after the subsidence of varicella, observes its regular course; which is never the case after variola. 5. The course of varicella is always the same, whether it shows itself after vaccination or after small-pox. 6. Both these affections may prevail as epidemics, independently of each other. We have known it prevail epidemically, to a remarkable degree, in localities where not a single case of small-pox was observed.

Varieties.—There are two varieties of varicella. In the first the vesicles are small, but slightly elevated, and contain a colourless fluid. It is to this form that the name "chicken-pox" is more properly applicable. In the other, the vesicles are large, globular, soft, and broader in the circumference than at the base. The contained fluid is limpid at first; but afterwards has a milky appearance ("*swine*-pox").

Chicken-Pox.—In the varicella with small vesicles ("varicella *lenticularis*" of Willan; "*chicken*-pox"), small, pointed, transparent, red vesicles appear suddenly on the first day, and increase in size for two or three following days. On the second or third day, the fluid has a milky appearance, and the vesicles become shrivelled; on the fourth day they are surrounded by red areolæ. Desiccation begins on the fifth day; and on the sixth the vesicles are changed into small brownish scales. These desiccate from the circumference towards the centre, and fall off about the ninth or tenth day. As the vesicles appear in succession for two or three days, the different stages of the eruption may be seen at once in the same individual; so that the duration of the complaint may be prolonged into the eleventh or twelfth day.

Swine-Pox.—Varicella with globular vesicles (the "varicella *globata*", or "*swine*-pox") is preceded by the same symptoms, and developed in a similar manner. The red points are quickly replaced by large round vesicles, containing a transparent fluid, which becomes opaque on the second day of the eruption. The vesicles have then reached their greatest size; they are soft and flabby; their colour is of a pearly white; and their circumference is larger than their base, which is surrounded by an inflammatory areola.

About the second day, the vesicles become faded and wrinkled; their fluid is thickened, and converted into a yellow colour. As the itching is generally very considerable, it often happens that the vesicles are torn, especially in children; by which the inflammation is increased, and yellow pus (of more or less thickness) formed. This accident most frequently occurs on the face; where the succeeding scabs may remain a considerable time, and produce permanent scars or pitting. This occurrence may also take place in the preceding variety.

The vesicular are succeeded, about the fourth day, by lamellated scales of a brown colour. These also desiccate from the circumference towards the centre, and fall off about four or five days after;—leaving little red marks, which gradually disappear.[a]]

[a] "Library of Medicine"; Volume I; Pages 389 and 390.

c. Tubercular Eruptions.

SECTION VIII.—ACNE.

Those eruptions of which I next proceed to speak, are not placed by Bateman with *pustular*, but with *tubercular* affections; because there is a considerable hardness of the skin. The fact is, however, that suppuration generally takes place in these affections, if they last long; and I therefore prefer arranging them, with Rayer, as *pustular* diseases. There is only this difference in them;—that there are *chronic* pustules, instead of *acute* ones;—they are *blind*, as people commonly say.

Nature.—The first of these to which I will allude, is called (by Willan and Bateman) "acne"[a]; and (by Rayer) "couperose." It is exceedingly common, and not at all contagious; nor is there the least harm in it. It occurs particularly in young men and women,—especially the former; and prevents them from being very handsome, about the period when they wish to "look their best." Sometimes the face will continue to be affected with this disease for four or five years.

Acne Indurata and Simplex.—In the ordinary form it is called "acne *simplex*"; and is described, by Bateman, as an eruption of small pimples, not very numerous, and without much inflammation;—the surface between the pimples being perfectly healthy; with the exception of a little roughness of the face. Sometimes there is a very great hardness; and it is thence called "acne *indurata*."

Acne Punctata.—Now and then it causes the sebaceous follicles to be large and distinct, and marked with a black speck on the top; and then it is called "acne *punctata*." By squeezing them, we force out what is called "a *maggot*"; but it is only the contents of the sebaceous follicles; and by repeated squeezing, we may force out this secretion, as long as the follicles will supply it. It will take place in the neck; but the face is its usual seat. Many people have a little of this affection; but some have it very severely. There is no occasion to remember the particular names. Sometimes there are black specks; and sometimes there is a good deal of redness around them.

Acne Rosacea.—Now and then, it occurs with considerable surrounding redness and prominence of the skin; so that we may discover each particular vessel; and from its redness it is then called "acne *rosacea*." We see this in middle-aged and elderly persons; and in this form the "maggots" lie in a bed of *roses*. This is a very permanent complaint. I do not know that it is often got rid of; but, luckily, it does not occur till late in life; and it is taken for granted to be an indication of being devoted to the bottle. Every person, who has such a nose as is represented in Willan's sixty-fourth plate, is set down for a tippler.

Suppurating Stage.—Each of these hard inflamed pimples of the skin, may suppurate. Some will *subside* after a time, but a great many *suppurate*; and if they do not, it is an instance of termination by resolution; and we ought not the less to call it "a *pustular* disease"; because, if it pursue its course,—if it be not arrested by some cause or other, it goes on to that end. If it is not resolved, suppuration is the termination of it.

Treatment.—There can be no doubt that, when these pimples are small, it is much the best practice to squeeze them, and empty the contents. If

[a] From ακμαι, *pimples on the face.*

this be done, the tubercle will for the most part subside; and of course, if they suppurate, the sooner the matter is let out the better. I am not aware that internal medicine has any effect on the disease; but I have seen great benefit arise from the application of stimulants; and one of the best is the ointment of the nitrate of quicksilver[a], rubbed well upon the part. This stimulates the disease; which seems to be one of inaction. Of course, if it stimulate too much, cold applications should be employed, and the irritation diminished. Sometimes this ointment is too strong; and then it is necessary to dilute it with simple spermaceti-ointment, or with zinc-ointment.

Some people give sarsaparilla, and nitric acid, in these complaints; but I do not know that they do any good; nor do I know that "Plummer's pill"[b] is serviceable; but I think I have seen benefit from tar-water. The best local applications, are the stimulating substances that I have now mentioned. I have seen the face swollen all over, when they have been employed; and of course, if any very great inflammation come on, that must be treated in the ordinary way.

SECTION IX.—SYCOSIS.

This is another disease which occurs in the face; but chiefly upon those parts which are covered with hair. It takes place, particularly, in the beard of men; and, from its appearance when ulcerated, it is called sycosis.[c] When it occurs on the chin, it is called "sycosis *menti*."[d] If it occur about the margin of the hairy scalp, it is called "sycosis *capillitii*."[e] There is, however, no occasion to make a variety, because it occurs in these different situations. We might as well make varieties of rheumatism, according as it attacks the *shoulders*, or the *knees*.

Characters.—The tubercles, in this disease, are not so hard as in acne. They continue for a length of time, and are more inclined to suppurate. It makes shaving an unpleasant operation; notwithstanding that we have a good razor, a good strop, good soap, and warm water. These affections are merely slow chronic pustules; and the complaint is exceedingly obstinate.

Treatment.—I have not seen the disease much relieved by bleeding, either general or local; or by the exhibition of mercury; but, of course, there are cases where antiphlogistic measures are proper. I have seen it subside from the administration of iron; but, for the most part, applications of all kinds fail. Stimulants may be applied; but, after a time, they do no good. Or we may employ cold soothing applications; but, after a time they also lose their effect.

It is absurd to call these "*tubercles*"; for there is simply *inflammation*. There is no tubercle;—no organic change in the skin. The gentleman represented in Plate 65 (of Willan), must have regretted having a beard. Acne is a disease of the follicles; and is frequently attended by extreme hardness; whereas sycosis is not so hard. I really do not know what to recommend in the disease. Every one must be left to his own judgment. I have been tired out and out by the treatment. Of course, as this is a disease which occurs in the beard, women are exempt from it; unless their ovaries begin to dry up, and they acquire the character of men; but it does

[a] "Unguentum Hydrargyri Nitratis."
[b] "Pilulæ Hydrargyri Chloridi Compositæ."
[c] From συκον, *a fig*.
[d] From "mentum", *the chin*.
[e] From "capillitium", *the scalp*.

not occur where there is no hair. Both these diseases are confined to the head;—*acne* to the face at large; and *sycosis* to those situations where there is hair. Rayer gives a drawing of both these affections.

d. Boils.

Classification.—The other pustular diseases which I shall describe, are not treated of by Willan and Bateman; but they are all, or nearly all, spoken of by Rayer. One, however,—to which I will now direct attention,—is not spoken of even by him. Rayer makes a distinct class of those diseases which are disposed to gangrene. Now and then plague is attended by pustules on the skin (*large* ones, indeed;—such as are commonly called "boils"); and there is a great tendency to gangrene. The same occurrence takes place in the disease called "pustule maligne",—"malignant pustule"; which is generally communicated from brutes. He makes a separate class of these; but they are merely suppurations; and therefore, I think, they ought to be classed with pustular diseases. However, if the suppuration be very considerable (forming not merely *pustules*, but a very extensive suppuration), it may only lead to confusion to speak of them in that way; and it is to be remembered that they are not merely pustules; but that the *cellular membrane* is chiefly implicated, and the *skin* only *secondarily*. Still, however, as the disease occurs on the surface of the body, it is well to consider it as an affection of the skin.

Sties, Boils, and Carbuncles.—The most simple affection of this description, is a stye of the eye. A more severe one is a boil in which there is a disposition to gangrene; and another is a carbuncle, in which there is a *strong* disposition to gangrene. These three diseases (not one of which is mentioned by Willan and Bateman) Rayer puts together; and calls them "*boily* diseases";—diseases characterized by *boils*. A carbuncle is only a large boil; but it is of such an extent, that surgical aid is necessary to let the matter out. He makes another kind, differing only in having a tendency to gangrene. Of this kind are "malignant pustules" (which he includes among the "inflammations gangreneuses"), and the plague. To these may be added another;—"the glanders" of horses;—a disease which may be communicated to the human subject.

Malignant Pustule, Plague, and Glanders.—With respect to sties, boils, and carbuncles, I shall say nothing; because they are spoken of in treatises on surgery. Those of which I shall speak are "malignant pustules", "the plague", and "glanders." The plague, indeed, is not confined to the surface; but neither are many other affections called "skin-diseases" (small-pox, for example). It is a general affection of the system; and involves the skin among other parts. The characteristic of these suppurations, is a disposition to gangrene. In respect to all these diseases, whether *small* ones (such as sties and boils), or *great* ones (such as malignant pustules and the plague), they bear the same relation to porrigo and bullæ, that the latter do to the small vesicles of herpes. I said[a], that I thought it wrong to separate them; and so, with respect to these, I think it a pity to make different classes merely on account of their size. Because small-pox and porrigo have *small* suppurations, and plague or carbuncle is characterized by a suppuration of *greater* extent, it is no ground for constituting a different class of diseases. They are merely *pustular* diseases with suppurations on a *large scale*.

[a] See Page 445.

SECTION X.—THE PLAGUE.

The plague is very similar to typhus and continued fever; but it so affects the surface of the body, that I have thought it well to speak of it among diseases of the skin, as Rayer has done.

Symptoms.—Like many other diseases of the skin, it is an acute fever; attended by headach, delirium, and a burning sensation at the epigastrium. Perhaps there may be great strength of body at first;—the person may be of a full phlogistic diathesis; but great debility soon comes on; and very often there is debility from the first. Glandular swellings speedily appear in the arm-pits and groins;—so that the disease is characterized by buboes[a]; but the glands of the groins are more frequently affected, than those of the arm-pits. Sometimes these glandular swellings, or buboes, come on at the first; and sometimes not till towards the end of the complaint. Besides them, however, there appear upon the surface vesicles of various sizes; the contents of which are frequently dark. There are upon the surface, boils, carbuncles, and vesicles; and between them, and even where they do not exist, there are often vibices, petechiæ, and ecchymoses. These petechiæ, it is said, will sometimes rise into carbuncles;—where at first there was merely a little effusion or congestion of blood, there will sometimes, at last, be carbuncles. Occasionally, there is not sufficient power of the constitution,—not sufficient strength of inflammation, for carbuncles and buboes to arise. Just as in the case of the violent application of malaria, or the violent application of the poison of typhus-fever, and also as in cholera, persons will sometimes die immediately, without any reaction taking place.[b]

Duration.—The plague usually destroys life in from two to five days; but if a person survive the fifth day, recovery is generally expected. Most people who are seized with this disease die; even though they enjoy every advantage of treatment and comfort. It is said that the disease may be had more than once.

History.—Some consider it a very ancient disease. The symptoms are mentioned by Hippocrates; and Dr. Bancroft contends that the disease is mentioned in the Bible; and that this was the affection under which the Philistines laboured, when they are said to have been smitten in the private parts, after taking away the ark. He says that the disease spread as they carried about the ark;—that it was a contagious disease; and the more they carried about the ark, the more the disease was communicated; till, at last, it spread from Ashdod to Ekron.[c] He considers that the Philistines probably received the disease from Egypt. Some consider that, as the Philistines were smitten "in the hinder parts", they were afflicted with piles; but Dr. Bancroft contends that piles would not have killed them, in the

[a] From βουβων, *the groin.*

[b] Dr. Shapter ("Library of Medicine", Volume 1, Page 188) has described three varieties of plague:—1. *Simple* or *glandular* plague; which is rarely fatal in its termination, and but seldom characterized by any very urgent symptoms. 2. *Eruptive* plague; which is attended by a period of reaction, and occurs more frequently than either of the other varieties. 3. Malignant plague; in which the period of reaction is either entirely absent, or but very imperfectly developed; and death ensues with great rapidity.

[c] "They carried the ark of the God of Israel about. And it was so that, after they had carried it about, the hand of the Lord was against the city, with a very great destruction. And He smote the men of the city, both small and great; and they had emerods in their secret parts."—"*First Book of Samuel*"; *Chapter* 5; *Verses* 8 *and* 9.

way in which they perished.[a] However, I think there is this objection to Dr. Bancroft's argument; that, in the book of Psalms, it is said, they were not only smitten "in the hinder parts", but were "put to a *perpetual* shame."[b] This intimates that a chronic disease was left; but the plague would not have left a chronic disease of that description. It is stated that from fifty to seventy thousand persons were smitten by the disease. But whether Dr. Bancroft be right or wrong, the symptoms were distinctly mentioned by Hippocrates. It is a disease that almost always prevails in the Mediterranean, at Constantinople, at Venice, and all the various ports of that sea. It has likewise prevailed at Marseilles, Moscow, and London.

It is Contagious, not Infectious.—There can be no doubt whatever of its being a contagious disease; but it is rarely communicated without contact. It is, for the most part, believed to be a *contagious* disease, in the strict sense of the word;—not *infectious*. One of the latest writers upon this subject (Mr. Madden, a surgeon) says, that if there be a deficiency of ventilation and cleanliness, so that the emanations from the patient are very much concentrated, it may be communicated by infection; but if there be any ventilation at all, then it can only be communicated by contact with the individual, or with something that he has touched. Some have denied, of course, that this disease is contagious; but there are proofs without end that it is. The case of Dr. Whyte, who inoculated himself and died, has been already quoted.[c] Dr. Duncan, in his "Medical Commentaries", mentions similar instances.[d]

When the French army were in Egypt, about eighty medical officers died of it in one year. The next year, they employed Turkish barbers to dress the patients, and bleed them; and then only twelve medical officers died; but one half the barbers died. It is said, that at Moscow, in 1771, all the assistant surgeons (amounting to fifteen) were seized with it, and of these three died; but the physicians, who did nothing but walk through the wards with a pen in their hands, generally escaped. The assistant-surgeons were here reduced to the same state as the barbers.

At Marseilles there had been no plague for fifty years, till 1720; when an infected vessel arrived. The disease, at that time, was distinctly traced to the arrival of an individual from an infected spot; and half the inhabitants died, in a short period after the arrival of the infected vessel. It is said that the plague had not been known at Moscow, for one hundred and fifty years, till they had war with the Turks; when two soldiers from an

[a] "There was a deadly destruction throughout all the city. The hand of God was very heavy there." ("First Book of Samuel"; Chapter 5; Verse 11.) The disease which proved *fatal*, however, would appear to have been something distinct from the emerods; for we are told, in the sixth verse, that "He destroyed them, *and* smote them with emerods"; and, in the twelfth, that "the men that died *not* were smitten with the emerods."

[b] "He smote his enemies in the hinder part; he put them to a perpetual reproach."—*Psalm* 78; *Verse* 66.

[c] See Page 346.

[d] Very different results have followed this operation. In some instances the symptoms of plague have appeared, while in others the only effect was slight local irritation;—as might be anticipated from inserting a poisonous fluid matter into the cellular membrane. But even had plague occurred in all these cases, no satisfactory conclusion could be deduced;—owing to the fact of their having been performed in situations where the disease was prevalent at the time. In order fairly to test the question, it would be necessary to institute a most unjustifiable series of experiments; namely, to inoculate with plague-products persons living at a distance from the localities where this disease occurs, and who could have no communication (either direct or intermediate) with plague-cases, except through the matter with which the experiment is made.—"*Library of Medicine*"; *Volume* 1; *Page* 209.

infected place arrived, and died; after which, eighty thousand perished from the disease in the city, and twenty thousand in the neighbouring villages. It is said that the plague had not been known in Malta, for one hundred and thirty-seven years previously to 1813; and then the disease was brought from Alexandria.

Howard says that the plague of London, which occurred in 1665, was conveyed to a village in the Peak of Derbyshire, by means of some old clothes. He was so astonished at the absurdity of many medical men, in denying that it was contagious, that he writes as follows:—"Have not some of our professors sullied their names with the dangerous doctrine of the non-contagion of the plague? From no other cause than the error of the physicians, who constantly maintained that the disease then epidemic was not contagious, happened that terrible visitation which, in 1743, ravaged the city of Messina and its vicinity, with the loss of above forty-three thousand individuals, in the short space of three months." Most writers show, that persons who attended others labouring under the disease suffered; while those who ran away escaped it. The Turks are so satisfied of its being contagious, that when the disease prevails, they shut themselves up; and the Pacha holds communication with no person whatever. I think there can be no doubt of the plague being contagious,—in the strict sense of that word.[a]

Influence of Heat and Cold on its Progress.—It is remarkable that great heat and great cold will stop the plague. It is a disease that will not bear great heat;—so that it has never been known to occur in tropical climates; and when the heat rises to a certain point, it stops. This takes place in Egypt about the twenty-fourth of June; and as that is the nativity of John the Baptist, he has the credit of putting a stop to the plague. The Catholics ascribe it all to him. From the intense heats, it is said never to appear in Upper Egypt; and it ceases altogether as the hot weather comes in. The winter also causes a cessation of it; and frequently renders exposure to a person labouring under it, perfectly harmless.

Cause of its Cessation in London.—From its being so contagious a disease, Dr. Wells considered that it was owing to quarantine laws, that we are not now troubled with this pestilence. He uses the following arguments:—1. Many persons ascribe our exemption from the disease to the fire of London; but the plague has not been known in London, since 1665; whereas the fire did not take place till 1666. The fire of London consumed only one-fifth of the town;—leaving untouched the Borough, Wapping, Whitechapel, Clerkenwell, St. Giles's, and the purlieus of Smithfield; which were among the dirtiest places. 2. Bristol has escaped for the same length of time as London, and yet there has been no fire in that city; and the improvements there began much later than in London. The Dutch are as cleanly as we are; and yet the plague continued there forty years longer than in England. 3. The town of Cracow is a very dirty place; and yet there has been no plague there for a century. 4. Ague alarmingly increased, and returned eleven years after the fire; and dysentery continued till the end of the century, notwithstanding the improvements; and therefore he argues, *à fortiori*, that as the improvements could not prevent *dysentery*, they could not prevent the *plague*. 5. The plague is not known

[a] For very full details, and reasonings at great length on this subject, the reader is referred to the following work:—"Results of an Investigation respecting Epidemic and Pestilential Diseases; including Researches in the Levant concerning the Plague. By Charles Maclean, M.D.; Lecturer on the Diseases of Hot Climates to the Honourable East India Company." The second volume contains an account of the author's experience in a plague-hospital; where he himself took the disease, but recovered.

in India, China, and North America; where, in many places, they are filthy in the extreme. 6. The plague began first among the poor, who associated with the sailors of infected vessels. Dr. Wells contends that, from the time the quarantine laws were established, the plague has been unknown in England; and that, from the considerations I have now stated, the circumstance could not arise from the increased cleanliness, and general improvement of London; but from a strict adherence to quarantine laws.[a]

Objections by the Non-Contagionists.—[The objections made to these views, by those who maintain that the disease is solely caused by endemic influences, are the following:—1. A miasm emanating directly from a plague-patient, or the transmission of the disease intermediately by fomites, are facts by no means conclusively proved; in truth, the whole statements in favour of contagion are imperfect and unsatisfactory. 2. Certain places, when the immediate neighbourhood was under the influence of plague, have not been kept healthy by means of quarantine regulations. It has often been shown, that in such situations some few cases have occurred, but that the disease has not spread; which immunity has been attributed to the ventilation and internal discipline rendering those within the cordon less susceptible of the epidemic influence. 3. Many of those in the most constant communication with the sick, do not take the disease; the attendants, who perform all the necessary offices, as well as the medical men, escape; and many who have advocated the doctrines of anti-contagion have ventured with impunity upon the more rash and hazardous experiments of tasting the secretions, wearing the clothes, and sleeping in the beds of those affected. Those engaged in burying the dead, are not more subject to plague than other persons; and even sexual intercourse has been known to take place, without communicating the disease. 4. The evidence of plague being communicated by inoculation, is any thing but satisfactory. It has already been remarked, that to make the experiment conclusive, the person to be inoculated with plague-matter should be living in some district far from the local or general influences of the disease. On the contrary, those cases previously referred to, where this method produced no results, go far to negative the communicability of the disease through the medium of pus, or other plague-products introduced into the system by inoculation. 5. The occurrence of sporadic cases is conclusive against the notion, that contagion is the sole origin of plague; and the existence of those cases, without spreading the disease, is a fact which militates greatly against its being contagious at all. It is evident that the occurrence of isolated cases in large cities, which is not unfrequent, is a fact totally irreconcileable with the doctrines of contagion, as sanctioned by its advocates. 6. When the disease becomes prevalent in a district, it is found to occur in situations and among individuals where there is the least possible communication with the infected; and it frequently breaks out in remote and separate parts of a town, without any traceable intercourse or communication. 7. In maritime towns, where it is said to have been imported, it frequently happens that those who are the first affected, live in

[a] We believe that, were they perfect and practically well carried out, which they certainly are not, they would yet be, comparatively speaking, useless. But they are, as now worked, not only useless, but most severe and vexatious incumbrances upon the liberty of the person; while the lazarettos—from the situations in which they are placed, from the nature of the buildings themselves, and from the ignorance of the medical men which are appointed to them—tend unnecessarily to harass and annoy the individuals condemned to confinement in them, as also to constitute them places where disease may be rather originated than prevented.—"*Library of Medicine*"; *Volume* 1; *Page* 212.

parts which are distant from the shore, and therefore not in the nearest and most likely places to receive the infection. 8. It is found to arrive in many localities at the same time; and this applies both to the country and to towns. In the East, it is frequently observed to arise within a few days in places which are not only very distant, but in circumstances which prevented communication; and to occur, in like manner, simultaneously in different parts of the same town;—facts which evidently show a more diffused influence, than is probable on the supposition of human contagion. 9. Notwithstanding all the very curious and ingenious modes in which the propagation of plague has been said to have taken place, the possibility of which it requires a very large share of oriental credulity to believe, the disease is really very difficult to propagate by any means which as yet have been devised by man. Many instances of adventurous experiment, made without success, sufficiently prove this. 10. Numerous instances may be quoted, of large masses of persons moving from an infected district without carrying the disease with them. The contagionists state, that immense multitudes of hadjis, or pilgrims,—who go every year from Turkey to Arabia, through both Syria and Egypt,—are the instruments by which the plague is spread in the countries thus visited by them. So far, however, is this from being the case, that the marches of these people, in different years, take place at different seasons, while plague is a disease more especially of one season; and that, excepting when these marches of the Mussulmen coincide with the plague-season, their progress is not characterized by its occurrence; and, moreover, that many of the districts through which they pass, during their pilgrimage, are never known to suffer. In 1824, when the plague raged so fiercely in European Turkey, many thousand Turkish pilgrims passed through Alexandria, on their way to the Holy City; but in Alexandria there was only one case of plague; though no precautions were taken, and no quarantine regulations then existed to interrupt their progress. 11. Plague is a disease of endemic origin; and, therefore, all those cases which are said to have been caused by contagion, are really owing to endemic influences. 12. The spontaneous and sudden decline of plague at a particular season, disproves the operation of a contagious principle;—this being evidence, that plague is influenced by climatorial changes;—a condition which the advocates of contagion do not suppose consonant with its laws. On the other hand, it proves plague to be owing to some endemic influence which has now ceased to exist. On this periodic cessation taking place, in the countries which are the most frequent seats of the disease, the inhabitants lose all dread; and from experience know, that without any evil consequences they may meet each other, visit the sick, and wear the clothes of those who have died. 13. Besides the above more general arguments against contagion, an inference to the same effect may be drawn from the fact, that before plague sets in, especially in such countries where it is of more rare occurrence, diseases of a putrid character and fatal tendency are prevalent; and that epizootic affections take place, and frequently cause great mortality among animals.[a]]

Period of Incubation.—When the poison has been applied, the disease generally appears in from three to five days.

Not Communicated by the Dead.—It is said that the disease is rarely caught from a dead body. When speaking of the innocuous agency of putrefied animal matter, I mentioned the statement of Howard;—that

[a] "Library of Medicine"; Volume 1; Pages 210 and 211.

persons did not suffer from the stench of the putrefying dead bodies of those who had fallen victims to the plague.[a] I believe persons may touch the dead bodies, without fear of catching the disease; but touching their *clothes* is another thing. It is said by Dr. Bancroft, that all the Turks employed by the French to bury the dead escaped, with the exception of one individual. Howard says, that in Turkey people are not afraid to handle the dead bodies.

Treatment.—As to the treatment of the disease, I believe that one half of those who have it perish; and therefore we must conclude that the treatment is not very successful. But we are told, that the treatment must be conducted on the same principles as in common fever. If there be a phlogistic diathesis, active bleeding, cold affusion, and calomel, are recommended; but, on the other hand, when there is debility, we must exhibit wine, quinina, ammonia, and (if Dr. Stevens be correct) the neutral salts, in great abundance. Of course those who follow one exclusive rule of practice, will kill a great many. Those who always bleed will destroy a great number; and those who always give brandy, will do the same. But Mr. Madden has compared the two modes of treatment. He says that, where bleeding has been had recourse to, the mortality has generally been very great; but where he gave strong brandy-and-water, and induced a copious perspiration, his success was very great. He also gave enemas of the same ingredients;—that is to say, hot brandy-and-water; he sponged the body with vinegar-and-water; soaked the head with vinegar; had hot poultices put on the buboes, till they gave pain; and cut into the carbuncles to arrest the mortification; and by this local and general treatment he was so far successful, as to save seventy-five patients out of a hundred. I should suppose that the period for a lowering plan, in this disease, is very short; and that stimulating treatment is preferable. The best antiphlogistic treatment would be, not to evacuate blood, but to apply cold water, and purge. From the accounts I have seen, I should think that active depletion would be very dangerous. The moment softness of the pulse is perceived, I should imagine that the treatment mentioned by Mr. Madden would be very proper.

Nature of Plague.—[The phenomena attending the development of plague during life, and the lesions observed after death, do not enable us satisfactorily to decide upon its proximate cause, or nature. Those writers who have entertained theories upon fevers generally, apply them most complacently to plague; and—without much effort, but with some little ambiguity—reconcile all that takes place to their favourite views. We shall not, however, dwell upon the "considerable spasm and loss of tone in the extreme vessels" of Cullen; nor upon the "gastro-enteritis" of Broussais;—the frequent absence of which (even to the period of death) he explains, by saying it has not had time to develop itself; nor to the equally puerile views of another pathologist, who states plague to be an inflammation of the bronchial tubes (comparatively speaking, a very rare seat of lesion in this disease); nor upon several others which might be named; but shall content ourselves by giving a short abstract of the opinions entertained by Craigie and Bulard. The former of these writers applies the general view which he advocates; namely, that it is owing to derangement of the capillary system. In reference to the disease now under consideration, he says, that "the remote material agent which causes it, whatever that may be, acts upon the capillary vessels, immediately or secondarily through their contents, in every tissue and every organ of the human body. The result

[a] See Page 358.

of which is, that the fluids are no longer freely transmitted through them; —so that there is produced a sudden and almost immediate retardation of the motion of the blood through the capillaries of the whole system." He infers this to be the case from the four following circumstances:—"1. The arteries of the brain and its investments of the stomach, of the intestinal tube, and of the secreting glands, are distended with dark-coloured semi-fluid blood. 2. The vessels (of all the organs) are much loaded with dark-coloured fluid blood; which escapes immediately on the smallest incision. 3. In several of the organs,—for instance, the brain, the lungs, the liver, the kidneys, and other solid organs, nay even in the muscles,—dark-coloured half-coagulated blood is found fixed in clusters of vessels;—so as to form dark or carbonaceous patches and masses. 4. Dark grumous blood is found, not only in the right chambers of the heart, but in the left auricle and ventricle; in which they are not usually found in ordinary death." ("Practice of Physic.")

Bulard is not less ingenious. He states plague to be the contagious product of lymphatic absorption. This view is grounded upon the statement, that the only symptom which has been remarked as alone and distinct from any other at the commencement of the disease, is pain in the lymphatic glands. This is at first but a slight throbbing, becoming more violent and continued, and ultimately succeeded by swelling and buboes. This change in the lymphatic glands is the only lesion which is to be found totally isolated from all others, and it is consequent upon changes in the lymph; and therefore each, during the local affection, is to be considered only as consecutive to this disorder in the lymphatic system; in which consists the simple original affection,—the essence of the disease, and without which no general disturbance could have occurred. This view Bulard supports, on the grounds that the whole system of lymphatic vessels, whether going from or to the gland, is not diseased, but only the glands themselves; therefore he argues that, as the glands are always diseased and the vessels never, it is evident that the malady is not conveyed by continuity of tissue, but that the diseased principle is introduced into the lymphatic circulation; and therefore the alteration of the lymph is cause and reason sufficient for the phenomena of diseased absorption, the pathological effects of which are displayed on the glands. The disease, therefore, arises from a change in the lymph. This constitutes the primary affection; the secondary effect of which is, that as this degeneration in the lymphatic fluids becomes more or less advanced, the blood itself becomes decomposed by the morbid lymph entering into its composition by the venous circulation. It thus loses its normal qualities, and then causes a general disturbance,—a deep disorganization in all its functions; in short, all the derangements of a true poisoning. From this moment it loses its physiological character, and assumes one entirely peculiar to itself: and hence are to be explained the lesions met with throughout the system—the livid colour of the stomach, the swollen state of its mucous membrane, the softened state of the spleen, gorged as it is with black grumous blood, the enlarged and softened condition of the heart, &c.; in fact, every lesion which has been mentioned. Hecker, in his account of "the black death", reverses the theory of Bulard; —stating that the blood is first attacked through the atmospheric poison acting on the organs of respiration; and that the inflammation in the lymphatic glands and other organs, is only consequent upon the change thus effected in the vital fluid.[a]]

[a] "Library of Medicine"; Volume 1; Pages 207 and 208.

SECTION XI.—MALIGNANT PUSTULE.

The two inflammatory and pustular diseases of which I have next to speak, are both derived from brutes. The first is what is called by some writers "the malignant pustule"; by the French it is called "pustule maligne"; and I rather think it is this disease (though I am not certain) that is called by the Germans "milz-brand." In this affection there is produced a carbuncle, very similar to the carbuncle of plague. I do not imagine that the disease is by any means well understood; but its existence is an undoubted fact.

Causes.—When animals have died of a particular disease, in which there are pustules tending to gangrene, it has occasionally happened, that the individuals who have skinned them have had carbuncular pustules (of a dark colour) take place on the surface, and have perished from them. It is said occasionally to have arisen from persons having merely touched the blood of an animal, which was killed while labouring under this disease. Indeed, one instance is recorded of a butcher being seized with a gangrenous inflammation in the face, and speedily dying, after having put between his lips a knife, with which he had killed a bullock labouring under this disease. Some suppose that disease of this description (a carbuncle tending to gangrene, and bearing a resemblance to the carbuncle of plague) is never produced but by the contact of the blood, or the secretions, or the body of a brute which has died of this disease; or of something which the body has touched; but Rayer, who gives an account of this disease, considers that, now and then, it occurs simultaneously and sporadically. However, I should hardly think him correct. It is possible that the person may have touched something, which had been in contact with the animal previously to its having its skin taken off. The animal may have been sent to market, and contact is possible (just like the infection of scarlet-fever and small-pox) without our being able to trace it.

History.—It has been described by Morand (a French surgeon) in the history of the French Royal Academy, for 1766. He there gives cases of butchers and others, who have been affected with gangrenous erysipelas, and carbuncles. He thinks it can arise, even without an abrasion of the surface, if the blood of the animal be applied. Enaux and Chaussier described the "pustule maligne", in their work on the Treatment of Bites, published in 1755;—that subject being followed by a short account of malignant pustules. Two instances are mentioned in Hufeland's Journal, for 1822, of diseases of this description, which proved fatal to two men. They had been wetted, in the performance of venesection, with the blood of a cow labouring under the disease. In each case, the chief inflammation found after death was peritoneal; and also they had buboes. The pustules, or carbuncles, of this disease, have generally been observed among veterinary surgeons, shepherds, tanners, blacksmiths, butchers, and labourers;—in fact, among all those persons who were most likely to come in contact with brutes labouring under the affection. It is said usually to display itself on those parts of the body which are uncovered; such as the face, neck, hands, shoulders, or arms;—all those parts being uncovered, in many descriptions of work.

Contagious, not Infectious.—I never saw an instance of this disease. I believe that, in general, it is not *infectious*; but merely *contagious*. There is an account of many people being seized with a disease in 1818, at Ostiano, in Italy. Thirty-five persons visited an ill-ventilated stable, which

contained three cows and ten horses; one of which had laboured under an offensive discharge from the nostrils for twelve months. Eleven of them were seized with the disease; and all but one died. Violent pyrexia, pains, spasms, boils, and at last a large carbuncle, characterized the first stage; gangrenous vesicles, and a typhoid fever, were the chief features of the second. Whether this was the same disease I do not know; but if so, it would appear that where there is a want of ventilation, and many animals are crowded together, it may be infectious.

Treatment.—It is at present rather an object of curiosity than of practice; for I believe that no treatment does good. Some persons, however, recommend the application of the actual cautery to the carbuncles, as soon as they appear. It is supposed, by Rayer, to bear a very great resemblance to the plague in human beings; but it is very likely, notwithstanding, to be a different disease.

SECTION XII.—EQUINIA.

Diseases of Brutes communicable to Man.—That the diseases of man are communicable to brutes, is a well established fact. The measles (according to good authority) have been imparted to sheep; and, in like manner, have trichoma and plague been each communicated to brutes. On the other hand, several diseases may be communicated from brutes to men;—as the cow-pox by vaccination, the mange from dogs[a], and hydrophobia;—the probability being that, in each case, the disease may be given back from man to brutes. The cow-pox certainly may[b]; and Magendie has himself reproduced hydrophobia in a dog, by inoculation from the froth of a rabid man. To these instances may now be added "glanders";—a disease well known from its destructive ravages among horses, but which has only recently been observed to occur in the human subject.

History.—The fact of its occurrence in man was first established, or (at least) rendered highly probable, in this country, by Mr. Coleman; and by three cases which came under the notice of Mr. Travers, and were reported in his work on "Constitutional Irritation"[c], as being very like cases of glanders; but were described by him (as if glanders in man were not possible) as instances of a diseased state of the constitution. Mr. Coleman had taken some of the glanderous matter from one of these cases, and inoculated an ass with it. Glanders and farcy were the result, and death ensued in twelve days. Further proof, moreover, was obtained; yet the facts were alluded to at the time by Mr. Travers as a matter for wonder, that disease could be communicated from man to a brute, and yet the disease in the brute not be the same as that which existed in the man.

Case 1.—Of the possibility of this disease occurring in the human subject I was perfectly ignorant, when a young man was admitted into St. Thomas's Hospital, under the care of Dr. Roots, on the nineteenth of March, 1829.

The upper half of the face—including the eyelids and nose, with a portion of the cheek on each side (especially on the right)—was greatly tumefied;—so that the eyes were closed. The eyelids and swollen portions of the cheeks, were red and hot, dry and shining; but the nose was dark-coloured; and its right half black, cold, and senseless. From around the gangrened portion of the nose, and some other points, a little pus was

[a] In which case the disease in man assumes the appearance of itch.

[b] See Page 474.

[c] Page 350.

oozing, as well as a thin dark coloured fluid; and *from the nostrils a thick discharge* (*of a deep-yellow colour, here and there a little bloody*) *was taking place.* It was very copious from the *right* nostril. Several hard phlyzacious pustules existed on and immediately around the nose,—still principally on the right side; and in various parts of the trunk and extremities. Tumefactions were observed in both fore-arms, and on the back of the right hand. Some of these were hard; others softening into suppuration. The temperature was high; the pulse 136, and sharp; the tongue white, and rather dry. The respiratory murmur was indistinct at the lower part of the chest, and the respiration quick and difficult. The gums were slightly turgid. It was stated that, twelve days previously, he had been attacked by pain in the right hypochondrium, extending up the chest, attended by dyspnœa, and rigors; that he took ten grains of Pilulæ Hydrargyri; and the next day felt quite well. The pain and dyspnœa, however, returned on the day following; but subsided at the end of the week; under the use of leeches and purgatives. On the Sunday, five days before his admission, a pimple was said to have appeared on the right side of his nose. While this increased and suppurated, the surrounding parts swelled and grew red; and the state of things became such as I have already described.

Fourteen ounces of blood were taken from the arm, and became both buffed and cupped. Some of the tumefactions were cut into, and large quantities of pus discharged. Lint soaked in a solution of the chloride of soda, and covered with a poultice of stale beer-grounds, was applied over the nose, and was renewed every hour; and a common poultice was applied to the abscesses which had been opened. An ounce of castor-oil was given; and the diet restricted to slops, milk, and arrow-root.

Late in the evening, two greenish and very offensive stools were passed involuntarily; and a little delirium was observed. Tumefactions had begun upon both legs, one upon the left hand, and one upon the right elbow. The next morning, more tumefactions were seen upon the extremities. They were red,—as all the others had been; but the latter had now acquired a purple tint; and the wounds looked dark. The forehead was swollen and red; and more pustules had formed upon the face. There was constant agitation, frequent delirium, and profuse diarrhœa; and there had been no sleep. Mistura Cretæ was ordered; sixteen leeches were applied to the temples; and strong beef-tea was added to the diet. In the evening, the diarrhœa was checked; but the upper lip had grown very dark. Sordes encrusted the teeth; the surface, still hot, was covered by a profuse sweat; and many new, hard pustules, were seen upon the trunk and extremities. The pulse had become soft, and was small and rapid. Twenty-five minims of Tinctura Opii were given in the first dose of the Mistura Cretæ; and one grain of the Quinæ Disulphas every four hours was prescribed. The Oleum Terebinthinæ was substituted for the solution of the chloride of soda.

He was calm after taking the opium; but, about four o'clock in the morning, was observed to breathe with more difficulty, to be unable to swallow, and to be constantly delirious. From that time he sunk gradually; and expired at six.

I was not present at the inspection; but understood that there were proofs of a violent pleuro-peripneumonia in the lower part of the right side; and that two ounces of healthy pus were found between the adherent lung and diaphragm. A dark red patch existed in the stomach, and several at irregular distances throughout the intestines. The mucous membrane of the stomach was very lacerable at that spot. The other viscera, and all

the contents of the head, as well as the veins of the extremities, were reported healthy; but the mucous membrane of the nostrils was not examined. The abscess which had been opened in the back of the right hand, communicated with the joint of the metacarpal bone of the middle finger; but those on the arm did not communicate with the elbow.

The appearances suggested to me the idea, that some deleterious matter had been introduced into the system. I inquired if he had probably been in the way of catching such a complaint, if he knew of any one similarly affected, and if he had taken any other food than was good and habitual to him, or was used by the rest of the family. But all these questions were answered in the negative; and therefore, when asked by the pupils my opinion, I declared myself perfectly at a loss.

Case 2.—On the following June, I found a young man lying in one of my beds, in precisely the same state. The nose and surrounding parts were exceedingly swollen; so that the left eye was closed completely, and the right nearly. The tumefied parts were hot, and of a bright red, with the exception of an inch of the left half of the nose; which was of a mulberry-colour;—precisely the same state of things, that occurred in the other young man.[a] A profusion of deep-yellow tenacious mucus, with a few streaks of blood, exuded from each nostril; but particularly from the left. Several hard phlyzacious pustules existed on the nose and adjacent parts; as well as on the arms, thighs, and legs; and each was surrounded, in the latter situation, by a blush of red. A patch of the same colour was observed on the left elbow. His pulse did not justify bleeding; it was rather an undulation than a pulsation. I ordered him beef-tea, wine, and sulphate of quinina; but he was dead in a few hours.[b]

As in the former case [a], the father was present at the inspection; and he would not allow the head to be examined, or any incisions that would disfigure to be made. Many parts of the lungs were gorged with blood and frothy fluid, and the corresponding bronchial branches were very dark; numerous papillæ, with pointed black summits, were seen at the end of the ilium; and clusters of minute greyish black points throughout the small intestines, and most abundantly at the commencement of the duodenum. The walls of the left ventricle of the heart were very thick. Nothing, however, was detected, either peculiar or important, or calculated to throw the faintest light upon the disease;—a disease which to me (I confess) was truly awful;—from its suddenness, rapidity, gangrenous source, and seemingly uncontrollable power.

While I was standing at the bed-side, considering in silence the case before me, its identity in nature with that which I had seen in March [a], appeared certain; and the disease appeared, as certainly, to be a specific eruptive fever. I therefore stated to the pupils, that while at the occurrence of the former case [a], I had only the idea of some deleterious agent (without being able to imagine of what kind), I now felt satisfied that this agent in the two cases was a morbid poison;—a poison furnished by a living system under the same disease. I put the same questions to this patient and his friends, as in the former instance [a]; and received the same negative answers.

The morbid poison could not have been generated in the system of the patients themselves; because their clean appearance, and the good circumstances and respectability of the friends with whom they lived, were such

[a] See Case 1, Page 493.

[b] A drawing was made of each patient; that of Dr. Roots's was executed by Mr. Solly; and the other (which contains two representations,—the one *before*, and the other *after* death) by Mr. Alcock.

as to preclude the generation of any morbid poison. Although acting but seldom upon human beings in this country, still its residence among us was certain, if it really existed; for neither of the patients had been near persons from abroad. Yet no other person in the vicinity of either patient, or anywhere that either had been, was known to have had such a disease. The morbid poison, and its residence among us (of which I entertained no doubt), together with the circumstance of its rarely affecting human beings, now seemed fully explained by the supposition, that the disease was one common to some of our brutes; and the profuse discharge from the nostrils, and the tumours and tubercular pustules on the surface, agreed with the supposition, that this disease was the glanders.

Case 3.—Soon after this, a "Fatal Case of Acute Glanders in the Human Subject" was reported, in the "London Medical Gazette"[a], by Mr. Brown, —a surgeon in the second regiment of dragoons; which, on examination, I found to agree precisely with the cases above described. The man was seized, on the night of the sixteenth of April, with rigors, headach, and slight irritability of the stomach;—all the symptoms which usher in an eruptive fever. However, he had great pains and stiffness of all the large joints; and these increased to an alarming degree. The left shoulder was rather swollen, though not inflamed; but the tumefaction became considerable, and of a livid hue. Similar swellings, but smaller, took place on the arms, legs, thighs, and sacrum;—exactly as in these cases in the hospital. The tumors were insensible and hard; but, in the cases in the hospital, the tumours were soft. They were of a chocolate-colour; but acquired a deep vermilion hue, and soon became of a dark brown. One appeared upon the left temple; and the eye-lids become tumefied. *The right nostril was gummed up with an inspissated discharge.* The posterior fauces were much inflamed, and nearly of a purple hue. Several watery pustules (which I have termed "phlyzacious") rose above the skin, in various situations around each of the tumefactions. On examination after death, a cluster of tubercles was found in the cellular membrane exterior to the pericranium[b] of the left superciliary ridge, and in the right frontal sinus;—exactly resembling (according to Mr. Brown) those observed in the frontal and other sinuses of the horse, after acute glanders. On dividing the various livid tumours down to the bone, the muscles appeared perfectly decomposed, and of a dark livid colour; and under each was a cluster of grey circular tubercles. The existence of these tubercles is so common in the glanders of horses, that one French writer takes this for a tubercular disease; and it is described under that name in a French Veterinary Dictionary. The army-surgeon adds:—"It appeared that the patient had had, for some time, the sole charge of a glandered horse, which had been destroyed on the very evening of his attack; and that he had skinned him; and exerted himself a good deal, in cutting up and burying the carcase. But these circumstances did not at first create the least suspicion; and his complaint was considered a very severe case of acute rheumatism; and was treated as such."

Case 4.—About a fortnight or a month afterwards, a general practitioner at Clapham, to whom I mentioned these cases, told me of a case which he thought was of the same description. A young man (a pupil of the Veterinary College, and the son of a veterinary surgeon at Clapham) had been seized with a very severe acute affection of the knee-joint (apparently rheumatic); and with severe pains;—just like the other cases. He proposed

[a] Volume 4; Page 134. (No. 83; July 4, 1829.)

[b] From περι, *about*; and κρανιον, *the cranium*.

that I should see the patient; but the father put it off till the next day, and in the interim the son died. Before death there was a copious sero-mucous discharge, occasionally a little bloody, from the eyes and nose; the Schneiderian membrane was excessively red and nearly excoriated; and the eyes were closed. A pretty abundant eruption, very similar to small-pox, but larger and hard, appeared in different parts; but particularly the neck. There was scarcely any sleep; but occasionally delirium, and at length convulsions; and the patient died. Unhealthy pus was found in the absorbents of the arm; and the bursa of the knee contained a large quantity of pus, with flakes of coagulable lymph. He appeared to have had under his care, at Clapham, a horse affected with "farcy-glanders."[a] The ring-finger of the right hand, and the absorbents and axillary glands, became all at once inflamed and painful; but whether after any wound or abrasion, could not be satisfactorily ascertained. The finger suppurated and was opened; and, a few days afterwards, he was seized with headach and pains in his limbs; which pains were considered rheumatic. There were afterwards pimples on the face; and a profuse discharge from the Schneiderian membrane.

Communicated to Man by Brutes.—The perfect correspondence in the symptoms and progress of those cases that had fallen under my observation, with those of Mr. Brown's case[b], convinced me that an active investigation would trace the origin to horses, from which they had received the contagion. I had a great deal of trouble in endeavouring to ascertain this fact, and indeed I could not prove it at last; but I found that these men (although in an occupation that one would suppose would never lead them near horses) had actually been in the neighbourhood of glandered horses. Further than that I could not ascertain; but it is a very singular circumstance, that this was satisfactorily proved. I found, with respect to my own patient, that he was a whitesmith, at Lambeth. I went there, and inquired whether he had had any thing to do with horses;—taking it for granted that, as a smith, he had. They told me that he had never been near horses;—that he was a *white*-smith. However, I went to the workshop, and found it situated in a mews. I then asked if there had been a glandered horse in the mews; to which the father replied—"No"; but one of the men immediately said—"Why, don't you recollect there was a glandered horse in the stable, for six weeks, just next the corner where Tom used to work?" He then shewed me that the boards which separated the stable from the whitesmith's shop were so defective, that the discharge from the animal's nostrils had come through; and occasioned so great a stench, that the young man frequently said he should not be able to work, unless the horse were taken away. I learned, that when this horse was being led to the knacker's, about a month before the commencement of this disease, it fell down exhausted at the door of the forge; and that he went and patted it about the head as it lay; and took hold of the head while the rest endeavoured to make the animal rise. I also found that he had a number of pimples on his face, which were raw; and his father said he recollected that his son had got a habit of wiping his nose with the back of his hand. So far I went; and, though this is not proof, yet these are singular facts.

With respect to the man that came first to St. Thomas's[c], he was a tailor; and, tailors not being famous for horsemanship, I almost despaired of being able to trace any connexion between him and a horse. But at last I found,

[a] See Page 498. [b] See Page 496. [c] See Page 493.

that the next-door neighbour of the man to whom this lad was apprenticed, had kept a worn-out pony in a filthy wretched shed, opposite the two houses. I ascertained that the animal had glanders, and was afterwards killed on this account; that this youth was in the habit of harnessing it, and getting into a little cart which it dragged, to have a ride. Nothing is more likely, than that he had brought some of the matter from this horse in contact with him.

An examination of the history and progress of these, and other cases which had occurred in Germany[a], led me to conclude that the cases in question were those of true glanders, and that man is susceptible of its contagion, on coming in contact with animals labouring under it. My reasons for this opinion are the following:—1. There is a perfect similarity and uniformity of the symptoms and course of all the acute cases of the affection; and they are quite distinct from those of any other disease. 2. There is a perfect correspondence between the post-mortem appearances in cases that have been properly examined, and those that present themselves in the horse. 3. Each of these persons had been in communication with a glandered horse; though the occupations of some of them had rendered this extremely improbable. 4. Glanders were produced in asses, by inoculation with matter taken from some of these cases.

a. Appearance and Varieties in the lower Animals.

Varieties.—Although it would be foreign to the character of this work to enter into a minute description of glanders as it occurs in the lower animals, still, as the disease may (and, as we have seen, does occasionally) occur in man, some notice of it is rendered necessary. Glanders may appear in two forms;—first, as ulceration of the nostrils; and, secondly, as tumours arising in various parts of the body, combined with corded or elevated lines in the neighbourhood of the tumours, formed of what are thought to be the absorbents. When the disease is limited to the former symptom, it is called "glanders"; when to the latter "farcy." The two, however, are the same disease, though distinct in name; and, from "glanders", the affection will at length become "farcy."[b]

Acute Glanders in the Horse.—The pituitary[c] membrane is very red, and very much inflamed; and presents little erosions, which take place rapidly, and become chancres (if we must, in compliance with custom, so call them); with edges thicker and more exuberant than those of the milder form of the disease. Sometimes the lips and the end of the nose swell; and afterwards the ulcerations commit more extensive ravages, and give rise to a discharge of a purulent appearance, and occasionally of a disagreeable smell. A fetid, purple, and perhaps bloody sanies, is mixed with it from time to time (at least, in some instances); and, at length, the nasal membrane looks gangrenous. The discharge continues, and becomes more abundant; even blood issues from the nose. The sublingual glands, which are much swollen in all the forms of the disease, are more painful

[a] See Rust's "Magazin für die Gesammte Heilkunde"; Volumes 11 and 17.

[b] Mr. Vines (in his work on glanders) says, that when the skin only is affected,—as with buds, ulcers, or œdematous swellings,—the symptoms are called "farcy"; but when the mucous membrane of the nostrils and lungs partakes of the disease, and becomes ulcerated,—with a discharge of unhealthy matter from the nostrils, and swelling and induration of the submaxillary lymphatic glands,—it then takes the name of "glanders"; but without any real difference being necessary in their treatment, although one set of symptoms may exist independently of the other.

[c] From "pituita", *phlegm.*

han in the mild acute glanders. The conjunctiva and nasal eye-lid ("membrana nictitans") are at first inflamed, and injected with blood; and afterwards acquire a violet hue. The eye-lids swell, and the eyes discharge. The local phlegmasia soon extends to the surrounding parts; respiration becomes laborious; the superficial vessels are successively congested; and the animal dies, in spite of all we can do;—frequently in a few days, at other times after a longer or shorter interval. If the disease is protracted, the symptoms occasionally, though rarely, relax; and the inflammation declines. The animal then appears partially to regain its powers, and may be to a certain degree useful; but the state of the pituitary membrane, and of the *auge*, and the permanence and character of the nasal discharge, show that the acute stage has degenerated into the chronic. It is in this form, especially, that attacks of glanders may be considered epizootic. That violently acute glanders is always speedily fatal, and never becomes chronic, is disproved by the following fact:—In a stable of eighteen horses and three asses, all of which were affected, ten died within the first days of the attack; four, after the violence of the disease had abated, remained stationary for two months, and then were cut off by a return of the inflammatory symptoms;—a relapse into the acute stage. The seven which survived presented all the symptoms of chronic glanders, and worked in the country nearly a year, when it was thought proper to kill them.[a]

Chronic Glanders in the Horse.—The symptoms of chronic glanders in the horse, are thus detailed by Mr. Blaine[b]:—"An increased and diseased secretion from the membranes of one or both nostrils, continually flows in small or large quantities. This discharge is seldom at first perfectly purulent; but is more glairy, thick, and not unlike the white of egg, and it sometimes continues thus for a long time; at others, it soon becomes purulent; but even then there is always a degree of viscidity and gluiness in it, that sticks the nostrils together (as it were) from its tenacity; differing from other pus; and which very circumstance strongly characterizes the complaint. The general colour of the Schneiderian membrane becomes changed, first to a violet-colour, and afterwards to a leaden hue. As ulceration takes place, the discharge becomes bloody, and sometimes sanious and offensive;—which is always the case where the bones prove diseased. From an absorption of the morbid matter from the nose, by the lymphatics of the part, the lymphatic maxillary glands under the jaws (through which these vessels pass) become swollen and tender; and, as one side of the head only is sometimes affected with the glandered running, in such case the lymphatic gland only is tumefied; and, of course, the one of the affected side."—"The disease sometimes remains long without producing ulceration; at other times, on the contrary, an ulcerating process quickly appears. The ulcers have a very peculiar character. They are not unlike the venereal chancre; but usually commence by small limpid bladders; which soon ulcerate into a sore of a particular kind; and where there are several of them, they are always placed high in the course of the lymphatics."—"As the disease advances, much of the Schneiderian membrane becomes ulcerated; till, at length, the bones prove carious. At an uncertain period of the disease, the lungs become affected; when hectic symptoms soon follow, with tubercles which ulcerate; frequent vomicæ also form and burst; there then appear cough, emaciation, and weakness in the loins; the hair feels dry, and falls off on being handled; the matter from

[a] "Dictionnaire de Medecine et de Chirurgie Vétérinaires." Article, "La Morve"; Pages 458 and 459. (Third Edition.)

[b] In his "Outlines of Veterinary Art."

the nose increases in quantity, becomes sanious, fetid, or bloody; and is coughed up by the mouth also; and, in this state, the animal dies."

Farcy in the Horse.—[The farcy generally appears in the form of small tumours (called by farriers "buds"), or small ulcers, about the legs; sometimes on the lips, face, neck, or other parts of the body. These tumours are, in some cases, so small, so few in number, and create so little inconvenience to the animal, that for a time they escape observation; at other times they are larger, more numerous, painful to the touch, and spread more rapidly; and, in these instances, a general swelling of the limb often takes place, particularly when the hind legs are attacked; and some degree of lameness ensues. The tumours (or "buds") are at first hard; but soon become soft, and burst;—degenerating into foul ulcers, of a peculiar appearance. The edges of the skin surrounding the ulcer, terminate abruptly; and the surface of the sore has a pale glossy appearance. The lines of communication between the "buds" or ulcers, are generally very observable; particularly when they occur on the inside of the limbs, where the superficial veins are large;—as in the thigh. They consist of what the farriers call "corded veins"; but, in reality, are inflamed and enlarged lymphatic or absorbent vessels.[a]]

b. Appearance and Varieties in Man.

Varieties.—I propose to call this disease "equinia" when it appears in the human subject,—as indicating its communication from the horse; for the same reason that "cow-pock" has been called "vaccinia." It may occur as true glanders, characterized *primarily* by ulceration of the nostrils; in which case I would call it "equinia catarrhalis"; or as farcy characterized by tumours in various parts,—"equinia apostematosa." Equinia may be either acute or chronic; but it has been observed more frequently, I believe, in the chronic form. The three cases, reported by Mr. Travers[b], are examples of chronic equinia; though not reported as such by him. The other cases which I have detailed[c], may be considered as instances of acute farcy and glanders.

Symptoms of Equinia Catarrhalis.—[The disease ordinarily presents the following phenomena in its progress, when it occurs in the acute form. Articular or muscular pains, in some cases simulating rheumatism, followed by subcutaneous, circumscribed, painful swellings (the probable result of angeio-leucitis); which either undergo superficial mortification, or are converted into abscesses, containing either laudable or sanious pus;—a yellowish, viscous, nasal discharge, of limited quantity; issuing, in the great majority of cases, from *both* nares; and first observed from the fourth to the sixteenth day; accompanied, in some instances, by a similar excretion from the mouth or eyelids;—occasional tumefaction of the nose and adjoining parts, followed by gangrene in one-eighth of the cases;—in very rare examples, swelling of the submaxillary lymphatic glands, or depositions of pus therein; and, pretty frequently, inflammation of the throat and tonsils;—a peculiar pustular eruption, differing from all varieties hitherto observed; namely gangrenous bullæ, appearing (towards the twelfth day of infection) on the face, arms, thighs, and anterior surface of the trunk; and sometimes preceded or accompanied by profuse fetid sweats; a rapid and full pulse at the outset; subsequently weak, depressible, and sometimes intermittent; and, as death approaches, extremely small and frequent;—diarrhœa, with

[a] "A Treatise on Veterinary Medicine. By James White." Pages 7 and 8.

[b] See Page 493.

[c] See Pages 493 to 497.

watery stools, of a cadaverous smell, and occasionally containing dark coloured blood;—dental sordes;—dry, brown tongue;—tympanitic abdomen, with hardly any abdominal tenderness;—thirst, in a few cases;—difficult deglutition;—occasional vomiting, especially towards the close;—*typhoid maculæ* on the surface;—violent cerebral symptoms, terminating in delirium, coma, and death.[a]]

M. Rayer distinguishes three varieties of the acute form of this affection;—the pustular, the gangrenous, and the pustulo-gangrenous.—"In some cases, the most striking phenomena consist of a pustular cutaneous eruption, a thick and glutinous nasal discharge, and a typhoid aspect. In others, the symptoms of nasal lesion are obscure; while the external characteristics (the pustular eruption and gangrenous affection of the skin) predominate. Again: pains in the limbs, purulent deposition in various parts of the body, and inflammation of the lymphatic vessels and glands, form, in the outset, the most striking features of another set of cases, still more strictly analogous in character to the acute farcy-glanders of the horse. Lastly: there are others more violent and promptly fatal; in which all these morbid changes and symptoms appear rapidly and at once, a few days after vague initiatory phenomena."[b]

Symptoms of Chronic Equinia Catarrhalis.—The following case of chronic glanders, will best illustrate the symptoms in this form of the affection:—"Thomas Gue, aged 50, was admitted on the thirtieth of April, 1835, under my care. He had been a sailor during the greater part of his life; but has lately followed the occupation of a groom. About two months since, his master having a glandered horse, he administered medicine to the animal, and washed its mouth; he also cleaned the nose with a sponge and warm water. He does not recollect that any portion of his hands were abraded of cuticle; but that he had an open sore on his lips;—the consequence of a blow from a hammer. The horse occasionally sneezed in his face, which he wiped with the same cloth that he had used for the horse's mouth and face. About three weeks prior to admission, he was seized with the following symptoms: a dull aching pain across the brows and in the eye-balls; his nose felt stuffed; and there was a considerable discharge of thick, yellow, offensive pus from one of the nostrils; no ulcers were discernible on the pituitary membrane; but, from the patient's statement, they probably existed in the more remote parts of the nose. The throat, on pressure, was rather painful, and the lymphatic glands were enlarged. He had also cough, and expectorated matter of a similar character to that discharged from the nose. His health had not been disturbed until about two days previously to admission; when he lost his appetite, and was seized with a pain in the epigastric region. This man recovered under the use of kreosote as an injection. "At a later period, sometimes after several months, tumours begin to appear in different parts; and their evolution is accompanied by horrors, nausea, delirium, general febrile disturbances, and frequent slimy evacuations. From this state the patient seldom recovers, but in general sinks gradually."[c]

Chronic Equinia Apostematosa.—[In this form of the disease, the nasal membrane at first remains sound; and small tumours gradually appear about the face, trunk, and limbs. These break;—producing an unhealthy discharge; and are attended or followed by purulent collections in the joints, or various

[a] Analysis of "Rayer on Glanders and Farcy in Man", in the "British and Foreign Medical Review", for July, 1838. (Volume 6, Page 118.)

[b] Rayer on Glanders and Farcy in Man; Page 642.

[c] "Library of Medicine"; Volume 1; Page 406.

parts of the body. The disease may terminate fatally in this manner; but the nasal affection often comes on at a later period.[a]]

Causes.—Among the various diseases of the lower animals to which man is susceptible, equinia is the most readily communicable of them all. According to the testimony of the best veterinarians, it is contagious (in the restricted sense), not infectious[b]; it is therefore only communicated by contact with the diseased secretion from the mucous membrane of the nostrils in glandered horses, or the pus produced in tumours on other parts. To render its contagion effective, abrasion of the surface is necessary; as it is believed, by most veterinary surgeons, that glanderous matter never excites the disease in the horse, even if applied to the pituitary membrane, while the surface is entire.[c]

Period of Incubation.—[There occurs in this, as in other contagious diseases, a variable though limited period of incubation. Thus, after the inoculation of glanderous matter, a period of from two to eight days, or more, elapses before the occurrence of any notable symptoms. At the end of this time, the evidences of local irritation appear at the injured part; its extension follows;—as is proved by the condition of the neighbouring lymphatic glands and vessels, and by general febrile phenomena. In some instances, these local symptoms were slight, and easily relieved; the patients even appeared on the brink of recovery, when the essential and specific symptoms of glanders supervened. When the disease is contracted by *infection*, the invasion is marked by fever; attended by gastric symptoms, diarrhœa, or pains of the limbs.[d]]

Duration.—[The duration of acute and chronic equinia, is very various. In the former, death may occur in a few days; but, in the greater number, life has been prolonged beyond the twelfth day, and in some cases to the thirtieth. The chronic variety may last a month only; a few tumours and pustules slowly form, and disappear under curative measures; sometimes ten months have elapsed before the fatal termination occurred.[e]]

Treatment.—All attempts to cure the acute form of this disease have hitherto failed. Rayer is decidedly hostile to bleeding, either topically or generally;—as tending to accelerate prostration, stupor, and local gangrene. On the other hand, bark and other tonic antiseptics have proved equally fruitless. Rayer recommends the immediate excision of the swollen glands, in the early stages of the disease; and if the local inflammation following this operation, or resulting from the inoculation alone, were intense, "de-

[a] "Library of Medicine"; Volume 1; Page 406.

[b] See Page 341.

[c] The opinion here expressed by Dr. Elliotson, is no longer general. Dr. Eck, of Berlin, in a recent and valuable paper, thus expresses himself:—"Though the glanderous nasal discharge is recognised as the chief vehicle of infection, and (on this account) the use of harness, mangers, drinking-vessels, &c., which have been in contact with glandered horses, and are liable to be brought in contact with the pituitary membrane of sound animals, is especially to be feared; yet it can hardly be doubted, that the contagion may exist in the other excretions; nay, that occasionally, as in damp stalls, infection may take place without any observable contact; — probably through the medium of respired air." ("British and Foreign Medical Review"; Volume 6; Page 116.) This opinion is also adopted by Rayer; who has divided his collection of cases into those,—"where no local results of inoculation are observed; the first symptoms being those of a general infection of the system"; and those,—"where the earliest phenomena are angeioleucitis, local phlebitis, or diffuse cellular inflammation in some region of the body; usually the arm; while the lesions and symptoms of *glanders* do not appear until subsequently." (Rayer on Glanders; Page 643.)

[d] Analysis of Rayer, on Glanders; in the "British and Foreign Medical Review"; Volume 6; Page 117. (No. 11 July, 1838.)

[e] "Library of Medicine"; Volume 1 Page 406.

bridement" and mercurial frictions might (he presumes) be employed with advantage. He also recommends the employment of repeated purgings, and the exhibition of large doses of acetate of ammonia;—a favourite remedy with veterinary surgeons. As to topical treatment, he advises the free incision, and subsequent cauterization of the pustules and abscesses; while the patient's strength is supported by tonic drinks, and generous wine diluted with gaseous water. Solutions of the chlorides,—used as gargles, taken internally, or injected into the nostrils,—have been recommended;—on account of their powerful antiseptic properties. Turpentine—either in the form of warm embrocations applied externally, or administered internally in small and frequently repeated doses—has also been recommended.[a] The patient's excessive thirst should be assuaged by the use of soda-water, or slightly acidulous drinks.

In two cases of chronic glanders which have come under my notice, the employment of kreosote has been attended with complete success. In one case, that of Thomas Gue already mentioned[b], the injection of a solution (consisting of one minim of kreosote to an ounce of water) into the nostrils, effected a cure in about three weeks. In the other case, this man's master, who administered it internally, in addition to the injection, with the like result. From one to three minims may be administered daily.

A few words as to the sanatory applications of the facts which are now so prominently before us. The subject is one of the highest public importance; and demands the serious consideration of those on whom the care of the public health devolves. The facts peremptorily behove all persons who have any thing to do with glandered horses, instantly to destroy them; and in all cases to do so, unless a cure be discovered for the disease, or some new mode of treatment be proposed. I am told by Mr. Youatt and other veterinary gentlemen, that at least forty-nine out of every fifty glandered horses ultimately perish of the disease. Then why suffer animals so frightfully dangerous, to linger out the remainder of an existence which they pass so wretchedly, and run the chance of giving the disease to other animals and to man? With such evidence before us, every glandered horse in the kingdom ought to be killed forthwith;—unless it is thought fit to institute some new investigation into the treatment of the disease. Nothing can be more wrong than to keep glandered horses alive for the little work which may, in spite of the debilitating effects of the disease, be forced from them. Let their owners but reflect for a moment on the multiplied opportunities which occur for contagion between these animals; the innumerable occasions for smearing, with the poisonous matter, the various parts of the stable; the risk of depositing it on the grass when turned out; and, above all, of giving it to man; who must assuredly perish by it in the most dreadful manner;—for no remedy is known for it. The effect is awful to me beyond any thing that I ever witnessed in disease. Here we may have young men in all but perfect health one week,—after acute suffering, offensive discharges, and sores and putrefaction, corpses the next. I thought when I had seen the fatal cholera, that I had witnessed the acme of sudden suffering and death; but the man who is glandered presents a scene quite as heart-rending to our view, as the cholera-patient.

[a] Dr. Pedduck, in a letter to Dr. Elliotson, published in the "Lancet" for February 19, 1831, (No. 390; 1830-1, Volume I. Page 689,) has related a case of glanders in the horse, which was successfully treated with oil of turpentine. The analogy between oil of turpentine and kreosote, in many respects, explains this success.

[b] See Page 501.

CHAPTER VI.

PURPURA.

I SHALL now describe an affection, which consists in extreme *congestion* of the skin, without any *inflammation*; and is characterized by the presence of petechiæ, vibices, and ecchymoses on the skin; which occur throughout the body, on the conjunctiva, and even within the mouth, and in the interior of the body;—so that the blood will actually be poured forth on the various viscera. This disease is called at present, in this country, "purpura."[a] It was formerly called "petechiæ sine febre", or "hæmorrhagia petechialis." Rayer has, very properly, separated it from inflammatory diseases; and has placed it in the order "congesta."

Pathology.—It is a very singular disease, and sometimes occurs in the most opposite circumstances;—occasionally with great debility, weakness of pulse, and exhaustion; sometimes with the most inflammatory state of the system.[b] Although the *skin* is not actually in a state of inflammation, yet the *system* is in an inflammatory condition; as is proved by the buffy and cupped state of the blood.

Analogous to Scurvy.—It bears a great affinity to scurvy, and some fancy it is the same disease; but I cannot subscribe to that opinion.[c] It is a disease that frequently happens without any constitutional affection. I have seen persons going about with it, and yet quite well in other respects; and in other cases, persons have died *with* it. There is no affection of the limbs, and no sponginess of the gums, as in scurvy. The disease, too, has often arisen without any evident cause; whereas scurvy (I believe) never takes place, except from a deficiency of proper food.

Symptoms and Varieties.—If the disease occur merely on the surface of the body, forming patches, it is called "purpura *simplex*." But frequently there is extensive bleeding from the mucous surfaces of the mouth, stomach, and intestines. I once had a patient, who died from bleeding within the head ("apoplexy"); and a clot of blood, which had oozed from the vessels of the pia mater, was found under the arachnoid membrane. Sometimes the spots are large; and sometimes there is ecchymosis. There is no inflammation or tenderness of the particular parts. It appears to be a mere congestion of blood. In severe cases, the patient is pale; he looks as if he were in a state of anæmia; and I dare say the blood is deficient in quantity. On the other hand, I have seen children with many hundreds of these spots upon them; and yet running about perfectly well. Sometimes there would appear to be a little inflammation connected with this congestion; attended with great tingling, and even little wheals; and then it is called "purpura *urticans*." Frequently there is such tenderness of the vessels in old people, that if they rest upon their arm, or knock their hand against a door,—so as to produce the slightest bruise,—ecchymosis will take place; and that has been called "purpura *senilis*"; although, indeed, it

[a] From πορφυρα, *a shell of a purple colour.*

[b] See Page 385.

[c] See Page 262.

is not this disease at all. It conveys the idea that it is the same disease; but it is merely such a tenderness of the vessels, that the slightest contusion produces ecchymosis. Persons may have the disease for many years, at the latter part of their life; and yet be perfectly well. We are often consulted by patients on this occurrence; and it is right to know that it is *ecchymosis*, and should not be called "*purpura*." It is merely a bruise; and may be produced on old persons with the greatest facility.

Causes.—Petechiæ may take place in many circumstances;—frequently in typhus-fever; frequently in small-pox, between the pustules; and sometimes in scarlet-fever. It is very common to meet with them in dropsy, where there is great debility; they very often occur where there is extreme dyspnœa; and sometimes in phthisis, where there is extreme difficulty of breathing. But there may be such debility of the vessels, that they allow the blood to ooze forth. Or there may be an impediment to the return of the blood; and the blood may be *forced* out. Frequently, however, no reason can be assigned for the disease. The person may be living as usual; when, all at once, the disease makes its appearance.

Treatment.—I do not think there is, at present, any satisfactory or universal mode of treatment; but we must treat it according to the particular circumstances in each case. In mild cases, moderate bleeding, or mere purging, answers very well; and I think I have satisfied myself that purging with *colchicum*, answers better than other things. I have made observations upon this medicine, in other cases. I have purged with colchicum, and with other things; and the difference has been very greatly in favour of colchicum. I am sure we shall get rid of this disease sooner, by purging with colchicum, than by any other means. Where there is strength of pulse, it is necessary to bleed, and bleed freely. I have seen patients lose two or three pints of blood, in a few days, with great relief; and they have got well. A great number of cases are of this inflammatory nature; but by no means all.

Others are of a different description; and wine, bark, and good nourishment, must be given. I recollect a case (which occurred in a child) where there was merely moderate debility; and the child was out every day. The disease was not intense, but these petechiæ existed; and under good nourishment and tonics the patient got well. But in extreme cases, it is necessary to do more than this. It is necessary to give wine and opium; and to treat the patient as we should if he were sinking under typhus-fever, or confluent small-pox with typhoid symptoms.

Turpentine.—Where there is hæmorrhage, I have no doubt it would be best treated by oil of turpentine. As the latter restrains hæmorrhage from the alimentary canal, better than any other medicine, I have no doubt it would restrain it under this particular affection. One of the most severe, and most successfully treated cases that I ever saw, was at St. Thomas's Hospital, under the care of Dr. Roots. There were petechiæ, vibices, and ecchymoses, in every part of the body; together with great congestion of the liver;—so that the right hypochondrium was distended. Blood was also poured forth from different cavities. The patient was bled, and took oil of turpentine; and he got well rapidly. Every one who saw him, must have supposed that he was near death. I was much disappointed in a case of my own, which I treated in the same way. Apoplectic symptoms came on; and, on opening the patient, a clot of blood was found on the brain.

CHAPTER VII.

DISCOLOURATIONS OF THE SKIN.

Before proceeding to those affections which are of a structural nature, I may perhaps make a few remarks on those diseases which consist in a discolouration of the skin. Some of these are really not affections of the skin itself. For instance: in jaundice the skin is yellow; in chlorosis the skin is exceedingly pale; and likewise in anæmia. On other occasions, however, the skin is itself discoloured; and among these affections are mentioned "sun-spots"; and that blackness or blueness of the surface, which is induced by the continued exhibition of nitrate of silver.

Lentigo.—["Lentigo"[a], or "freckle", is the name given to the multifarious small, rounded, brownish-yellow or fawn-coloured stains that appear upon the face, bosom, hands, and neck;—more especially in individuals of fair complexion and delicate skin. Sometimes these spots cover the whole surface of the body. They are generally most abundant in childhood and youth; and are much less seen in dark complexions, in manhood, and in old age. They are evidently induced by exposure to light and heat; although they do not seem to result from the direct action of the sun's rays. The parts upon which they appear, never evince the slightest symptom of derangement. The best mode of preventing their appearing or increasing, —which they generally do in spring,—is to avoid carefully a too vivid glare of light, and to protect the skin by some slight covering. They require no treatment.

Ephelis.—"Ephelis"[b] is characterized by one or several irregular-shaped broad patches, of a light or dark yellowish-brown; occurring most frequently on the front of the neck, chest, abdomen, groins, and inner part of the thighs; generally accompanied with itching, and sometimes with slight desquamation of cuticle.

The patches of ephelis generally appear slowly; and remain several weeks, or even months. They often occur in individuals enjoying the most perfect health, but sometimes appear to depend on a particular state of the system;—such as that which occurs on the approach of the menstrual period, and during pregnancy. Violent excess may sometimes occasion their appearance; but they have often a connexion with disease of the digestive organs. They occasionally occur upon the face of pregnant women; —covering it with a kind of mask.

The patches of ephelis, at first small, increase slowly; and attain a size varying from that of a sixpence, or less, to that of the palm of the hand. These patches, being separated by intervals of healthy integuments, give the skin a very peculiar appearance. But at a later period they coalesce, and cover extensive continuous surfaces with a single coloured patch; in the breadth of which, here and there, some spots of healthy skin are seen; and at first sight appear like so many morbid stains. These patches are

[a] From "lens, lentis", *a lentil*;—from its resemblance to lentil-seeds.

[b] From ἐπι; and ἥλιος, *the sun*.

usually attended with itching; which is increased by exposure to heat, by slight moral impressions, by indulgence in spirituous liquors, and by scratching. Sometimes, though rarely, slight cuticular desquamation takes place.

The two latter symptoms distinguish the patches of ephelis from "pityriasis versicolor"[a]; in which there is no pruritus, and much desquamation. The red copper-colour of syphilitic blotches, will always prevent their being mistaken for ephelis; and if, in some rare cases, the yellowish cast of a patch of nævi should cause any doubt, the duration of the latter, and the knowledge of its being congenital, will soon clear up the mystery.

Treatment.—The patches of ephelis readily disappear on the use of the sulphurous water-bath, with or without the internal use of the same remedy. The waters must first be taken mixed with two-thirds of barley-water or milk; and their quantity increased by degrees. When the itching is very troublesome, a lotion containing one ounce of sulphuret of potash dissolved in two pounds of water, may be frequently applied. Gentle aperients may, at the same time, be administered; and all stimuli should be strictly forbidden.

Nævi.—Under the common title of "nævi", two very different forms of congenital affection of the skin are included. The one—termed also "spili"[b], "nævi pigmentares"[c], or "mole",—is met with on all parts of the body, is of various sizes, and cannot be considered as a disease of the skin. The other—"nævi vasculares" ("mother-mark")—is owing to an original morbid condition of the vascular[d] system of the part affected. Of these, some are quite superficial, often met with on the face, and are of the colour of claret or port-wine. They remain indolent; and appear to be formed by a simple dilatation of the arterial and venous vessels, distributed to the part of the skin affected. Others are somewhat elevated, and of the same deep red colour; these are of a far more dangerous nature, and are formed of erectile vascular tissue. Their size is very various: sometimes a small speck not bigger than a pin's head, and of a bright red colour, rapidly acquires such dimensions as to render it necessary to have recourse to a surgical operation. The treatment of the vascular erectile tumours is, indeed, altogether surgical.

Vitiligo.—"Vitiligo"[e] is a partial colourless state of the skin, either congenital or accidental, occurring in irregular white patches of various extent. It occurs frequently among negroes, and occasionally among whites. The "vitiligo hydropicorum, gravidorumque"[f]—a name given by Frank to the small white lines which are seen upon the abdomen of females after delivery, or those which succeed to ascites—does not really consist of patches of vitiligo; but of small lacerations of the corpus mucosum, induced by the distension of the parts. The patches of vitiligo are white; and when they occur on parts naturally covered with hair, the latter is also white. It is not uncommon to observe vitiligo upon the scrotum.[g] In aged persons, these patches acquire sometimes considerable extent: they never cause pain, heat, or itching; and require no treatment.[h]]

[a] See Page 432.

[b] From σπιλος, *a spot.*

[c] From "pingo", *to paint.*

[d] From "vasculum", the diminutive of "vas", *a vessel.*

[e] From "vitulus", *a calf.*

[f] "Vitiligo of the dropsical and the pregnant."

[g] From "scortum", *a skin.*

[h] "Library of Medicine"; Volume 1; Pages 424 and 425.

CHAPTER VIII.

ORGANIC DISEASES OF THE SKIN.

The organic affections of the skin are, for the most part, of a tubercular nature. The most important of these are lupus ("noli me tangere"), cancer[a], elephantiasis, and ichthyosis.

SECTION I.—LUPUS.

Lupus[b] is a disease more frequently treated by the surgeon, than by the physician; and is an affection that is particularly seen upon the face, around the nose, and upon the upper lip.

Characters.—Lupus is characterized by tubera; which are rather oval, and frequently flat; and of a brownish red or livid colour. They increase and terminate in ulceration; and an ichorous discharge is then poured out, and concretes into crusts. It appears on the nose and cheeks, and sometimes upon the ears and chin; but it is calculated that, eight times out of ten, it attacks the nose. The parts around become harder and harder; suppuration goes on to ulceration; till, at last, a great degree of destruction is produced. It is exceedingly intractable.

Varieties.—One variety occurs in scrofulous children; and frequently gives way, sometimes to one application, and sometimes to another;—occasionally, perhaps, spontaneously. But there is another description, which produces deep ulceration and extreme pain; and frequently appears to be somewhat allied to cancer. This is called "noli me tangere"; from its generally becoming worse, if interfered with by medical men.

Diagnosis.—[It has been compared to, and probably sometimes confounded with, scirrhous ulcerations of these parts; but the features by which it may readily be distinguished from such affections, are the following:—1. Cancerous disease of these parts usually occurs first on the lower lip. 2. The uneasiness belonging to it is, in no case, described to be worse than are comprehended under the general designations of "heat", "itching", "tingling", or "smarting"; while scirrhous ulceration is accompanied by severe darting pains. 3. Diseased enlargement of the contiguous glands, does not often make its appearance in its train, even though the disease has existed for years; which is not the case with cancer. 4. The surface of the sore is never occupied by fungous granulations, or has thickened and hardened or everted edges; but retains its peculiar character to the last.[c]]

Treatment.—Some cases have been cured, it is said, by the application of

[a] With respect to cancer of the skin, I need say nothing; because I have already spoken of it, when treating of structural diseases at large. (See Page 217.) The particular treatment of cancer, falls within the province of the surgeon.

[b] So called from its resemblance to a *wolf* (lupus) in the ravages which it makes.

[c] Plumbe, on Diseases of the Skin; Fourth Edition; Page 119.

caustics, and particularly arsenic; but there is no rule for the treatment; and I believe, in a great number of cases, the disease resists all means.

SECTION II.—ELEPHANTIASIS.

The next disease which I shall briefly notice, is one of very rare occurrence in this country;—so that I have seen only two or three instances of it. I refer to "elephantiasis." It receives its name from the skin becoming as rough and hard as the back of an elephant. It has been termed "the elephantiasis of the *Greeks*";—to distinguish it from another form which is local.[a]

Characters.—In this disease the features become extremely altered. The lips are very thick; and the whole of the face, and great part of the body, are beset with hard tubercles;—so that a person could not be recognised, by those who knew him previously to the appearance of the disease. The face is particularly rough. It is considered by Rayer to be a chronic inflammation; but we may either regard it as such, or as an organic disease of the skin. It is characterized by numerous independent tubercles of a livid colour; particularly developed on the face and ears, the upper and lower extremities, and likewise on the arch of the palate. The tubercles terminate, either by resolution, or by small ulcerations; which seldom extend in depth or breadth. They are covered by adherent crusts, under which a cicatrix is formed. It may occur in any part of the body; but, like lupus, it attacks the face much more than other parts. It has been said, by a great many writers, that the sexual desire becomes insatiable in this affection. Others, however, deny this; and not only so, but they go to the other extreme, and say it is extinguished.

[A kind of dry gangrene pervades the fingers and toes, which are generally eaten away, and drop off at the first phalanges; these sores then generally cicatrize, without any rete mucosum; and the next joint becomes invaded, by a renewal of the ulcerative process. It is singular to observe that, notwithstanding these extensive sores, the patients can wear hard shoes, which are saturated with the sanious ichor that exudes from these ulcerated surfaces. The disease progressively advances;—eating through the ankles and wrists; and performing slow, but certain and successive dismemberment;—every revolving year bearing some trophy of this tardy, but gradual march of death; till, at last, the vitals become affected. During all this time, a sleepy inertness overpowers the mind, and "seems to benumb and almost annihilate every faculty, as well of the soul as of the body; leaving only sufficient sense and activity to crawl through the routine of existence."

In the last stages of this complaint, the flesh gapes with long sores; the mouth, nose, and brain become exposed to its ravages; and death, at length, terminates this loathsome existence. The patient is usually cut off by the supervention of diarrhœa. It is astonishing, however, to witness how long the victim lingers;—from twelve to twenty years being no uncommon duration. During the greater part of this period, he has a good, and even voracious appetite; and moves about from village to village.[b]]

Causes.—[It is not contagious, but appears to be hereditary; though not necessarily so. M. Biett lately attended a lady, from the West Indies, affected with tuberculous leprosy in a very severe degree; and who had been delivered of several children since the disease first appeared. These

[a] "Barbadoes-leg", or "elephantiasis of the *Arabs*." See Page 510.

[b] Brett's "Practical Essay on the Surgical Diseases of India"; Page 164.

children, who are now of a certain age, all enjoy excellent health; and do not shew the the least symptoms of Greek elephantiasis. This disease attacks both sexes equally; and appears at all periods of life, but less frequently in elderly persons. The cases seen in Europe, generally come from the West Indies and other colonies. We have seen it in a young Portuguese; who, according to his statement, had never left Portugal before the appearance of the disease. In the colonies, damp dwellings, malaria, and unwholesome food, especially pork, often appear to be exciting causes. To these may be added, over-working, the too free use of spirits, and especially depressing moral affections.

Diagnosis.—In the commencement, the erythematous patches may be considered as symptoms of a disease far less fearful than lepra tuberculosa; and often, for a time, mislead. The impaired or total loss of sensibility in these points of the integuments, their dusky red hue, soft feel, and the circumstance of the patient having previously inhabited a tropical climate, may assist the diagnosis; the mistake would, however, be only that of not foreseeing the disease that is about to occur. At a more advanced stage, we conceive an error to be almost impossible;—if we compare the symptoms of the occasional tubercle of lupus, or those connected with a syphilitic origin, of mollusca, and of frambœsia, with those of elephantiasis.[a]]

Treatment.—The only case which I have seen, occurred in a person who came from Madeira; but it is also found at St. Domingo, and in the Isle of France. It has been cured, I believe, by the exhibition of arsenic. Many cases have been *improved* by this medicine; and slight cases have been absolutely *cured* by it; but, for the most part, the treatment is very unsatisfactory.

[The vapour-douche, friction with volatile liniments, or (what is still more efficacious) the repeated application of blisters to the diseased surfaces, may be tried. When the disease is limited in extent (to the ears or face, for example), the ointment of hydriodate of potash (one scruple to an ounce of axunge) is often very beneficial;—the vapour-douche being frequently applied at the same time. When it is more extensive, and the tubercles have not ulcerated, warm water, alkaline, or sulphurous baths are to be employed; and, if the state of the bowels admit of them, arsenical preparations, or the tincture of cantharides, are to be administered, with the precautions stated in the treatment of psoriasis. In the advanced stages, M. Biett has employed the actual cautery with success. It should be kept in view, however, that from the frequent complication of irritation or inflammation of the gastric mucous membrane with elephantiasis, it is impossible to exhibit remedies of an active or irritating character, more especially preparations of arsenic or cantharides. In such circumstances, a soothing course of internal treatment, comprising measures calculated to allay the intestinal affection, is to be adopted; while we endeavour to ameliorate the condition of the skin, by the external treatment already noticed.[b]]

Barbadoes-Leg.—There is another disease which is called "elephantiasis"; but it is local, and does not spread throughout the body, or form tubercles. As it commences in a thickening of the parts below the skin, it is mentioned by Rayer as a disease, not of the skin itself, but as one of those diseases which extends from other parts to the skin.

Symptoms.—This affection is what is called "Barbadoes-leg"; and is

[a] "Library of Medicine"; Volume 1; Pages 419 and 420.

[b] "Library of Medicine"; Volume 1; Page 420.

also called "the elephantiasis of the Arabs." It is a local disease, occurring in the scrotum, and at the lower part of the leg.[a] The skin becomes diseased; but the cellular membrane beneath it is the chief seat of the affection. It becomes excessively thickened and indurated; and at Barbadoes it sometimes affects only one leg.

[Although the progress of the disease is slow, there is more or less general disturbance at the beginning; such as fever, frequent vomiting, pain and erythematous redness over the course of the lymphatic vessels, with swelling of the limb or part. This never subsides entirely, and increases with each returning attack of constitutional disturbance; which intermits and returns at irregular intervals. The limb gradually increases to an enormous size; and becomes so hard as to resist the firmest pressure. In a few months, the general symptoms and local pain disappear; but the distended and enormously swollen part—whether the leg or the scrotum—not only remains in that state, but increases. The scrotum has been known to weigh nearly sixty pounds; and one of the lower extremities to attain a weight equivalent to that of the rest of the body. The skin—at first pale, smooth, and shining—becomes rough, hard, thickened, and covered with scaly incrustations of various thickness; it afterwards cracks in all directions, and deep and painful fissures ensue. The lymphatic glands, which were from the first hard and swollen, sometimes inflame and suppurate, and even mortify. Deep abscesses form, and discharge a large quantity of fetid pus; and death occurs with the ordinary symptoms of adynamic fever.

Treatment.—In the first stages of the disease, local and general bleeding may be necessary, with rest and the horizontal posture of the limb. At a later period, gentle and frequent friction, compression carefully applied, daily shampooing, and the vapour-douche, may be employed. Frictions with the different preparations of iodine, are of great service; but should inflammation come on, their use must be immediately suspended.[b]]

A friend of mine says it is produced by a kind of flea; which is not satisfied with being on the surface, but forms a bag beneath, in which it lays its eggs; from the continued irritation of which, he says, the disease is produced. How that may be, I do not know. The blacks, in the West Indies, suffer under the affection; and they are very dexterous in dragging out the bag, by means of a needle;—so that no harm ensues. But if any portion be left, an egg usually remains; and the disease proves very troublesome. The name given to the insect is "chigoe."

SECTION III.—ICHTHYOSIS.

Nature.—The next disease which I shall notice, is classed by Rayer among *organic* diseases of the skin, and is one which we occasionally see. It is termed "ichthyosis."[c] It is not so rare a disease but that every one, in the course of his life, may perhaps see a few cases. It is classed, by Willan, with scaly diseases[d]; but as the scaly diseases I have mentioned[e] have been

[a] No part of the body, however, is exempt; the face, neck, breast, abdomen, nates, labia, and margin of the anus, have at different times been observed to be its seat.—"*Library of Medicine*"; *Volume* 1; *Page* 429.

[b] "Library of Medicine"; Volume 1; Pages 429 and 430.

[c] From ἰχθὺα, *the scale of a fish.*

[d] Order 2 ("Squamæ"); Genus 4. See, also, Plates 18 and 19.

[e] Pityriasis (Page 431); Lepra (Page 432); and Psoriasis (Page 435).

classed, with a number of others, in the list of inflammatory affections, this could not come in with them. Moreover, although a scaly disease, it is necessarily separated, in the arrangement of Rayer, from pityriasis, lepra, and psoriasis; because all those scaly diseases are of an inflammatory nature.

Characters.—In this disease, there is no inflammation whatever. The skin is neither red, hot, nor tender; but it is covered by a large number of scales. These scales have been supposed to resemble the scales of a fish; but they are not imbricated. Indeed, in many parts, the skin looks more like the feet of fowls, than any thing else. This will give us the best idea of it. At a little distance from a person labouring under the disease, we might suppose that the skin was dirty;—the scales which lie upon it being of a bluish colour. It exists in various degrees of intensity, and of extent. The constitution is not in the least degree disturbed;—the health is not at all affected. There is nothing to be seen, but this organic affection of the skin;—the cuticle being formed with this diseased character.

The affection will sometimes cover the whole body. It is said, in books, that it is not seen exactly over the furrow of the spine; but in the cases which I had in the hospital[a] (or, at least, in one of them), that part was covered with scales, exactly like the rest. The face, in those cases, was very little affected; but the back of the neck suffered pretty severely.

Causes.—The cause of this affection is not known; but it sometimes occurs from original constitution. I had two brothers under my care for this complaint; in each of whom it made its appearance without any obvious cause. They were born at Sheerness, and lived at Woolwich.[b] It seemed to be constitutional; and occurred in the progress of their age. It has sometimes been known to be hereditary. The skin feels dry and rough, and there seems to be no perspiration;—in general, the skin ceases to secrete a watery fluid. If the affection be more intense, it exhibits exactly the appearance that Alibert has represented in Plate 37, as occurring on the knee; and which he calls "ichthyose nacrée."

Treatment.—The disease is generally thought, I believe, to be incurable;—at least, that internal medicine has little power over it. Pitch, however, is said to do good. Dr. Willan says he cured a lady, by giving her pitch. The pitch was made into pills; and she took as many as she could swallow in a day;—altogether one or two ounces. I certainly did not give these patients as large a quantity as they could have taken; but each boy swallowed forty or fifty pills, three times a day. One of them put them into his hand, and swallowed them as children do sugar-plums: he must have taken, every day, a quantity of pitch, nearer two ounces than one. At the same time that I employed this treatment, I had one of the boys rubbed over with olive-oil. He was sent to the warm-bath; and when he came out, he was regularly oiled; and in this way he got well. Of course, I was quite in uncertainty, as to whether it was the *internal* or the *external* medicine that did him good;—whether it was the pitch within, or the oil without; and being told that he had a brother in a similar state, I requested that he also might come and be cured. I gave him pitch only; and in larger quantity than Dr. Willan had done; but he was no better for it. I then left it off, and had him oiled;—not all over, but over one extremity only; and that extremity recovered its natural texture, while the other parts remained

[a] St. Thomas's.

[b] See the "Medical Gazette"; Volume 7; Page 636. (No. 167; February 12, 1831.)

as they were. It was singular, that if a part which had been oiled touched, by chance, one that had not;—that is to say, if one leg touched the other, this last immediately improved, though not to the same degree. In this way the boy was perfectly cured. These two brothers went out of the hospital, with their skins as smooth and as soft as any girl's; and, for the time, they were certainly cured; but whether the disease will return, I do not know. The free application of oil, in these cases, answered perfectly. With regard to the latter boy, I made careful experiments with the pitch, the warm-bath, and the oil; and such intervals elapsed between the various modes of treatment, that I was perfectly satisfied it was the oil which effected the cure. The disease was quite of the intensity represented in Alibert's thirty-seventh plate. At one period, I used *linseed*-oil; but that did no good; for it dried directly. The *olive*-oil, however, retained its moisture for some time; and answered completely.

Varieties.—The ordinary form of the disease is called, by Willan, "ichthyosis *simplex*"[a]; but now and then it occurs in a much severer form; and then it is called "ichthyosis *cornea*."[b] The latter of these species is a rare disease; and is of an hereditary nature. Several instances have occurred, in the children of parents who had laboured under the disease;—not perhaps appearing at their birth; but occurring, like "ichthyosis *simplex*", at a certain time afterwards.

The Porcupine-Family.—There is, in Suffolk, a family in whom it has appeared for several generations;—three or four; and (what is singular) always in the male line. No female has been known to have it. Every part of the body is covered with the disease; except the face, the palms of the hands, the soles of the feet, and the glans penis. I saw one of these men;—the grandson of the person who is described in the "Philosophical Transactions." It was a famous family;—called, from the roughness of the skin, "the *porcupine*-family." This man told me, that the scales were shed every year; and, when I saw him again, they were in the act of falling off. The scales, in this form of the affection, all stand side by side;—they do not overlap each other; and when the limb is put in a certain position, there is a pretty smooth surface, on which you may make a noise, just as in striking horn; but if the part be stretched, so as to separate the scales a little, the divisions may be seen between them.

There was a man, labouring under this affection, who described himself as the descendant of an American savage;—I suppose he wished to make himself appear very wonderful. He came to London, every now and then, to shew himself for what he could get. There is also an instance of the hereditary form of this disease, published in the ninth volume of the "Medico-Chirurgical Transactions"[c], by a gentleman residing in Sussex: it occurred in a female. With regard to treatment, I conceive nothing can be done.

SECTION IV.—FRAMBŒSIA.

Its Nature.—[Framboesia[d] is a disease indigenous in Africa; whence it has been conveyed to the West Indies and America: it is rarely, if ever,

[a] "Description and Treatment of Cutaneous Diseases"; Order 2; Genus 4; Species 1.

[b] From "cornu", *a horn*. See Willan's Description and Treatment of Cutaneous Diseases"; Order 2; Genus 4; Species 2.

[c] Page 52.

[d] From "framboise" (French), *a raspberry*.

seen in Britain. It is characterized by the evolution of small, red, tuberculous tumours; generally distinct from each other at their summit, but connected by their base; and very similar (in their form, colour, and size) to a raspberry or mulberry. They appear on surfaces of various extent, and occur on all parts of the surface of the skin; but more frequently on the scalp, the face, the axillæ, in the groins, around the anus, and on the organs of generation.

Causes.—Persons of all ages may be attacked; but it is more common in children and young people. It is contagious; and is propagated by the contagion of the matter discharged from the eruption. It sometimes appears spontaneously: filth, misery, unwholesome food, and living in damp dwellings, are its more evident exciting causes. Negroes are more frequently attacked than whites. According to Bateman, frambœsia is propagated solely by the application of the matter discharged from the eruption to wounded surfaces of persons who have not previously passed through the disease. It does not appear to be propagated by effluvia; and, like the febrile eruptions, affects the same individual only once during life. In Africa, it is generally undergone during childhood.

Symptoms.—The disease begins by solid elevations of a papular nature; and their eruption is sometimes accompanied by general symptoms. The affected surface is sometimes of limited extent; but, in a case which came under our[a] observation, it occupied the whole of the front and inferior district of the thigh;—the size of the tubercle varying from that of a pea to that of a hazel-nut. The vegetations appeared seated in the substance of the dermis, which was in a state of hypertrophy; and, instead of cuticle, they were covered with dry, adherent, thin scales. In warm climates, the tumours frequently ulcerate, and discharge a fetid ichor; which sometimes forms thick crusts. One of the tuberculations generally acquires much larger dimensions than the others; and afterwards forms a foul and sloughy ulcer, which the negroes call the "mama pian" or "mama yaw." The disease is usually of long duration, and leaves well marked cicatrices; but is not attended by much pain.

Diagnosis.—The only disease for which frambœsia may be mistaken, is some form of syphilitic tuberculous eruption. Affections of the latter description often return; their colour is peculiar and characteristic; and they never form fungoid tubercles united by their bases, covering surfaces of various extent.

Treatment.—According to Dr. Winterbottom, the natives in Africa "never attempt to cure this disease until it has reached its height; when the fungi have acquired their full size, and no more pustules appear." ("Account of the Native Africans of Sierra Leone.") It would appear, from the experience of those who have seen the disease in tropical climates, that no remedy yet discovered has any influence over its progress. All, therefore, that is necessary in the first stage, is to enjoin a moderate cooling regimen. When the disease is on the decline,—indicated by the eruptions beginning to dry, and then ceasing to multiply and enlarge,—the treatment should consist of a moderately nutritious diet, pure air, proper clothing, and the exhibition of sarsaparilla, bark, and the mineral acids in succession; with mild laxatives, and alterative doses of mercurials, according to circumstances. Dr. Bateman states, that the "*mastu*-yaw" sometimes remains large and troublesome, after the rest of the eruption has altogether disappeared. It requires to be treated with gentle escharotics; and, under these

[a] That of Dr. H. E. Schedel.

applications, soon assumes a healing appearance. Stronger caustics are requisite for the cure of the "*crab*-yaw";—tedious excrescences which occur on the soles of the feet. In the case we [a] saw under the care of M. Biett, the actual cautery was employed with the greatest success. The different preparations of iodine, and other stimulant applications, appear to be indicated in this disease.[b]]

[a] Dr. Schedel.

[b] "Library of Medicine"; Volume 1; Pages 421 and 422.

CHAPTER IX.

DISEASES OF THE APPENDAGES OF THE SKIN.

As to diseases of the *appendages* to the skin (such as diseases of the *nails*), I must leave them to the surgeon. But there is one disease of the appendages, which is very interesting; and, although we do not see it in this country, we have specimens of its effects;—I mean a disease of the hair.

Trichoma.—It appears, that the bulbs of the hair sometimes become inflamed; a quantity of acrid stuff is poured out; the hair becomes very much entangled; and sometimes grows, it is said, to a great length. This disease is called "trichoma."[a] Sometimes it is called "plica"[b]; and, having been common in Poland, it has received the appellation—"plica *polonica*." From the inflammation that exists, the scalp becomes excessively tender. It is found that the bulbs of the hair are gummy, and filled with a great quantity of liquid; and the least touch of the hair induces very great pain. The fluid which is discharged is gelatinous, and sticks the hair together. Some have considered the disease contagious; but I believe that is not the case.

Causes.—The causes of this affection are not known. Some ascribe it to the cessation of the perspiration; but any disease may be ascribed to that. Why it occurs more particularly in Poland, than in any other northern countries, is also inexplicable.

Treatment.—As to the treatment, we may recommend the warm-bath, and numerous remedies of different kinds. If antiphlogistic regimen be indicated (by the strength of the system, and the heat of the part), we may suppose that it will do good. The treatment, however, is very unsatisfactory.

[a] From θρίξ, *the hair.*

[b] From "plicor", *to be knit together.*

CHAPTER X.

DISEASED SECRETIONS OF THE SKIN.

The diseases of the skin, as a secreting organ, have either been already mentioned, or will be mentioned hereafter. As to excessive perspiration, that I described when treating of intense secretions generally[a]; and as to dryness of the skin, that is rather a symptom of other diseases. Dryness of the skin occurs particularly in ichthyosis, in diarrhœa, and in fevers. As to diseased secretions of the skin with regard to quality, it is very common (as we shall find in rheumatism) for the skin to secrete an exceedingly sour fluid;—so that the perspiration smells something like sour whey. Occasionally, excessive perspiration of parts of the body (either of the hands or of the feet) will occur as an idiopathic disease.

Offensive Perspiration.—Many people are troubled with sweating hands; so that whatever they touch they moisten. This state, however, occurs particularly in the feet; and is very liable to be of an exceedingly offensive character. Some persons are tormented with this only at certain periods of the year; but some have always very offensive feet, from the diseased nature of the secretions that take place there. Many servants, I believe, have lost their places on account of this misfortune; they have been discovered to have offensively smelling feet. I had a letter, not long ago, from a medical man, residing at a considerable distance from London;—stating that he was in this condition. He was in a state of extreme melancholy, on account of the copious and offensive perspiration, which he experienced in the feet. He had consulted every one within his reach; but had derived no benefit. I advised a number of things that occurred to me, as likely to prove beneficial; but I had a second letter from him;—telling me that they had done no good. I endeavoured to alter the secretion by purging, and by applying astringents to the feet; and I advised a number of other things, which I now forget; but which appeared to me rational. I was not sure, however, that they would do him good; and, so far as I know, they did not; for the second letter which I received, betokened the same agony of mind, as that under which the first was written.

This is all I think it necessary to say, respecting diseases of the skin. I have omitted several; some of which are trifling; while with others we are so conversant, that they do not require any observations; and some of them are not common in this country.

[a] See Page 156.

BOOK II.

DISEASES OF THE NERVOUS SYSTEM.

INTRODUCTION.

[In entering on the consideration of those affections to which the nervous system is liable, we think it will materially aid the reader in his comprehension of the subject, if we subjoin a brief notice of the general physiology and pathology of those organs, which are collectively known as the nervous system. More especially when we consider the important additions that have been made to medical knowledge, on these subjects, within the last few years.

Subdivisions of the Nervous System.—All recent anatomists have divided the nervous system into the "cerebro-spinal" and the "sympathetic." The first of these consists, first, of the cerebrum as a centre; secondly, of *sentient* nerves, which pursue their course to it; and, thirdly, of *voluntary* nerves, which proceed from the brain and spinal marrow, either along the base of the brain, or along the spinal marrow, and then along every external part of the animal frame. The second comprehends the internal ganglionic, or sympathetic system of nerves. To these Dr. Marshall Hall has since added a third;—consisting of the *true* spinal marrow, distinguished from the sentient and voluntary nerve which run along its course, as an *axis* of *excitor* and motor nerves. It is the seat of a peculiar series of physiological phenomena, and of a peculiar class of pathological affections: in the former are included *all* the functions which relate to the immediate acts of *in*gestion and *e*gestion; in the latter, all spasmodic diseases. He therefore divides the nervous system into—I. The cerebral; or the *sentient* and *voluntary*. II. The true spinal; or the *excito-motory*. III. The ganglionic; or the *nutrient*, *secretory*, &c.

Cerebral System.—The first relates to every part of the nervous system which relates to *sensation* and *volition*;—the nerves of sense—the olfactory, the optic, the auditory, the gustatory, and the nerves of touch; and all the nerves of voluntary motion. Its centre is the cerebrum, including the cerebellum; its sentient nerves run variously from the organs of sense, and from the *external* surfaces, first *without* the cranium or spine, and then *within* the cranium or spine, to that centre; its voluntary nerves pursue a similar but retrograde course, *from* that centre to the muscles of voluntary motion.

True Spinal System.—A peculiar set of nerves constitutes, with the tru

spinal marrow as their *axis*, the second subdivision of the nervous system. As those of the former subdivision were distinguished into "sentient" and "voluntary", these may be distinguished into the *excitor* and *motory*. The first, or the "excitor" nerves, pursue their course principally from *internal* surfaces, characterized by peculiar excitabilities, to the true "medulla oblongata" and "spinalis"; the second, or the "motor" nerves, pursue a reflex course *from* that medulla to muscles having peculiar actions;—concerned, principally, in *in*gestion and *e*gestion. The motions connected with the former, or "cerebral" subdivision, are sometimes, nay, frequently *spontaneous*; those connected with the "true spinal" are always *excited*.

Ganglionic System.—Dr. Hall regards the fifth and posterior spinal nerves as constituting an external ganglionic system, for the nutrition, &c., of the external organs. So that the ganglionic subdivision of the nervous system would be divisible into, first, the *internal* ganglionic system, which includes that usually denominated the "sympathetic", and probably filaments of the pneumogastric; and, secondly, the *external* ganglionic system, which will embrace the fifth and the posterior spinal nerves.

Pathology of the Cerebral System.—The cerebral system being the system of the sensations, of judgment, and of volition, it is to it that we must refer all morbid conditions of these mental acts or functions. Every derangement of the senses, every form of delirium or of coma, or of perverted judgment, every *act* of violence, must be referred to the condition (primary or secondary) of the cerebrum or cerebellum. The facts which, in a *practical* point of view, are the most important, are those determined by M. Magendie and M. Flourens;—that it is impossible, by lacerations or other modes of injury of the *cerebrum* or *cerebellum*, to induce either pain or contraction in the muscular system. These organs are not endued with *sensibility*, or with the "vis nervosa" of Haller. They are the seat of a self-acting, automatic, sentient, and motive principle,—the ψυχη, or "soul"; but they are *themselves* incapable either of sensation, or of the production of motion.

When the cerebrum is irritated, delirium ensues; when compressed, coma is induced; when lacerated, we have paralysis of voluntary motion. If other phenomena are seen in diseases of the encephalon, they arise from the extension of these to the true spinal and ganglionic systems, through *irritation*, or *pressure*, *counter-irritation*, or *counter-pressure*;—points of extreme importance, to be noticed very particularly hereafter. In disorders of sensation, of the faculties of thinking, or of volition, we must attend to the course of the sentient nerves, the condition of the encephalon, and the course of the nerves of volition. We must examine the state of the circulation, and the condition of the general system.

The olfactory, the optic, and the acoustic nerves, are (equally with the cerebrum and cerebellum) incapable of *pain*, or of *exciting movements* in the muscular system, when punctured or lacerated. They are, as has been before stated, the *seat* of the sentient principle—the soul; but they are not endowed with the excito-motory principle. But when the optic nerve is inflamed or irritated, there is impatience of light; when the membranes of the encephalon are inflamed and the cerebrum is irritated, there is delirium. When these several textures are compressed, there is amaurosis, and coma respectively; and when the cerebrum is lacerated, there is paralysis of voluntary motion.

Effects of Exhaustion.—But, in treating of the pathology of the cerebral system, a subject of the utmost importance comes to be considered. Not only undue arterial action, and venous congestion, induce morbid states of

the cerebral functions; but the state of exhaustion from loss of blood, the anæmious condition in chlorosis, &c., induce *similar* effects; and present to the physician anxious cases, which frequently try his skill in diagnosis. Too great action of the minute arteries, congestion in the veins, an anæmious state of the vascular system of the encephalon, alike induce morbidly exalted and impaired conditions of the mental and cerebral functions:—spectra, delirium, insomnia; amaurosis, stupor, coma; violent voluntary actions, or paralysis of the voluntary motions: these are the symptoms which arise out of these morbid conditions of the cerebral system and functions; and these only. Spasmodic actions depend upon the part of another system being implicated. This subject has been well illustrated by the experiments of Sir Astley Cooper, on the large arteries and veins in the neck of the dog and rabbit.

The influences of position, of a whirling motion, &c., are also worthy of attention. So also are the effects of anxiety of mind, ardent spirits, sexual excess and vice, &c.;—seen in the suicidal mania, in delirium tremens, and in the half maniacal, half imbecile state of mind so frequently seen in such circumstances.

In order, then, to obtain a clear idea of the pathology of the cerebral system, we must imagine the physiological phenomena assuming a pathological character. Now the force of these phenomena may be augmented, diminished, or annihilated. With regard to the cerebral functions, we have, in the sentient nerves, pain or insensibility; in the cerebrum itself, erroneous perceptions, judgments, and volitions, or delirium; or a total deficiency of these faculties,—coma; and in the motor nerves, either continual voluntary actions, or paralysis.

Crossed Effect in Disease of the Encephalon.—It was well known to the ancients, that disease in one hemisphere of the brain induces paralysis in the opposite side of the body. This fact has been confirmed by modern pathologists. It has been fully ascertained, that disease confined to one hemisphere of the cerebrum, or of the cerebellum, and to one side of the mesial plane in the "tuber annulare", constantly affects the *opposite* side; while disease confined to one of the lateral columns of the "medulla oblongata" and "medulla spinalis", affects the corresponding side of the muscular system. The encephalon has a *crossed* effect; the "medulla spinalis" a *direct* effect.

Cause of Convulsions in Disease of the Encephalon.—It has been ascertained that, *in experiments*, lesions of the encephalon induce *paralysis only*; while lesions of the "medulla oblongata" and "spinalis" induce *convulsion* or paralysis, according to their severity. Hence it becomes important to determine the cause of convulsive affections, in disease of the encephalon. This cause appears to be either irritation or counter-pressure. The former may act through the medium of the nerves distributed to the membranes (as the "recurrent of the trifacial" of Arnold);—as in epilepsy induced by a spicula of bone. The latter is illustrated by a case, recorded by Dr. Abercrombie, in which the anterior fontanel became prominent, and pressure upon it induced convulsion.

Attempts to Localize Affections of the Brain.—Saucerotte, in his prize memoir presented to the Academie Royale de Chirurgie, in 1768, and (more recently) MM. Foville and Pinel-Grandchamp, M. Serres, M. Lacrampe-Loustau, and M. Bouillaud, have attempted to show that, besides this crossed effect of the cerebrum, affections of the thalamus, or its *posterior lobe*, induce paralysis of the lower extremities;—so that, if this opinion were true, there would be a *doubly crossed* effect. This phrase

is used as a sort of *mnemonic* for those who may wish to speak of these opinions. M. Lallemand and M. Andral, after an examination of an extensive series of facts, have declared that the statement is without foundation. M. Bouillaud has further attempted to show, that disease, or lesion, of the *anterior lobe* of the cerebrum, leads to a loss of the power of articulation. But this opinion is equally contested by the two authors just quoted. It is also desirable, briefly to notice an attempt to localize affections of the brain of a different kind, but equally disputed by these pathologists. MM. Delaye and Foville have stated, that the grey or cortical substance of the brain is principally affected in mania; MM. Bouchet and Cazauvieilh, while they agree with MM. Delaye and Foville in their view of the pathology of mania, contend that in *epilepsy* it is, on the contrary, the white or *medullary* portion of the brain which is diseased. The "tubercula quadrigemina" alone have a crossed effect, both of convulsion and paralysis. M. Ollivier observes, that hæmorrhage into the "tuber annulare" only paralyzes the movements; M. Cruveilhier, on the contrary, asserts that such an affection destroys the sensations and the movements, but leaves the intellect uninjured. It need scarcely be added, in this place, that in those cases in which hæmorrhage occupies an extensive space, affecting both hemispheres of the brain,—as in meningeal hæmorrhage at the summit or base of the brain, or in extensive hæmorrhage within the brain, extending from one hemisphere to the other, or into both ventricles,—*general* paralysis is observed; the same event takes place in cases where a clot of blood is formed in the mesial line in the "tuber annulare"; —the "nodus encephali", as it has been called.

Pathology of the True Spinal System.—The whole order of spasmodic and convulsive diseases belongs to this, the excito-motory division of the nervous system; and they all have their source in one of three parts of it. The morbid stimulus may act upon the incident, the central, or the reflex part of the excito-motory arc or arcs, and produce corresponding effects,—corresponding diseases. To use words familiar to the physiologists of Germany, we have a class of "centripetal", "central", and "centrifugal" diseases; we may have centripetal or central epilepsy, and we may have spasmodic and other affections, from an affection of the reflex or motor nerves. In this manner, the *class* of "spasmodic diseases" is subdivided into three *sub*-classes;—a division of the utmost importance in practice, and illustrated by the following table:—

Table of the Pathology of the True Spinal System.

I. Diseases of the incident nerves.

I.	1. Dental 2. Gastric 3. Intestinal	Irritation in infants.	1. The crowing inspiration. 2. Strabismus; spasm of the fingers and toes; strangury; tenesmus; &c. 3. Convulsion. 4. Paralysis.
II.	1. Gastric 2. Intestinal 3. Uterine	Irritation in adults.	1. Hysteria. 2. Asthma. 3. Vomiting; hiccup; &c. 4. Epilepsy. 5. Puerperal convulsions; &c.

III. Traumatic tetanus; hydrophobia; &c.

II. Diseases of the spinal marrow itself.
  I. Inflammation and other diseases.
  II. Diseases of the vertebræ and membranes.
  III. Counter-pressure, &c., in diseases within the cranium.
  IV. Centric epilepsy, tetanus, &c.
  V. Convulsions from loss of blood, &c.
III. Diseases of the reflex or motor nerves.
  I. Spasm. II. Paralysis.
    1. Spasmodic tic.
    2. Torticollis.
    3. Contracted limbs, &c.

What are the parts or organs physiologically connected with this system? The orifices, the sphincters, the organs of ingestion, of expulsion, and of exclusion. Now these are precisely the parts and organs involved in diseases of the true spinal system. The *physiology* has become *pathology*. The *larynx* is *closed* in the convulsions of children, in epilepsy, in puerperal convulsion; it is partially affected in the croup-like convulsion, in hysteria (in which there is frequently loss of voice), &c. The *pharynx* is affected in some of these diseases. The respiratory muscles are so in all. In epilepsy we observe affections of the sphincters, and even of the ejaculators.

Influence of the Passions.—The *passions* exert a singular influence over these and *all* the functions of the excito-motory system. Sickness, panting, convulsions, relaxation of the sphincters,—these, and a thousand other affections of this system, are induced through the mysterious influence of disgust, fear, &c. Infantile convulsions and epilepsy are renewed by vexation, &c. Of all diseases, those arising from fright are the most formidable.

Pathology of the Ganglionic System.—The "cerebral" system is concerned with *psychical* or mental acts merely; the "true spinal", with *physical* acts on the masses of bodies to be appropriated to or expelled from the animal economy; while the "ganglionic" system relates to the *chemical* changes in the disposition of the *atoms* of the animal body, its solids, fluids, &c.;—its office being, to regulate the interstitial absorption, deposition, re-absorption, and the secretion of the *atoms* or particles of which the animal frame is composed, and of the ingesta and egesta.

In the case of disease or injury of the fifth (trifacial) nerve within the cranium, besides the loss of sensibility and of its excito-motor property, other phenomena are observed. The nostril loses its susceptibility to the impression of stimuli; and eventually the eye, not being nourished, shrinks and collapses. The power of the masticatory muscles is impaired; but the face is not distorted by any apparent paralysis. These facts, which have been confirmed by cases and experiments, prove that the *fifth*, as a ganglionic nerve, regulates the nutrition of the eye, gums, &c.; and that defective nutrition of those parts is one of the results of injuries inflicted upon it.

The effects of the division of the pneumo-gastric nerve on the lungs and stomach, as demonstrated by the experiments of Dr. Wilson Philip, and Sir Benjamin Brodie, prove this to be a nerve of secretion. There are probably no cases on record,—with the exception of a very defective one by M. Gendrin [a],—where the pneumo-gastric was distinctly affected; and in which the influence of its disorganization upon the lungs, stomach, and other internal organs, was traced. Some diseases are obviously affections of the internal ganglionic nerves; we have *augmented* action, for instance,

[a] In his Translation of Abercrombie; Second Edition; Page 109.

of the liver and kidney in the cholera europæa, and enuresis[a]; we have *paralysis* of the same organs in the cholera indica, in some cases of icterus, and in ischuria. The effect of injury or disease of the spinal marrow on the quantity and constituents of the urine, is also well established.

The whole nervous system seems to have a certain influence over the action of the heart. According to the experiments of Legallois and Dr. Wilson Philip, to crush the brain or spinal marrow enfeebles or arrests the circulation. The same effect is produced by crushing the limbs or viscera; and this is doubtless effected through the medium of the ganglionic system. In an eel, in which the brain had been carefully removed, and the spinal marrow destroyed, the stomach was violently crushed with a hammer. The heart, which previously beat vigorously sixty times in a minute, stopped suddenly, and remained motionless for many seconds. It then contracted; after a long interval it contracted again, and slowly and gradually recovered an action of considerable frequency and vigour. No experiment can demonstrate, more clearly, the effect of violence inflicted upon the system generally. The experiment is the more remarkable, because the connexion and influence of the brain and spinal marrow were entirely removed. The organic structures must have been the medium through which the effect of the violence was conveyed to the heart. Similar events have occurred in surgical practice;—the case of the late Mr. Huskisson for example. The tremendous vehicle passed over his thigh. The action of the heart failed; and the surgeon waited for re-action—for an opportunity for amputation—in vain.[b]]

[a] From *ενουρεω, to pass urine.*

[b] Abstract of Chapters 1, 2, and 3, of Dr. Marshall Hall's "Diseases and Derangements of the Nervous System."

CHAPTER I.

PHRENITIS.

HAVING concluded my observation on diseases of the surface[a], I now proceed to consider those affections which are situated in the interior of the head. The first disease of which I will speak, according to the order I have hitherto pursued, is inflammation within the head; which is called "phrenitis."[b]

SECTION I.—SYMPTOMS.

Ordinary Symptoms.—In the first place, we have the symptoms common to inflammation in every part; only that, in this case, they are situated within the head. There is a sense of constriction of the forehead; which answers to the sense of tension in other situations. Perhaps, also, we have vertigo, and violent pain and throbbing in the head; throbbing of the carotid arteries; throbbing at the temples; throbbing at the back of the neck; and an acute stabbing pain in the head, or a dull heavy pain. Although we cannot examine the part itself which is inflamed, still we have evidence of morbid heat; and that heat extends to the external part which is not inflamed; so that here is another mark of inflammation;—increased heat. Although we cannot see the inflamed part, and therefore cannot discern the redness, yet this frequently extends to the eyes; so that they are very much suffused; and thus we have a third mark of inflammation. Three, then, of the marks of inflammation are to be observed, though not actually at the part itself. Swelling, of course, is out of the question. Besides the pain, there is what we usually notice in inflammation;—morbid sensibility, extreme excitability of the mind, and intolerance of light and noise.

Delirium.—Another set of symptoms arises from a disturbance of the *function* of the part;—so that there is delirium; and it is not of a mild or slight character, but violent;—"delirium *ferox*." In the greater number of cases, there is also constant watchfulness; the patient cannot sleep at all.

Symptoms.—As to the *secondary* symptoms, which arise from sympathy, we have pyrexia, which is perhaps violent. The pulse is accelerated, generally full, and perhaps also hard. At any rate, in the greater number of cases, it is accelerated; and it is generally full and firm, if not absolutely hard. If it should so happen that, instead of violent delirium, there is more or less stupor, we may then have a *slow* pulse; but in general there is violent delirium, and a *full* pulse. The tongue is of course altered in appearance. It is at first *white*;—the usual colour of the tongue, in active inflammation; but as the powers sink it becomes brown. Not unfrequently, the stomach is affected;—so that, in the greater number of cases, there is vomiting; and as the bowels become exceedingly torpid, there is likewise costiveness. The urine is generally high-coloured. As

[a] See Pages 383 to 517.

[b] From φρην, *the mind*; and "itis", *inflammation.*

the disease continues, it is by no means unusual to notice convulsions; and at last, perhaps, paralysis.

Varieties in Degree.—Inflammation of the brain itself and its membranes, like all other inflammations, may vary in degree. There may be mere headach;—characterized by a sense of tension, heat, and a degree of giddiness; or there may be simple giddiness without any pain, or watchfulness, or sleeplessness; and from these symptoms there may be all the intermediate grades, up to the most intense inflammation, and the most furious delirium.

Varieties in Duration.—The same variations may occur, also, with regard to the *duration* of the affection. Sometimes this inflammatory affection of the head, will destroy the patient in a few days, or even in a few hours; and sometimes these symptoms may last for years. Chronic inflammatory headach (which is neither more nor less, in many cases, than phrenitis) may last for many years. When the disease is of this chronic character, we may have merely some thickening of the membranes; but if lymph be effused, they are rendered still thicker. There may be continuous adhesions; and even the bones themselves, as well as the membranes, may become exceedingly dense and thick.

Diagnosis of Meningitis and Cerebritis.—These symptoms may arise either from inflammation of the brain itself, or of its membranes; and either of these affections is called "phrenitis." There are no distinctive symptoms in these cases. It is mentioned in books that the pain is more acute, and the pulse harder, when the *membranes* are inflamed (as in the case of "arachnitis"); but that when the *substance* of the brain is inflamed, the pain is more of a dull character, and the pulse is not so hard. But although, now and then, we may make a very good guess, as to how it may turn out after death; yet, I believe, in the greater number of cases, we shall be wrong. In the majority of instances, both parts are inflamed;—the substance of the brain and the membranes; and frequently, when the membranes only are inflamed, there is not an *acute*, but a *dull* pain; and not *hardness* of the pulse, but merely *rapidity*. Besides, the distinction is of no importance. The membranes are more frequently inflamed than the substance of the brain itself; and when the substance is inflamed, it is very rare indeed for the membranes not to be inflamed likewise. It has been said, that when the *superficial* part of the arachnoid is inflamed, there is usually delirium; but that when the *basilary* part is affected, there is rather stupor and convulsions;—at any rate, spasmodic movements. So that some would have a diagnosis between inflammation of the brain itself, and inflammation of its various membranes; while others go still further, and when the membranes are inflamed, (at least the arachnoid,) they would have us to infer that it is the superior part, if there be delirium; but that it is the basilary, if there be stupor and convulsions. This is the statement of some French writers.

[We find, that in meningitis[a] of the convexity of the hemispheres, the surface of the brain itself is always irritated and generally inflamed; that the consequent disturbances of the functions of the organ are the principal, though *indirect*, signs of the meningitis; and that these disturbances are characterized, as a general rule, by high excitement and irritation;—evinced by smart symptomatic fever, headach of the acute kind, great sensibility of the eye and ear, delirium of the more violent kind, and convulsive movements; which, from the usually great extent of the cerebral inflammation,

[a] From "meninx, meningis", *a membrane*; and "itis", *inflammation*.

may affect any or all parts of the muscular system, simultaneously or in succession, without being restricted to a particular limb or part. Now, in general cerebritis, no less than in meningitis, the functions of the brain are disturbed; but the disturbance is characterized less by excitement than by depression. Nor is this difficult to understand; for when the substance of the organ is extensively diseased, the abolition of the function speedily overtakes, as it were, and supersedes any excitement existing in the early stage. Accordingly, though the invasion be attended with fever, quick full pulse, exalted sensibility, &c., (as is apt to be the case when general cerebritis is complicated with meningitis,) yet these symptoms of vascular excitement are less violent than in pure meningitis of the convexity; and they are promptly replaced by a slow irregular pulse, stupor advancing to coma, muscular spasms, and universal paralytic relaxation. In some cases, we have seen universal cerebritis wholly devoid of vascular excitement; and attended, from first to last, with a preternaturally slow, weak, and irregular pulse. In such instances, when post-mortem examination shows the membranes to have been implicated, we suspect that they had been attacked only secondarily; for, in certain instances of the kind, we have noticed slight vascular excitement—evinced by heat of the head, with quickness of speech, manner, and movements of the eye—to supervene in the mid-career of marked symptoms of depression. It is not to be supposed, however, that convulsions—whether in the form of mere twitching, or of violent and general fits—are incompatible with symptoms of depression. We[a] have repeatedly seen them in general cerebritis; and they may result either from the irritation of coexistent meningitis, or from counter-pressure on the "medulla oblongata";—the superior extremity of the "true spinal or excito-motory column." Besides convulsions, there may be *tonic* spasms;—that is, rigid contractions of limbs; and it is maintained by Rostan, Lallemand, Bouillaud, and others, that these are peculiar to cerebritis and foreign to meningitis; but their idea appears to extend to the cerebritis of the surface which accompanies meningitis, and it therefore includes the bulk of the cases which we denominate "meningitis." However, when the rigid contractions occur in general cerebritis, or in meningo-cerebritis, it is maintained that they are not restricted to a particular limb, side, or part; but affect a variety of parts on both sides at the same time; also, that when the rigid spasms relax, the limb recovers its muscular power and sensibility.[b]]

SECTION II.—MILDER FORMS OF THE AFFECTION.

Let us now consider certain milder forms of this affection, together with some other affections; which, though not inflammatory in their nature, present many points of resemblance.

Inflammatory Headach.—When phrenitis occurs in a very mild degree, the patient complains, more or less, of headach; but that headach is attended by a throbbing sensation. There is a throbbing pain in the head, or a throbbing of the temples, or of some particular part; and the pain is usually most intense in the forehead. In the greater number of cases, the patient puts his hand up to his forehead. It is rendered worse by heat;—by the heat of the bed, and by the heat of the fire. It is rendered worse

[a] Dr. James Hope. [b] "Library of Medicine"; Volume 2; Pages 38 and 39.

too, by stooping; and especially on rising again after stooping. This will cause a sensation of great weight, or even a cutting sensation, to be experienced within the head. It is generally worse in the morning;—from the continued heat of the bed, and the horizontal posture. There is likewise, in many cases, drowsiness; and yet the patient perhaps cannot sleep, on account of the intensity of the pain. There is a morbid heat of the head, and a morbid sensibility to light and sound. These produce, not an agony, but an uneasiness. The least noise frets the patient; and so does the light. The mind too, in these cases, is almost always irritable. Patients are easily put out of humour; and they are impatient. In these cases, the pain rarely extends below the zygoma. If it be an inflammatory affection *within* the head, the face does not suffer; nor does the pain extend, for the most part, down the back of the neck. The pain is usually not increased by touching the scalp. Now and then, however, the external part may be affected, as well as the internal; and then there may be tenderness of the scalp: but, for the most part, there is not.

Rheumatism of the Scalp.—In rheumatism of the scalp, on the contrary, there is almost always extreme tenderness. Many cases occur, where we are exceedingly anxious to ascertain whether the pain complained of is internal or external; and, by attending to these marks, we shall be able to say whether it is internal, or external. In rheumatism, there is not only, for the most part, tenderness of the scalp; but the pain generally extends beyond the cranium. It frequently runs down the face; it runs behind the ears, and down the neck; and, very frequently, there is rheumatism in other parts. Sometimes there is great sweating;—just as in common rheumatism.

Rheumatism of the Membranes.—Now and then, however, the internal parts suffer in rheumatism; so that we may have both external and internal inflammation. In these instances, the nature of the case is in general easily made out, by observing that, although the scalp is tender, and the pain runs down the face, and the back of the neck;—although there is rheumatism in other parts, and the pain is worse in the evening; yet there is likewise giddiness, drowsiness, and a throbbing of the inner part of the head. When we see two sets of symptoms like these, we may be sure that the two parts are affected;—the external and the internal; and, in such a case, although the patient is labouring under rheumatism, yet we must not trust to such ordinary remedies as, for the most part, cause rheumatism to disappear sooner than it otherwise would; but we must treat the case as phrenitis. Very frequently this pain of the head, when it is rheumatic, is attended with a great sense of coldness. In these cases, too, the pain, for the most part, is worse in the afternoon or evening; but the latter is by far the most usual; and that without any cause which we can discover. The pain is not worse in the morning; and the addition of even two or three flannel nightcaps, does not make it worse; but in inflammatory pain of the internal part of the head, these things could not be borne; and (as I have before said) the pain is almost always worse in the morning;—which arises simply from the mechanical circumstance, that the horizontal posture allows the blood to go more easily to the head, and renders its return more difficult; and from the bed increasing the heat of the body. But in rheumatism (which is of a cold nature) this very pain is almost always worse in the evening, and is relieved by heat. These circumstances clearly point out the nature of the case.

Hemicrania.—When pain of the head is of another description,—neuralgic,—we may frequently discover its nature, by the absence of these in-

ternal symptoms, and by the pain running along particular nerves. Sometimes it runs in the course of the supra and infra-orbital nerves; sometimes it is particularly seated in the branches of the fifth pair near the ears; and sometimes we may trace it along the mastoideus.

At other times, however, it does not run along the course of particular nerves; but is situated in one spot, where there is a violent continual pain; and this is very common in hysteria. Sometimes the part itself is very tender; and sometimes not. When we see the absence of the usual symptoms of inflammation of the head, we may easily, in general, make out the true nature of the case. It very frequently attacks the brain on one side;—not in the situation of the supra-orbital nerve merely, but some other part of the brain; and the pain seems seated there. In this case it is not intermittent, nor does it run along the branches of nerves; but is situated in nerves terminating at one spot on the surface of the body. A pain of this description is sometimes inflammatory; and is attended with these internal symptoms; and then we have to treat it accordingly. It may last for a few days, or for a long time;—coming on at a regular or irregular periods. Such a pain as this is frequently hereditary. I have known many members of the same family suffer from the disease; especially after they have become adults. It is a very hereditary sort of pain;—a pain over the brow; coming on once in three weeks, or once a month, or more or less frequently. It is sometimes produced immediately by mental agitation, by overloading the stomach, or by putting improper articles into it; but, in many persons, in spite of every thing, it will come on (without any apparent cause) every few weeks. In many other cases, there is a local pain;—a pain not intermittent, situated in different parts of the head; and very frequently it is hysterical. It occurs, especially, in hysterical patients.

Thus we have pain of the head of a decidedly *inflammatory* nature;—attended with inflammation of the brain itself, or its membranes. We may have pain of the head of a *rheumatic* nature; and the rheumatism may be *active*, attended with heat; or of a *cold* character (which I shall hereafter speak of) relieved by warmth, and worse in the evening; or we may have another headach, which is *neuralgic*; and of that kind called "tic doloureux";—running along particular nerves; but sometimes diffused, with morbid sensibility of a particular part; or of an intermittent character.

Sick Headach.—The last kind of headach which I mentioned[a], where it occurs particularly over the brow, has been called "*sick* headach"; because it is attended frequently with sickness. The stomach is deranged in the first instance, or it soon becomes deranged after the headach has begun. More or less, we find headach connected with the affection of the stomach; so that it is called "*sick* headach." I believe that most persons ascribe this to the stomach; but I am quite sure it is very unjust to lay it to the charge of the stomach, in every case. The stomach has enough to do with diseases of its own, without being accused of the diseases of other parts. I have experienced pain of this description, two or three times, from evident local causes in the head. From having a draught blow on my head, when I have been overheated, I have had intense pain come on. I may mention, that I rarely have any thing the matter with the stomach; but, after this pain has existed some time, I have had violent nausea, and then vomiting;—the stomach being only affected *sympathetically*. I have ob-

[a] See the last paragraph but one.

served, too, in a great number of persons, that this headach has not been preceded by an affection of the stomach. People have declared that they digested well, and that they had a good appetite, not only up to the time of the occurrence of the pain, but as long as the pain was moderate; but when the pain arrived at a certain intensity, then the stomach fell into nausea and vomiting; and was disturbed as much as the head. There is no doubt that persons predisposed to these pains, may bring them on by overloading the stomach, or taking improper articles of diet; but it is to be remembered, that pain of the head will cause disturbance of the stomach; and therefore we have no reason to suppose that the stomach is in fault. I do not think that we ought to infer that the stomach originally is in fault, simply because it is disturbed as well as the head. In a great many cases, the stomach is not affected until the derangement of the head has arrived at a certain point; but the state of the stomach will bring it on; and so also will costiveness; but it is precisely the same with all other affections of the head, and of the alimentary canal. If a person allow himself to become costive, he will be almost sure to have an inflammatory headach; and an inflammatory headach will induce costiveness. It is quite illogical to say, that so many affections of the head arise from the stomach and intestines; and it is just as wrong to say, that all affections of the alimentary canal depend on the head; yet there are parties who, if they do not say so in plain and distinct terms, nevertheless approximate very closely towards it.

Treatment of Sick Headach.—This is a most intractable complaint. I have known it affect many persons, in whom all the remedies that were employed, failed in accomplishing any material good. If the system be too plethoric,—if we find the pulse full,—if we find the patient eating and drinking too much, we may do good to a certain extent, by bleeding and lowering the diet. Now and then the pain is so intense, that a degree of phrenitis occurs; and we must then treat it as phrenitis. But where it only comes on from time to time, I do not think we can easily remove it; though we may lessen it, and prevent it from being as bad as it otherwise would. If the patient avoid every thing likely to do harm, and pay proper attention to the bowels, this object may be effected. Now and then, the stomach is very much out of order, and an emetic may mitigate urgent symptoms; but it will not produce material benefit. I have tried iron, sulphate of quinina, arsenic, and every medicine that suggested itself to my own mind, or has been recommended by others; but it has been in vain. After a number of years, this description of headach will sometimes cease of its own accord.

SECTION III.—MORBID APPEARANCES.

High Vascularity of the Membranes.—After death we find, with regard to the membranes, either a distinct red net-work, or a uniform redness, of greater or less extent. The minor degree of inflammation, is where we can discover each vessel distinctly; and the higher degree is where there is uniform redness in any portion; because the uniformity of the appearance arises from the excessive number of vessels which contain red blood. These patches vary exceedingly in extent and frequency.

Inflammation of the Arachnoid.—It is probable that, of the three membranes of the brain, the arachnoid is most frequently inflamed; and we may have inflammation, not merely in the enveloping portion, but likewise

in that which lines the ventricles. Either one portion or the other, or both, may be inflamed. When this membrane becomes inflamed, it is opaque; and it also becomes thickened;—both which are common effects of inflammation.

There is generally a certain quantity of serum, either *upon* or *in* the brain; and in the greater number of cases (as I mentioned [a] when speaking of serous membranes in general) the serum is turbid. Not only, however, is the serum turbid, but often larger or smaller portions of fibrin are seen in it.

Now and then the inflammation is so intense, that layers of lymph are found either upon the brain externally, or in the ventricles. Sometimes the fibrin is not in the form of layers, but has a jelly-like appearance; and we find this appearance most frequently at the *base* of the brain. Now and then we find absolute adhesions. In general, when there is such violent inflammation, death takes place too soon for the layers of fibrin to become adherent: but death may not take place so rapidly; the process may be slow; the inflammation may not be so acute; and then adhesions may be formed. If the disease be rather chronic, this fibrin may become very thick and organized; and we may have it to a very great extent. I was shewn, by a friend of mine, a portion of fibrin which covered nearly the whole of the brain; and I should think, that nearer a third than a fourth of it was an inch in thickness. It was perfectly organized; and formed an envelope to the brain. Pus is sometimes produced; and Dr. Baillie says [b], that he once saw pus all over the surface of the brain;—secreted, I presume, by the arachnoid.

Inflammation of the Pia Mater.—If it be the "pia mater" which is inflamed, this of course becomes red; there is more or less of fluid under it; and the fluid, from being confined under the membrane (like the vitreous humour in the cells of its capsule), gives exactly the appearance of jelly. The jelly-like fibrin secreted by the arachnoid, of course lies *upon* the arachnoid; but the jelly-like matter which arises merely from fluid collected in the "pia mater", lies *under* the arachnoid;—the "pia mater" being within.

Inflammation of the Dura Mater.—When the "dura mater" is inflamed, there is redness of it; and now and then it has been said to suppurate, and even to have fallen into a state of gangrene. Frequently, a very large quantity of blood is observed after this inflammation, between the "dura mater" and the cranium. The great turgescence is not confined to the vessels of the "pia mater." Indeed, in inflammation of the head, the blood is not confined to the interior, but very frequently extends to the scalp; so that all the vessels of the scalp are exceedingly full; and we find an increased secretion of serous fluid in the scalp itself. When the inflammation of the dura-mater is local,—the effect of an injury arising either from a diseased bone, or external violence,—we know that the superjacent scalp becomes so affected, that it is quite œdematous; and this is a point attended to by surgeons;—as indicating, after an accident, great affection at a particular spot within. In general, if the dura-mater be inflamed throughout, there is great turgescence of the vessels of the scalp, and a serous effusion into it; but if the inflammation be local, then we may have, exactly over the spot, absolute œdema of the scalp.

Inflammation of the Substance of the Brain.—When the substance of

[a] See Page 113.

[b] In his "Morbid Anatomy"; Chapter 24; Section 8.

the brain itself is inflamed, we may observe (on slicing it) a very large number of red dots, besides those which are always seen; and the latter may be double their usual size. We frequently, too, see a large number of minute vessels, which ought not to contain blood, like so many fine red hairs, in the substance of the brain. Now and then inflammation, when situated within the brain, runs on to abscess. This is most usually the case when the inflammation is not general, but local. Dr. Baillie says that he once saw the brain in a state of gangrene.[a] I have myself seen the "dura mater" in that state, but I never saw the brain so;—at least, if we are to judge of its existence from its being very lacerable, and exceedingly offensive. From inflammation, the brain will become exceedingly soft,—so as to be a mere pap;—something like very thick arrow-root and water. There are various degrees, of course; but still the brain is softened. Now and then, we observe softened brain and pus together. The brain generally looks of a dead-white colour; and of course the pus has more or less of a yellow tinge; but frequently they are seen together. It is very rare for the brain to become ulcerated on the surface; but, now and then, such a condition has been seen.

Appearances in Chronic Inflammation.—All these effects that I have mentioned, are frequently observed after *chronic* inflammation of the brain, as well as after an *acute* attack; and after chronic inflammation, there is another effect very frequently seen; namely, induration in that part which has been inflamed. Acute inflammation generally causes, besides the redness, a great turgescence of the vessels, large and numerous red dots, distinct red vessels, a great fulness of the larger ones, perhaps more or less effusion, and perhaps abscess. But besides all this, in chronic inflammation, the brain may become hard. Now and then, *acute* inflammation may produce hardening; but I believe it is more frequently the effect of *chronic* inflammation.

Infiltrations of Pus, and Abscess.—When the substance of the brain has been inflamed, and pus has been produced, it is sometimes not collected in a large quantity, so as to form an abscess; but is seen infiltrated throughout the brain;—so that it has been found in the substance of the organ, in innumerable points. Where this is the case, the substance of the brain is generally softened; because, in the first place, there must be a great degree of inflammation to produce pus; and when the pus is infiltrated so extensively, of course there cannot be induration. There is a great variety in the degree of this; so that we may have mere drops of pus, in the midst of softened portions, and then still larger drops; till we come to such large ones that they are, in fact, abscesses. When the pus is collected in the form of an abscess, there is a capsule produced, of various degrees of perfection; so that sometimes it has been known to have distinct coats. The contents of such abscesses will sometimes be exceedingly offensive; although, of course, no air could have had access to them. The parts surrounding an abscess in the brain, may be in all states;—either perfectly healthy, or diseased and softened, or altered in colour, &c. The matter of the abscess may, of course, remain there, and be found shut up all around; or it may work its way, and burst into the ventricle; or it may burst into the nose, or into the ear. Abscesses more frequently occur in the hemispheres, than in any other part.

Changes in Consistency.—With regard to consistency, it is to be remembered, that the firmness of the healthy brain varies at different parts; so

[a] See his "Morbid Anatomy"; Chapter 24; Section 15.

that a degree of softness which would be morbid at one part, would be only natural in another. It varies, likewise, according to the time at which we examine a body;—a fresh brain being firmer than one some days old; for as soon as it is exposed to the air, it becomes very soft. With respect to different parts, I need not say that the "tubercula quadrigemina" are exceedingly firm. The consistency, too, varies according to *age*. The brain of old people is firmer than that of young persons. There is greater variety in the degree of change of consistence after inflammation, than in any other disease.

Softening of the Brain.—When the brain is softened, the part may retain its natural colour; or it may be yellow, it may be of a rosy hue, it may be grey, or it may be whiter than usual. If the change be not the result of inflammation, the part is generally exceedingly white: but the parts around, which are not yet softened, will be found of a rosy colour. But when the brain is softened,—to say nothing of inflammation,—the colour may be of all the varieties which I have just stated. It may be rosy from inflammation, or it may be perfectly white;—the redness being only in the surrounding parts. When the brain is inflamed, the softened parts may be mixed with pus, or with blood. If there be a vessel of any considerable size very near, the blood is poured forth into the softened part. It is the grey part, some think, which is the most frequently softened; but however this may be, every part of the brain is liable to it. When the membranes have been inflamed, it is the cortical part which is most frequently softened. From being in a bad neighbourhood, the brain under the inflammation suffers, and becomes softened. The softening may occur in one or more spots; and, like the existence of pus, it may be exceedingly partial, or may be very general.

The spinal marrow is also liable to softening;—just in the same way as the brain. This softening occurs whether there is inflammation or not; and is seen at all ages, but more particularly in old men. Generally, around the softened part, there is congestion and inflammation. Very often we see inflammation; but frequently we do not. The part is frequently softened, when no inflammation can be discovered. I recollect, distinctly, opening the brain of a young man, whose brain was softened in a great many parts. He was not a patient of mine; but a medical man invited me to see him. He had had paralysis, and the brain was softened; but the part was so white, that we could not conceive there had been the least inflammation. I opened another individual, shortly afterwards, where there were the most intense marks of inflammation;—the brain was absolutely red around the softened part. This is a proof that, though these appearances are often connected with inflammation, yet they are sometimes wholly independent of it.

Induration of the Brain.—Induration of the brain may, like softening, be *very* local, or only *rather* local, or it may be *general*; and of course it varies very much in degree. Sometimes it amounts to no more than it would, if it had been hardened by acid; or it may amount to the consistency of wax; and now and then the hardness is still greater;—assuming a fibro-cartilaginous character. When the brain is pretty generally indurated, it is said to be the effect of an acute inflammation; but, as I before observed [a], acute inflammation more frequently produces *softening* than *hardening*. However, in this case, hardening is more frequently thought to be the result of *acute* than of *chronic* inflammation; but it is only the

[a] See Page 531.

first degree of hardness (namely, that which is equal to the consistency induced by acids) that occurs from this process. When the hardening is *general*, we should not suppose that such extreme induration, as to be called fibro-cartilaginous, could exist universally throughout the brain; nor, indeed, is it the case. The second degree of hardness (*waxy* hardness) is usually *local*; and the same is the case with the *fibro-cartilaginous* hardness. This is exactly what we should *à priori* suppose. These two extreme hardnesses are almost always the effect of chronic inflammation;—perhaps *always*; but I cannot positively say so. It is said that, after fever and general debility, the brain is frequently found in an indurated state; but I do not know this from my own experience.

Red Dots.—Then, as to the red dots, they ought to be very numerous, or very large, or indeed both, for us to say that there is morbid redness. We find people differ, every day, about the inflammatory appearances of the substance of the brain;—some contending that there are not more red dots than there should be, and others that there are. I think, therefore, we ought not to be satisfied, unless there are a very considerable number, or they are of very considerable size. They are more usually found in the *medullary*, than in the *cortical* portion of the brain.

Summary of the Morbid Appearances.—[The different morbid appearances of which a description has been given, may be summed up as follows:—1. Increased vascularity; redness, either dotted or uniform; no change of consistence or colour; no exudation of fluid, or rupture of vessels. (*Congestion.*) 2. Great increase of vascularity; intense dotted redness; spots of ecchymosis, with a striated appearance, and effusion of drops of blood; increased firmness. (*First Stage of Inflammation.*) 3. Infiltration of blood, and softening of the cerebral pulp towards the centre of the inflamed portion. (*Red* softening.) Infiltration of pus mixed up with the disorganized pulp. (*Yellow* softening.) The *red* and *yellow* softening combined. 4. Serous infiltration of the cerebral pulp; softening of a milk-white colour, without vascularity. (*White* softening.) 5. Increased formation of pus, of various colours; the wall of the cavity lined with a membrane. (*Undefined abscess*; *encysted abscess.*) 6. Loss of substance on the surface of the brain, or that of the ventricles. (*Ulceration.*) 7. Infiltration of the pulp or its vessels, with permanently concrete fluids; conversion into a more or less dense mass. (*Induration.*)[a]]

Precautions necessary in Examining the Brain.—In examining the brain and its membranes, with the view of ascertaining the existence of inflammation, we must carefully remember, that position has a very great effect; that if the head lie in the usual recumbent posture, and the body be not opened till several days have elapsed after death, extreme congestion may take place at the posterior lobes of the brain;—such as might lead us to suppose, that there had been a vast accumulation of blood during life. If the body have become putrid, this congestion may amount to effusion;—at least, the slightest touch will cause blood to be poured forth. We should carefully note whether position can have caused that accumulation of blood, which we observe on opening the head. We ought also to look at the brain the moment we cut it; because, after it has been cut and exposed to the air, it becomes rather redder than before. Our judgment should be formed, therefore, immediately on slicing the organ. It is likewise to be borne in mind, that both the brain and the spinal marrow, without any accumulation at either part, have a redder appearance when death

[a] "Cyclopædia of Practical Medicine"; Volume 1; Page 304.

has taken place *rapidly*, than when it has occurred *slowly*. It is said, too, that they are redder in persons who have died from asphyxia, than in other persons. We must also remember, that the redness constantly varies in different parts;—that there is, for instance, more redness in the "corpora striata", than in many other parts. At the base of the "thalami nervorum opticorum", there are naturally a number of red vessels; the appearance of which we must not mistake for turgescence. We must remember, with respect to colour, that the white part of the brain contains more vessels in early life, than in old age; when it assumes a yellow hue, and has by no means the same number of vessels. We must also remember, that the *grey* portion of the brain is much more "vascular" (as it is termed) than the *white* portion. When a part is redder than usual, there are not more *vessels* than natural;—the vessels merely contain more *blood* than they ought to do; and therefore the expression "more *vascular*" is, strictly speaking, incorrect: but we merely mean, by that phrase, that vessels contain red blood which ought not to do so; and that those which should, have an increased quantity in them. The grey part is generally more vascular than the medullary portion. All these things are necessary to be remembered, in forming an accurate judgment of the morbid appearances in the head.

Anæmia of the Brain.—In many states of the body, the very reverse of all these appearances takes place. In some diseases the brain will become bloodless. In cases of starvation, it is said, the brain will become colourless. This may be expected. When persons die through the want of some natural stimulus to which they have been accustomed, there is also this extreme whiteness of the brain. I have seen this condition, quite independently of a general cause; quite independently of the loss of blood, or the want of food, or the want of stimuli; but from local disease of the cerebral arteries. I have seen the arteries diseased;—so that they would not admit of a proper quantity of blood passing through them; and the brain has consequently been rendered far whiter than it naturally is. However, this whiteness is said sometimes to occur, after there have been signs of irritation of the brain; but I should think that it more frequently arises from the want of blood throughout the body, or from causes which prevent the brain from receiving its proper quantity of blood. So much, therefore, for the morbid appearances.[a]

Comparative Frequency of the Several Forms of Cerebral Inflammation.—[Inflammation of the "dura-mater", exclusive of that produced by fractures and other surgical affections, is perhaps the most rare variety. The "phrenitis" of old authors,—that is, inflammation of the membranes and surface of the convexity of the brain, with furious delirium and rapid sinking,—is not, according to our[b] observation, a frequent affection in this country; but it is much more common in tropical climates, where inflammations in general are characterized by intensity and rapidity of progress. Inflammation of the central parts of the brain, with or without effusion into the ventricles, and not unfrequently conjoined with meningitis at the base or on the hemispheres,—occurring principally in children, and running a protracted course of fifteen to thirty days, with two or three well-marked stages,—is an affection which, under the designation of "hydrocephalus"

[a] One of the most splendid books on the morbid appearances of the brain, is Dr. Hooper's. Some of the plates are rather too showy; but still they exhibit, extremely well, the appearances of inflammation. Representations of this affection, are also given in Dr. Baillie's work on Morbid Anatomy; but the plates, not being coloured, do not shew it very clearly.

[b] Dr. James Hope's.

is perhaps not surpassed in frequency by any other single variety of cerebral inflammation. General acute cerebritis is rare; partial is pretty common, especially with more or less meningitis; chronic partial cerebritis is perhaps equally, or even more common.[a]]

SECTION IV.—CAUSES.

Inflammation of the brain is less frequently an *idiopathic*, than a *symptomatic* affection. It is more frequently seen as an accompaniment of *fever*, than of any other disease.

Heat and Cold.—It will arise, like any other inflammation, from cold applied to the body, especially when the latter is over-heated. It will occur also from simple heat; for if a person in a hot climate be exposed to the direct rays of the sun, without any covering on his head, (especially if he be lying down,) inflammation of the brain may be the consequence. This is called "insolation." Sometimes, instead of inflammation, apoplexy is induced; but this more frequently occurs when the patient is making a violent exertion at the same time.

Intoxication.—Intoxication will produce inflammation of the brain. Spirituous or vinous liquors irritate the brain, or they would not intoxicate; and the irritation may amount to such a degree, that inflammation may occur. The same circumstance arises from mental irritation.

Mental Irritation.—Mental irritation, whether it arises from rage or anxiety, causes a great excitement of the brain. Want of sleep, or long-continued watchfulness, will have the same effect. Long-continued excitement, of a less degree, may amount to the same thing as violent excitement for a short time. Excessive use of the brain cannot take place, without the want of sleep and anxiety. No person studies, without being anxious to *learn* what he studies; and his love of study induces him to sacrifice sleep.

Narcotics.—Narcotics, which stimulate the brain, may also induce this condition of that organ. It is very common, after large doses of opium, hyoscyamus, or stramonium, to find a throbbing in the vessels of the head. After a person has taken prussic acid, he may experience throbbing in the head, or throbbing of the throat, and more or less delirium.

Mechanical Injuries of the Head.—Wounds, of all descriptions, are common causes of inflammation within the head. Contusions, concussions, penetrating wounds, and mechanical injury of the head, may act in two ways:—as *exciting* and as *predisposing* causes. We may have inflammation directly induced by them; or such morbid irritability excited, that any common cause, afterwards applied, may easily produce inflammation;—so that when a person has had injury inflicted on the head, (whether it be fracture or any thing else,) it is sometimes very dangerous for him to drink wine or beer, or spirituous liquors, for a very great length of time; or perhaps even to eat meat; for the slightest cause, in these circumstances, may give rise to inflammation. This disposition will occasionally last for years. I recollect seeing a person who, twenty years before, had suffered fracture of the skull; and, on taking a glass of spirits, he immediately became almost delirious. I mentioned, when speaking of inflammation in general, that I had seen delirium induced from rheumatism of the scalp, after an injury to the head.[b]

[a] "Library of Medicine"; Volume 2; Page 46. [b] See Page 115.

Cessation of an Eruption.—Phrenitis has sometimes arisen from the cessation of an eruption. It is said that cessation of itch, has been followed by inflammation within the head.

Removal of a Tumour.—Sometimes it has arisen from the removal of a tumour. The tumour has taken off a great deal of excitement. It has required a considerable quantity of blood to nourish it; and, the tumour being removed, there has been so much more energy throughout the system, and the brain has consequently suffered. This has more frequently occurred, when the tumour has been situated on the head itself. This is exactly what we should suppose.

Amenorrhœa and Costiveness.—Analogous to the cessation of an eruption, are amenorrhœa, and costiveness. Women, every day,—from the cessation of the menses, when they ought to menstruate,—become the subjects of violent headach, giddiness, and symptoms of that description. Now and then actual inflammation of the brain will take place. Costiveness frequently induces headach. If a person pass his usual time for having a motion, headach takes place; and it is said that inflammation of the brain has sometimes been the consequence of mere costiveness.

Inflammation of the Eye, Ear, or Nose.—Inflammation of the eye, or the ear, or the nose, or the frontal sinuses, will sometimes spread to the brain. Phrenitis has frequently carried off patients who have had nothing more, at first, than inflammation of the parts I have just enumerated. Of course, inflammation will spread in the head, just as in other parts of the body. When the nose and the sinuses have been inflamed, in a great number of cases the bones have been found carious. I have several times seen phrenitis arise from disease of the ear. When a person has what is called "otorrhœa"[a], or "otalgia"[b], (in common language, a discharge from the ear, or ear-ach,) we ought to be on our guard to notice the first symptoms he may mention of pain in the head, or the first anxious look that is displayed. The very slightest symptoms of cerebral affection, when there is a cessation of discharge from the ear, ought to put us on our guard. I have seen several cases of this description, where persons have had phrenitis after pain of the ear, or a discharge from that organ. Some have had deafness; some have previously had a pain; and then only discharge. In the first case that I saw, there was a wildness in the person's look, and a quick pulse; and I expressed to the friends my belief, that the person would never go out of the hospital again alive. This circumstance is mentioned by several authors; and several instances are quoted by Dr. Cheyne, in his work on Hydrocephalus Acutus.[c] In these cases the bone is generally more or less carious. That portion of the "dura-mater" which lines the petrous portion of the temporal bone, is found inflamed, perhaps softened; and perhaps there is pus there.

I mentioned[d] that I had once seen the "dura-mater" gangrenous; and that was in a case of this description. The portion of the brain lying over the ear was likewise altered in colour;—and even underneath there was a very considerable change. In a short time the patient became violently delirious; no bleeding, no mercury could stop it; and for this simple reason;—there was local disease keeping up the inflammation. There was diseased bone, and old ulceration within the ear; and we might as well have thought of curing inflammation while a portion of depressed bone rested on

[a] From *ους, the ear*; and *ρεω, to flow.*
[b] From *ους, the ear*; and *αλγος, pain.*
[c] "Essays on Hydrocephalus Acutus; by John Cheyne, M.D."
[d] See Page 531.

the brain, or curing an ulcer where there was a piece of carious bone to come away, as curing this disease.

Venereal Nodes.—When the skull has become affected by venereal nodes, it is not uncommon for the "dura-mater" to become inflamed; and the patient to die with all the symptoms of phrenitis.

Erysipelas of the Head.—When the external parts of the head, the scalp, or the face, are inflamed, it is very common for phrenitis to occur. When erysipelas of the face and head proves fatal, I believe, in the greater number of instances, it does so by inducing inflammation of the brain itself, or of its membranes;—at least, in every case of erysipelas of the head which I have opened, I have found very considerable effusion, either upon, or within the brain, or both. This is not an instance of metastasis, or the occurrence of inflammation in one part from its cessation in another; but appears to be an instance of the *extension* of inflammation; for the inflammation of the face, and of the rest of the head, goes on just as vigorously (in the greater number of cases) when phrenitis has taken place, as it did before it commenced.

Metastasis.—Inflammation of the brain, however, certainly does occur sometimes in the way of metastasis. When rheumatism ceases in the joints, or gout ceases in some situations, phrenitis occasionally occurs; and it sometimes takes place after the cessation of inflammation in the salivary glands;—in the case of mumps, or (as it is sometimes called) "cynanche[a] parotidea." Phrenitis sometimes occurs immediately on the cessation of this species of inflammation; but sometimes it occurs on the cessation of inflammation of the testicle; which itself occurs, in the first instance, after the cessation of inflammation in the salivary glands. Sometimes the testes are inflamed intermediately. It is very common, after inflammation of the salivary glands, for the testes to become inflamed; and when that inflammation ceases, phrenitis sometimes occurs; but sometimes inflammation of the brain occurs immediately on the cessation of the mumps themselves.

Its Occurrence in Fever.—Phrenitis, however, as I before stated[b], is by far the most frequently seen as an occurrence in fever; and some may choose in this case to consider it *idiopathic*;—excited by the contagion of typhus-fever, or malaria, or remittent fever, or by excess, or vicissitudes of temperature. Some contend that fever itself, in many instances, consists of inflammation of the brain; and if they be correct, such phrenitis must be considered idiopathic. If, however, fever be a general affection of the system, then the phrenitis would be considered by those who hold that opinion as *symptomatic*. But these are mere differences of words.

Predisposing Causes.—Inflammation of the brain is predisposed to, by native congenital irritability of that organ. Some persons have extreme irritability of the brain. If such individuals be thrown into a passion, or be suddenly and violently excited, they are very liable to phrenitis. Habits of intoxication, injuries of the head, all organic diseases of the head, and especially tumours in or upon the brain, necessarily have the same effect. All these things give a tendency to inflammation of the brain; so that an exciting cause easily becomes efficient.

[a] From κυων, *a dog*; and αγχω, *to strangle*.

[b] See Page 535.

SECTION V.—DIAGNOSIS.

[We now proceed to point out the diagnosis between the several varieties of inflammation of the brain, and the diseases with which they may respectively be confounded. These diseases are—*mania*; *continued fever*; *delirium tremens*; *apoplexy*; *active determination* and *congestion* of the brain, in various diseases of infancy; *exhaustion*; and *hysterical*, *neuralgic*, *rheumatic*, *bilious*, and *dyspeptic headachs*.

Mania.—Meningitis of the convexity of the hemispheres, with fierce delirium ("phrenitis"), is distinguished from mania by the want of the characteristic symptoms which distinguish the latter;—the more or less complete absence of fever and disturbance of the digestive organs, together with its prolonged course.

Continued Fever.—The diagnosis of meningitis, both superficial and central, from continued fever with cerebral disturbances ("typhus mitior"; "fievre nerveuse, ou ataxique essentielle"), is certainly very obscure. The symptoms of cerebral excitement commence as early in the fever as in meningitis, but more commonly they are later; not appearing till after the lapse of two or three days or more. The nature of the symptoms may, at the onset, be much the same in both; but the progress of the two affections soon renders manifest a remarkable difference between them. The typhus-fever is characterized by restlessness in a high degree, by anxiety, low delirium, and spasm in the form of subsultus tendinum, but seldom more; and these symptoms often alternate with intervals of calmness and even of sleep, especially in the morning. In meningitis, on the contrary, there is comparatively little restlessness, except in the phrenitic variety; when there is wild delirium, but not the peculiar restlessness of fever. The muscular symptoms are distinct convulsions, spasmodic rigidity, or paralysis; they occur in connexion with a state either of delirium, decided somnolency, or complete coma; and these symptoms are more or less permanent;—seldom exhibiting intermissions, except occasionally in the earliest stage. The pulse in fever does not fall below its natural standard, display singular fluctuations in frequency, and finally rise to an extreme degree of acceleration before the fatal event;—circumstances which are highly characteristic of meningitis; nor is the respiration suspirious and irregular in fever, as in meningitis.

Finally: in the later stages of fever there are—a parched, brown, crusted tongue, with sordes on the teeth; dark, offensive fæcal evacuations; tympanitic abdomen; sometimes petechiæ; low muttering delirium; the supine posture; slipping down in bed;—symptoms which, taken in connexion with the absence of the pathognomonic symptoms of meningitis, render the diagnosis so distinct, that the two diseases can scarcely be confounded.

We [a] have seen cases of general cerebritis present symptoms at the onset very like those of low fever; but these may be detected with little difficulty, by observing that the headach is more intense and permanent than corresponds with the degree of fever, and that it usually increases in intensity as the pulse falls;—a most suspicious circumstance; especially if the pulse also fluctuate, and the respiration be suspirious and irregular. Such are the most prominent diagnostic criteria between inflammation of the brain and fever.

Delirium Tremens.—Delirium tremens is distinguished by the absence

[a] Dr. James Hope.

of the headach; by the peculiar tremors; by the singular hallucinations and spectral illusions, inspiring fear in the patient; by the remarkable wakefulness; by the tractability and unoffensiveness of the delirium; by the copious clammy perspirations; and by the history being that of habitual inebriation: on the contrary, there is absence of the somnolency, coma, convulsive and paralytic affections, and slowness of the pulse, which characterize inflammation of the brain.

Apoplexy.—Apoplexy is distinguished by its invasion being abrupt, the paralysis sudden and complete, and the course of the disease short and rapid; whereas, in partial cerebritis, there are most frequently premonitory symptoms; tonic or clonic spasm generally precede the paralysis, which supervenes more gradually; and the course of the disease is irregular, and comparatively slow. It must not be forgotten, however, that when cerebritis is excited by an apoplectic extravasation, spasmodic symptoms, with delirium and fever, may follow the apoplectic phenomena.

In Infancy.—In infants under a year old, the diagnosis requires the most scrutinizing attention. "The head hanging over the nurse's shoulders, and the half-closed eyelids", says Cheyne, "are alarming symptoms; and in no other complaint do we observe the same knitting of the eyebrows unaccompanied with crying." There is a quiet, vacant, abstracted air in the face, from non-convergence of the pupils;—very different from the lively, violent, and varying expression, indicative of acute pain from other causes than cerebral disease. There are no paroxysms of temper, with alternate extension and retraction of the legs,—as in colic and gripes. If, in addition to these symptoms, there be unusual wakefulness, or unsound sleep with starting and crying, or obstinate screaming without obvious cause; if, while awake, the infant seem drowsy, moan, roll its head restlessly on the pillow or the nurse's arm, or keep thrusting it backwards against the pillow; if there be a shrinking and frowning aversion to light, a contracted or dilated state of the pupil, or disobedience of it to light, and obstinately frequent vomiting not explicable by other causes,—we may feel almost certain, in the absence of great and rapid exhausting causes capable of producing some of the same symptoms (the hydrencephaloid disease), that we are dealing with the first stage of inflammation. If coma, dilated pupil, blindness, and strabismus, with or even without convulsions or spasms, have taken place, the nature of the case can scarcely be doubted, and the disease has made considerable advances.

The same diagnostic symptoms are applicable to children above the age of one year; and they are rendered more distinct by the declarations or more intelligible manifestations of the patient with respect to pain, fever, and other circumstances.

When Masked by Previous Exhaustion.—The most perplexing cases are those in which the cerebral symptoms are unusually masked by great previous exhaustion and emaciation, from tubercular disease, dentition, and chronic gastro-enteritis ("infantile remittent fever"; "tabes mesenterica"; "marasmus"). After scarlatina, likewise, the utmost attention is requisite for two or three weeks, to detect the very first symptom of inflammation of the brain; which, as already stated, generally supervenes in connexion with inflammatory anasarca. The occurrence of severe headach should be regarded with the utmost suspicion;—as usually being the earliest sign. If neglected, convulsions, coma, and other formidable symptoms rapidly follow.

Worms.—Worms are distinguished by the transitory nature of the headach, vertigo, dilatation of the pupils, convulsions, and vomiting, which they

occasionally excite; by the absence of fever, of the slow fluctuating pulse, of the unequal suspirious respiration; and by the symptoms not presenting the progressive increase and regular course usually observed in inflammation of the brain.

Exhaustion.—Exhaustion, producing some cerebral phenomena resembling those of hydrocephalus (whence it has been called "the *hydrencephaloid* disease"), is distinguishable by coldness and paleness of the surface, in connexion with a very quick and feeble pulse, and by the occurrence of these symptoms after the operation of exhausting causes.

The diagnosis of nervous, hysterical, neuralgic, rheumatic, and bilious and dyspeptic headach is so simple, as merely to require in the student a competent knowledge of these several affections.[a]]

Variety in the Paralytic Symptoms dependent upon the Part Affected.—[Before concluding the subject of diagnosis, we[b] shall briefly allude to the interesting inquiries of some French pathologists; who have endeavoured to point out the parts of the brain affected in cerebritis, by the various modifications of the paralytic symptoms. Paralysis may affect one extremity or both;—one entire side of the body; or the eyes, face, and tongue, either singly, or in a variety of combinations; and there are the same diversities in the state of the sensibility and intellectual faculties. How are these modifications to be accounted for? Several of the older writers had conjectured that, if the nervous filaments could be traced up to their remote origin in the brain, it would be found that each part of the body regularly receives its nerves from a determined part of the brain;—so that any lesion of that part must necessarily affect the functions of the organ to which it sends its nerves. The following are the results of numerous pathological observations made on this subject, by MM. Foville, Serres, Pinel Grandchamp, and Bouillaud. They are, of course, to be received with a good deal of reserve; but we[b] still think them deserving of notice, if it were only to direct others in the path of inquiry.

1. The paralysis of the organs of speech, depends on diseases of one or both *anterior* lobes of the brain. There are seventeen cases reported in the works of Lallemand, Rostan, and Bouillaud, with paralysis of the tongue; in which the anterior lobes of the brain were found affected with various degrees of inflammation and softening. On the other hand, an examination of about fifty cases, in the same authors, without loss of speech or paralysis of the tongue, does not afford a single instance of inflammation or softening in the anterior lobes. It should be noted, that there may be loss of speech without paralysis of the tongue,—from mere loss of memory; and M. Bouillaud's observations led him to think, that the anterior lobes of the brain preside over the memory of words, as well as over the organs of speech. The above statement, if the facts on which it is founded can be relied on, is certainly very remarkable; and is deserving of further investigation.

We remember an interesting case under the care of Dr. Cuming, of Armagh; in which there was disease in the anterior part of the brain, from a blow received on the forehead, just above the nose. It was found necessary to remove a portion of bone with the trephine; and, after a variety of remarkable and untoward symptoms, the gentleman perfectly recovered. One of the prominent symptoms was a loss of the memory of language.

2. The paralysis of the *inferior* extremities depends on disease of the

[a] "Library of Medicine"; Volume 2; Pages 52, 53, and 54.

[b] Dr. Adair Crawford.

middle lobes of the brain, and of the "corpora striata." This conclusion is not supported by the same number of facts as the former.

3. The paralysis of the *upper* extremities depends on disease of the *posterior* lobes of the brain, and of the optic thalami. This is likewise stated as yet resting only on a small number of facts. The paralysis of one arm only, has been observed (in a good many cases) in connexion with inflammation at the junction of the posterior and middle lobes. When several parts are paralysed at the same time, the morbid alterations of the brain are supposed to be more extensive, or seated near the "medulla oblongata." Paralysis of the arm and leg on the same side, or hemiplegia, is supposed to follow the combined affection of the "corpus striatum" and "thalamus"; or else disease of the "crus cerebri", from which these two bodies derive their origin.

The last speculation on this subject which we[a] shall refer to, is one relating to the respective uses of the cortical and medullary substances of the brain. We[a] have seen that the cortical substance has been found, in a great many lunatics, highly injected, and often inflamed; while the medullary substance remained healthy. M. Foville and Pinel Grandchamp have conjectured, from this and some other circumstance, that the *cortical* substance was the seat of *intelligence*, while the *medullary* was intended to preside over *motion*. The principal other grounds of this hypothesis are,—the apparent disease of the cortical substance;—which has been found reduced to a very thin layer, in cases of imbecility; and the small size of the convolutions, and small quantity of cortical substance, observed in the brains of idiots, compared with those of intelligent beings.

In the article "Encéphale", of the volume of the "Dictionnaire de Médecine et de Chirurgie Pratique", just published, M. Foville—whose recent discoveries, on some points of the minute anatomy of the brain, have deservedly attracted much attention—enters at considerable length into the examination of the preceding considerations. He has adduced a number of striking facts and arguments in their support; and lays down the following general propositions:—

1. The joint lesion of the "corpus striatum" and "thalamus" of one side, gives rise to the same paralytic symptoms as the lesion of the whole fibrous substance of the corresponding hemisphere; of which they are, in some manner, the centres or nuclei.

2. The lesion of the "crus cerebri" is followed by the same paralytic symptoms, as that of the "corpus striatum" and "thalamus"; which are themselves, in a great measure, formed by the expansion of the fibres of the crus.

3. A lesion of the "medulla oblongata" produces all the symptoms which arise from the joint affection of the "crura cerebri" and "cerebelli"; and (if we ascend still higher in the brain) from that, also, of the "corpora striata", "thalami", and hemispheres.

4. If we direct our attention to the portion of the nervous system below this great centre of the nervous action of the brain, we shall find the cerebral influence unimpaired, in all parts *superior* to any lesion of the spinal marrow; while it is completely intercepted in parts *inferior* to that lesion.

SECTION VI.—PROGNOSIS.

Cerebritis is a disease always attended with considerable danger. When once fully developed, it had hitherto been generally considered as incurable;

[a] Dr. Adair Crawford.

but since we have been enabled, by a better knowledge of its true nature, to apply with promptitude more appropriate remedies, the treatment is often successful, even under the most unpromising circumstances. The extremely delicate structure of the brain, however, its situation in a bony unyielding case,—without room for expansion, or any opening for the exit of effused fluids,—and the great importance of the integrity of its functions to the preservation of life, are circumstances which must always connect a considerable degree of danger with its inflammatory affections.[a]]

Prognosis of the different Varieties.—[Meningitis of the convexity of the hemisphere, though extremely rapid and dangerous if neglected, is perhaps the most tractable form if promptly and vigorously treated. Internal arachno-cerebritis ("hydrocephalus") is less tractable and more fatal. Before it was known to be an inflammatory disease, the sufferers died, almost without exception; subsequently, the mortality has amounted to about two-thirds; but, in consequence of improvements in diagnosis and the use of mercury, the proportion is now undergoing a considerable diminution. Cerebritis is the most dangerous form of cerebral inflammation; in consequence of the facility with which the organ passes into softening and disorganization. When chronic, and attended with progressively increasing palsy, complete recovery is exceedingly rare. Success in the treatment of chronic cerebritis, however, is daily on the increase;—in consequence of its inflammatory nature being better understood. Formerly,—under the supposition that the symptoms were nervous, neuralgic, rheumatic, dyspeptic, or from debility,—they were treated with tonics, stimulants, and full diet. The general prognosis is more unfavourable, when inflammation of the brain appears during, or shortly after, other serious diseases; especially typhoid fever, the febrile exanthemata, pneumonia, apoplexy, epilepsy, and mania; because, in these maladies, the vital powers are already more or less exhausted, and in some the blood is diseased;—whence active treatment is less easily borne. The same remarks apply to weakly, scrofulous constitutions; especially where several of the family have been affected by hydrocephalus.

Favourable Symptoms.—The particular prognosis, in individual cases, is regulated by the symptoms. The following are favourable:—return of natural sleep in contradistinction to somnolent stupor; return of the several secretions;—namely, moisture of the tongue, with cleaning of its point and edges, and removal of dry sordes from the gums and lips; gentle perspiration, or at least softness and coolness of the skin; a free secretion of natural urine, and an open manageable state of the bowels; a simultaneous diminution of the heat of the head; a more equal and regular state of the pulse and respiration; and a corresponding amelioration of the other basic symptoms. The earlier this improvement takes place, the more favourable the prognosis; because, in the first stage, or the early part of the second, the disease may not have proceeded beyond vascular turgescence; which, by pressure and interruption of the circulation, is capable of producing the worst symptoms (convulsions, coma, paralysis, &c.); yet, as the brain is not disorganized, the vascular congestion is susceptible of removal. An amelioration in the advanced part of the second stage, or later, ought to inspire less sanguine hopes; as effusions of serum, lymph, and pus, may have taken place, and may not admit of absorption; or, if the case be cerebritis, the effect may have been softening;—a highly intractable affection.

Unfavourable Symptoms.—The unfavourable symptoms are—a contin

[a] "Cyclopædia of Practical Medicine"; Volume I; Pages 306 and 307.

ance, notwithstanding suitable treatment, of headach, heat, delirium, and watchfulness; or of coma, convulsions, strabismus, spasmodic rigidity, palsy, and a slow irregular pulse: finally, the mortal symptoms; namely, an exceedingly rapid and feeble pulse; relaxation of all the sphincters, including the "orbicularis oculi"; singultus; aphonia [a]; dysphagia [b]; general muscular relaxation, with inability to move; collapsed cadaverous countenance; &c. Of chronic inflammation of the brain, or acute becoming chronic, the prognosis is always doubtful; and the friends should be apprised, that the disease may induce epilepsy, paralysis, mania, insania, or idiocy [c].]

SECTION VII.—TREATMENT.

Blood-Letting.—As to the general treatment of phrenitis, it is perfectly easy. In the first place, we should have recourse to copious blood-letting; and my own experience leads me to think, that bleeding in the arm is just as good as bleeding in the neck. It is not advisable to bleed from the temporal artery, because we have to put a bandage on the head afterwards; which occasions more or less augmentation of the heat; and the bandage itself is often very troublesome. With regard to opening the jugular vein, that sometimes causes so much agitation of the patient, that it is not a very easy matter to accomplish it; but there is no difficulty in detracting blood from the arm; and, besides, I am not aware that there is any particular *advantage* in taking blood from the head. If we make a large orifice in the arm, make the patient stand upright, and produce a strong impression, it will generally answer every purpose.

Cold Applications and Quiet.—Cold should be applied to the head. A bladder of ice laid upon the head, and a stream of cold water allowed to run upon it, are both very serviceable. In a case of violent phrenitis, evaporating lotions are hardly sufficient; and it is better to apply ice, or a stream of cold water. The posture of the patient should be carefully attended to. The head should be raised as much as possible; and silence and darkness are indispensable.

Purging, Colchicum, Antimony, and Mercury.—I need not say, that active purging is likewise required; and we may give antimony, colchicum, or mercury. Antimony is a very good remedy, if given so as to keep the patient in a state of constant nausea; colchicum, likewise, is excellent;—on account of its depressing the whole system, producing nausea, and purging the patient violently. But altogether, as I said [d] when speaking of the treatment of inflammation in general, I should place the greatest reliance on mercury; and should get the mouth sore as quickly as possible.

Blisters and Low Diet.—Sinapisms to the feet may likewise be exceedingly useful; and, after free bleeding, a blister applied to the nape of the neck may be advisable. But blisters are, generally, dangerous remedies. After a time, if the inflammation be not very violent, a blister may be applied to the forehead; but it is not till towards the close of the disease, that I would recommend any blisters to be applied to the crown of the head. I need not say, that the patient ought to be starved; and that rest should be strictly enjoined. If the disease have arisen from the cessation

[a] From α (primative), *without*; and φωνη, *voice*.

[b] From δυς, *with difficulty*; and φαγω, *to eat*.

[c] "Library of Medicine"; Volume 2; Page 54.

[d] See Page 135.

of another disease, we ought (if possible) to re-excite the latter. If it have arisen from the cessation of gout or rheumatism, we ought (with this view) to apply sinapisms to the extremities.

Digitalis.—I certainly would not give digitalis in such a case; for it is a narcotic that frequently produces irritation of the brain, when exhibited for other affections; and not only so, but it is much less to be depended upon in inflammatory cases, than other medicines. It will, moreover, frequently produce delirium or headach.

Inflammatory Headach.—In chronic inflammatory headach, the same treatment is required; but it should be carried on, of course, with less vigour. It is astonishing what perseverance in bleeding is sometimes required, in order to effect a cure in these cases. Blood must be taken every week or ten days;—either from the arm, or by cupping, or by leeches. The application of cold, of blisters to the nape of the neck and to the forehead, and likewise setons in the neighbourhood of the neck, are all useful. The disease often gives way to mercury, as soon as the mouth is tender. I have seen this in dozens,—I might almost say *hundreds* of instances. Bleeding did good to a certain extent only; but as soon as the mouth became sore, away went the pain. I need not insist upon low diet, and attention to the state of the bowels.

Blood-Letting from Distant Parts.—In some cases, however, which have proved rebellious to starvation, the application of cold, setons, frequent bleedings in various ways, and ptyalism long continued, I have seen the disease yield rapidly, on taking away blood from a more distant part. I have seen several cases in which, on applying cupping-glasses no longer to the nape of the neck, but to the hypochondrium, the disease has rapidly given way. Some recommend them to the verge of the anus. I have been surprised, on some occasions, to see the disease decline immediately, when cupping was instituted on the abdomen.

Treatment in Vertigo.—The same perseverance in bleeding is frequently necessary, when the phrenitis or inflammatory state of the head is not characterized by *pain*, but simply by *giddiness*. I have seen some cases of intense vertigo (in which there was sufficient strength of body to bleed freely) ultimately give way to that measure. In instances where I could not make out any sympathy with the stomach and intestines, but where it appeared to be an inflammatory state,—the chief symptom of which was vertigo; or where that was almost the only symptom except throbbing of the head, on motion or taking stimuli,—I have seen continued depletion effect a cure. If patients feel themselves worse for stimuli, and the pulse is sufficiently strong, I would certainly bleed.

I recollect a case of severe vertigo, in a young man, attended by no other symptom whatever; and, as he was young and strong, I bled him to between twenty and thirty ounces, with no relief whatever, but with no aggravation of the symptoms; and I was obliged to have recourse to this extensive bleeding several times, before he was cured. He had been ill, from this giddiness, for many months; and used to roll about the room with it; but he recovered simply by repeated bleedings to this extent. It is just the same sort of case, as chronic inflammatory headach; only that these symptoms arise from the particular part of the head, which the inflammation has attacked.

I had a case, a few years ago, in which this vertigo was acute. A young woman was suddenly seized with intense giddiness; but without any pain. There were some very odd symptoms about her. Her eyes were pushed

far more forward in the orbits, than in health; and every event appeared old to her;—so that there was an extraordinary affection of the brain. If she put down a tea-cup, she fancied that it was years ago; and she could not get over this feeling. These were her symptoms; and, as she was plethoric, and her pulse justified bleeding, she was twice depleted very copiously; and, by that simple means, together with purging, she got completely well. There was no pain whatever in this affection.

Vertigo depending on an Opposite State.—It is to be remembered, however, that all these affections—whether there be an inflammatory state of the head, or inflammatory headach, or simple vertigo—may depend upon an opposite state of the brain. I have seen several cases of chronic pain of the head, which have resisted all anti-inflammatory treatment; but which gave way very speedily to the exhibition of iron, quinine, or other tonics, and to full diet. We can only judge of these things by observing, not only how long the case has existed, but that the pulse is feeble, and that stimulating the patient does not make him worse. If this be the case, we may safely resort to an opposite mode of treatment; and I believe iron is the best remedy we can employ. In other cases, it is well to apply cold, in the form of a shower-bath; which is a powerful tonic. This state appears to be a morbid sensibility, without any great accumulation of blood; and certainly without any violent action of the brain. With respect to vertigo, I recollect seeing a gentleman, who had a constant sensation as if he were going to fall forwards;—a sense of plunging as he sat in the chair. He had no pain at all; but he had heat; and the throbbing sensation in his forehead was terrific. He was upwards of sixty years of age; but he had a florid complexion, and was a strong old gentleman. It seemed to me, that the case required antiphlogistic treatment; and I recommended that it should be put in practice, and that his diet should be low. I may mention, that he was a very excitable person; that, although he was so old, he said he had not lost any of his vigour; that since he was twenty-five he had not experienced the least change; and that in hot weather he experienced the strongest excitement. In general, people are not so sensitive at that age; but the slightest effects of various agents, were distinctly perceptible to him;—in fact, such agents as would not have affected other individuals. Seeing all this, and that there was such extraordinary excitement within the head, I concluded that though he had no pain, yet the case was certainly of an inflammatory nature. Antiphlogistic measures were put in practice; but, as I understood, without the least benefit. He was afterwards allowed meat, wine, and stimulants of all kinds; and I was told that he got perfectly well. Here was an instance of vertigo of an opposite kind. It was difficult for me to form an opinion, though I had paid great attention to these diseases; and I formed a wrong judgment. I thought antiphlogistic treatment would be best; and it is possible that the other mode might not have succeeded, if anti-inflammatory treatment had not been put in practice first. We may have inflammatory pain of the head, of a nature to be benefited rather by stimulants and tonics, than by depletory measures; and we may have these partial symptoms of affection of the head;—such as vertigo; which must be treated in the same way.

After-Treatment.—It is to be remembered that, after the acute disease, we may have a state in which nourishment, and even opium, are the chief remedies. At the close of phrenitis, especially if the evacuations have been copious, there sometimes will be a continuation of delirium; and if the evacuations be carried to a greater extent, they will kill the patient; and

sometimes this state will come on, without any previous active inflammation. In such a case as this, opium is the proper medicine; and, for the most part, the patient's diet must be good; but of this I will speak hereafter, when I come to consider that affection occurring within the head, which has been called "delirium tremens." As it has received a particular name, I will speak of it separately; but it is a state which will occur without any great tremor, at the close of common inflammation of the brain.

CHAPTER II.

HYDROCEPHALUS.

[Under this term was formerly comprehended every preternatural effusion of serous fluid in the region of the head;—whether external to the cranium, or contained within it. In process of time, however, it became limited to effusion occurring within the cavity of the skull. Systematic writers have laid it down, that such effusion may occur either between the cranium and dura mater, into the great cavity of the arachnoid, in the subarachnoid cellular membrane, or (finally) into the cavity of the ventricles. But hydrocephalus[a], in the more restricted sense in which it is usually understood in this country, means a serous effusion taking place into the ventricles, or (which is a much rarer occurrence) into the sac of the arachnoid.[b]]

SECTION I.—HYDROCEPHALUS ACUTUS.

This is another instance of inflammation of the brain;—causing, for the most part, great effusion; and as this effusion was formerly noticed more than any thing else, the disease does not go, or has not gone, by the name of "inflammation of the brain"; but has received the peculiar appellation of "hydrocephalus acutus." Some who have been more precise in their language, have chosen to say "hydr*en*cephalus"; and some have called it "*phrenitic* hydrocephalus."

Mostly occurs in Infancy.—It is a disease seen, in the greater number of instances, in children. In fact, it particularly occurs in the phrenitis of children; but the phrenitis of *adults* is sometimes attended by very copious effusion. When a child has inflammation within the head, it usually goes by the name of "hydrocephalus acutus"; but in its essential character, it is very much the same as the common phrenitis of adults.

Premonitory Symptoms.—It frequently comes on, in children, after heaviness of the head, dulness of the mind, and a disturbance of sleep; the child frequently has frightful dreams, wakes screaming, is found to be restless both up and in bed, and to be exceedingly peevish in temper. There is, likewise, a continual knitting of the brows; which is a common symptom in inflammatory states of the head. The child, too, is frequently observed to walk insecurely;—to totter a little; as if it experienced a certain degree of vertigo. Some say they have observed children, in these circumstances, have a great trick of putting their hands behind their head, and pulling the back of their neck. There is occasionally darting pain in the head; and there is feverishness. The body is hot; and the pulse is quick[c], and exceedingly various. From feverishness, the child's nose and

[a] From ὕδωρ, *water*; and κεφαλη, *the head*.

[b] "Cyclopædia of Practical Medicine"; Volume 2; Page 452.

[c] This remark is somewhat at variance with the opinions of Gölis, and other subsequent writers. Gölis states that "the pulse, *which deviates little or not at all from its*

lips are dry; and this gives rise to a degree of itching;—so that the child is continually picking his nose and lips. Of course there is thirst, and loss of appetite; and frequently there is fetid breath. The stomach and bowels are disturbed; the tongue is white, yellow, or brown; nausea is experienced, and also vomiting and costiveness; though occasionally there is purging and griping. The fæces are observed to be white, and to have a sour smell; though, on the other hand, they are sometimes dark and very fetid. The abdomen is frequently full, especially at the epigastrium; and there is frequently tenderness on pressure; but this is particularly noticed at the epigastrium, and the right hypochondrium.

These premonitory symptoms may go off spontaneously; and if the practitioner attend to them, he may remove them;—so that nothing follows. Whenever we see such symptoms as these, we must recollect that they may be easily followed by hydrocephalus; and it is our duty to attempt to remove them. This may generally be accomplished; but if we fail, and hydrocephalus does come on, we have, at any rate, done our duty. It is true that hydrocephalus might not have supervened; but it was impossible for us to tell that; and it is our business to do what we can to prevent it. These symptoms may last only a day or two, and then come on with increased severity; or they may last many weeks.

[Dr. Yeats[a], who has made the earlier stages of this disease his particular study, places among the premonitory symptoms occasionally present, tenderness in the scalp, stiffness of the neck, increased sensibility of the eyes to light, and in some rare cases severe ear-ach. He also draws attention to the remarkable change from the healthy appearance which the countenance undergoes, the transient paleness and occasional collapse of the features, the dulness and loss of expression in the eyes, and the dark line under them. A teasing cough is sometimes present. There is an unusual tendency to constipation. If aperient medicines be given, the consequent evacuations are both harder and less abundant than they were wont to be from a similar dose. In colour they are sometimes lighter than natural, and at other times tinged of a dark greenish hue, and accompanied with a slimy matter.

Dr. Cheyne has the merit of having been one of the first writers who strongly directed the attention of the profession to the derangement in the functions of the liver and of the alimentary canal, which so often precedes, and not unfrequently seems to excite, this affection of the brain. The proportion of cases in which the diseased action commences in the abdominal viscera is, he thinks, very considerable. He was led to this belief, partly, by having observed how usually derangement of the above-named organs precedes hydrocephalus; partly, from the remarkable benefit which, in the early stages of the affection, so often ensues upon the use of active purgatives; and, finally, from the frequency with which unequivocal marks of disease are discovered in the liver or intestines on dissection. In the incipient stage, or while the disease of the brain is as yet only forming, the colour of the stools indicates an inactive state of the liver; while, at a subsequent period, when hydrocephalus has become fully established, the bile seems to be both vitiated, and in excess. The intimate sympathy which

natural quickness, is found, on an attentive examination, to beat oftentimes a few beats weaker, and sometimes to intermit altogether. It is commonly the seventh, ninth, sixteenth, seventeenth, or one-and-thirtieth beat, which the finger feels weaker, or not at all." (Gölis, on Acute Hydrocephalus; translated by Dr. Gooch. Page 12.)

[a] "Statement of the Early Symptoms which lead to the Disease termed 'Water in the Brain.' By G. D. Yeats, M.D."

exists between the brain and the liver, is well known to surgeons; and that between the brain and the stomach and intestines, is familiar to every one. When we consider the close and unquestionable sympathy which subsists between the head and the digestive organs, and take along with this the greater exposure of the latter to irritating causes and consequent functional derangement, we are disposed to think that the now very generally received opinion, as to the frequent origin of hydrocephalus in abdominal disorder, is well founded. How this connexion is to be explained, matters little. The comatose state in which inflammation of the mucous membrane of the bowels in infants (about the period of weaning) often terminates, is a striking instance of this origin of cerebral derangement. A remarkable diminution of the urinary secretion, frequently precedes the oppression of the brain; and may possibly sometimes, as Dr. Abercrombie has suggested, be in some degree connected with it.[a]]

Stages.—When the disease is formed, it has two stages; and it may occur without any premonitory symptoms. Not only may the latter vary in duration,—from a day to a few weeks; but they may last only for an hour or two; and, indeed, they may not exist at all; for the child may be seized in a moment.

Symptoms of the First Stage.—When the disease occurs, there is severe pain in the head,—shooting through it; so that the child lays its head in its mother's lap; and is continually crying—"Oh, my head!" It is awakened, too, from sleep, by this violent shooting pain in the head. The latter is found to be very hot; and there is intolerance of light and sound; and, from the sensibility of the retina, the pupil is very much contracted. From the extreme irritation of the nerves, I presume, there is strabismus; but some ascribe this to *paralysis* of certain nerves;—so that some muscles get the ascendancy over others. However, it appears before there are any signs of paralysis;—during the mere excitement of inflammation. Besides the squinting, there are convulsive spasmodic motions of other muscles; and frequently there are general convulsions. Sometimes there is delirium at last, but sooner in some cases than in others; and the delirium may not be constant. In the first instance, it is *not* constant. The child is observed to turn its head continually about on the pillow;—never to be at ease; and there is a peculiar motion of its arms; so that it saws the air with its hands, and tosses them over its head. Whenever we observe these symptoms, we may be sure that the disease is formed. There is now violent pyrexia; the pulse is rapid and full[b]; and Gölis says that the abdomen sinks, and becomes flatter; and that this is a pathognomonic sign of the disease[c]; so that if this occur, we may be certain as to the nature of the disease. Whether he is correct, I cannot tell. There is, in this stage, costiveness; and the stools are usually very fetid, and of a very dark colour;—something like tar. About this time, the abdomen (especially the epigastrium, or the right hypochondrium) is exceedingly tender; and the vomiting which occurred as a premonitory symptom, is now perhaps very frequent. These symptoms, like the premonitory, may exist for various periods; but, of course, they

[a] "Cyclopædia of Practical Medicine"; Volume 2; Pages 453 and 454.

[b] Gölis says—"the pulse is now like that of an old man;—slow, unequal, and intermitting"; and he regards it as a pathognomonic sign in this (the inflammatory) stage, in complicated cases. See his "Treatise on Hydrocephalus Acutus" (Gooch's Translation); Page 26.

[c] See "A Treatise on the Hydrocephalus Acutus, or Inflammatory Water in the Head. By Leopold Anthony Gölis; Physician and Director to the Institute for the Sick Children at Vienna. Translated by Robert Gooch, M.D." Page 24.

cannot exist so long as the premonitory symptoms may. They may last only a few hours; or they may last a day or two; or they may be extended to seven days; but I believe they very seldom go beyond that.

Symptoms of the Second Stage.—After this, comes on the second stage; which is that of exhaustion. There is now more or less blindness; and the child is unable to discern one object from another; and perhaps it cannot perceive the light, which is now borne very well. There are no longer twitches; the pupils are no longer contracted, but dilated; and sound no longer produces disturbance, but appears not to be heard. There is a general insensibility; and the child, from being delirious and irritable, is now drowsy; and the convulsions come on with more intensity; as likewise does the squinting. The pulse is no longer quick, but weak and slow; and, in fact, an apoplectic state occurs. There is sometimes hemiplegia, or local paralysis of the limbs; and there is likewise paralysis of the eyes. Sometimes the two stages are very distinctly marked; but they certainly run into each other: so that both may exist together in a limited degree. This may last for three weeks; but it rarely, I believe, extends much longer. The first stage does not subside entirely, but there is a great diminution of it; and the second stage comes on, but is not fully formed. The first stage, without the second, rarely extends beyond seven days; but when the second stage begins before the first has come to a close, the two may continue together for two or three weeks. Now and then the pulse is quick throughout the disease; and when the apoplectic state comes on, the pulse is as rapid as before, or very rapid.

Symptoms of the Third Stage.—It has been observed, that before death, after the second stage has been fully formed, there are again symptoms of excitement; so that some writers have divided the disease into three stages. But this, I believe, does not occur very frequently. Now and then, however, there is excitement; and the pulse, after it has been slow, will become quick. There will appear to be some sensibility of the eyes and ears. Even the muscular powers, which have been implicated, will be partially restored; and likewise the mind: so that not only the delirium, but even the stupor, will pass off; and the child again knows its friends and parents. Some of these symptoms will occur without the others. Occasionally the mind will be restored to a certain extent, and the senses return; and yet the pulse will continue low. Now and then the pulse will be rapid; and no other change occur. But, now and then, this restoration of the powers of the mind, and the powers of volition in the muscles, will take place where great effusion is found after death; and where there is every reason to believe that effusion existed, at the time that this restoration occurred. The common people term this "a lightning before death"; and we observe, in many diseases, an apparent amendment just before the fatal event. But when this last change does occur, the pulse generally becomes very rapid; and for the most part, whatever restoration there may be, there is observed more or less stupor; and perhaps convulsive actions.

Water-Stroke.—The disease occasionally occurs in a moment; and when that is the case, from the idea of water being so prevalent among medical men, it has been called, by Dr. Gölis, "wasserschlag", or "water-stroke."[a] But it is to be remembered, that children sometimes die from this disease without effusion taking place; and, on that account, "arachnitis" would, I think, be a much better name than "hydrocephalus." Sometimes, in a

[a] See his "Treatise on Hydrocephalus Acutus" (Gooch's Translation); Page 5.

moment, a child will have a rush of blood to the head; it will breathe hard, and die; and, after death, a great collection of blood may be found in all the vessels of the head. The disease sometimes, when it terminates, leaves more or less paralysis; sometimes it will leave hemiplegia; and some patients have recovered with paralysis of one arm, or of one leg.

Morbid Appearances.—After death from hydrocephalus, the same marks of inflammation and congestion in the brain and its membranes may be present, as those which are met with in phrenitis. Sometimes we find nothing more;—so that the squinting, the dilatation of the pupils, and the coma, are not necessarily the result of *effusion*. There may be no effusion whatever; notwithstanding that the child has died from hydrocephalus; and, before death, there were strabismus, dilated pupils, and loss of consciousness. Death will arise from the mere irritation and excitement which the child has undergone; and from the compression, and perhaps fulness of the vessels; but it is not necessary that there should be compression from effused fluid. Frequently we find the same congested and inflammatory state on the scalp, that there is within, and a great deal of serum is effused;—just as has been occasionally observed in common phrenitis.

But sometimes no such appearances are present. I have myself opened children who have died of this disease, and have found nothing;—the congestion and the signs of an inflammatory state having subsided, I presume, after death; and the blood having left those vessels in which it ought not to have existed, and returned to its usual route. It is possible for even the marks of inflammation to cease after death, before the body is examined.

Characters and Seat of the Fluid.—If, however, there be fluid, it varies very much as to its clearness. Sometimes it is perfectly limpid and uncoagulable. It will be found, of course, *in* the brain or *upon* the brain; and its quantity is generally from two to six ounces. The brain at large is sometimes found œdematous after this affection; especially at the "corpus callosum", the "fornix", and the "septum lucidum"; and this œdematous state exists either alone, or in conjunction with ventricular effusion. In infants there is great ventricular effusion, at the same time with œdema of the brain; and not unfrequently the same circumstance is noticed in adults; but it is generally seen in infants. The brain, after this disease, is very often found soft in particular parts (from the inflammation); and it is not an uncommon thing to meet with scrofulous tubercles in the brain itself, or its membranes:—shewing the predisposition to disease in the brain. These, of course, existed before the hydrocephalus was set up; but they shew the tendency to disease of the brain.

The longer the disease has lasted, the greater in general is the turgescence of the vessels, and the softer is the brain;—at least according to Dr. Gölis[a]; who has had more experience, I suppose, in this disease than any one else. He also mentions[b] that effusion will sometimes take place in a very few hours. Now and then, we have marks of inflammation in the liver and in the intestines. It is not by any means uncommon, for an inflammatory state of these parts to co-exist with hydrocephalus.

Causes.—This disease, as I have already stated[c], is for the most part an infantile disease. Sometimes it occurs about puberty, sometimes afterwards; but it chiefly affects children from two to ten years of age. It is an affection that very much runs in families; so that we may meet with

[a] See his "Treatise on Hydrocephalus Acutus" (Gooch's Translation); Page 183.

[b] At Page 19 of his "Treatise on Hydrocephalus Acutus" (Gooch's Translation).

[c] See Page 547.

some who have lost several children by hydrocephalus. It frequently succeeds other acute diseases, especially hooping-cough; now and then *(frequently*, indeed) it occurs during teething.

History.—Hippocrates speaks of water in the brain; and mentions many symptoms of acute hydrocephalus; but this particular disease was only first accurately described by Dr. Whytt, in 1768. He gives a full description of the inflammatory symptoms.[a] Dr. Cook, in his work on Nervous Diseases, states that Dr. Gregory used to say it was described by a surgeon at Glasgow, in 1753; and that M. Petit, a celebrated surgeon at Paris, gave many of the symptoms in 1718. But its description was not thoroughly given, till the latter part of the last century.

Prognosis.—Our prognosis ought to be exceedingly cautious, even during the premonitory stage. It ought to be still more cautious in the first stage of the disease itself; and it ought always to be unfavourable in the second stage, although this is sometimes recovered from: and so, it is said, is even the third stage, when excitement takes place. It is said to have been recovered from spontaneously; but I have never seen it. However, children have actually recovered from the disease in the very last stage. Even by medicine and the best means, recovery is very rare; and perhaps a favourable issue occurs quite as frequently by the spontaneous efforts of nature, as by art. Indeed, to shew that the disease may be recovered from by a child apparently in the most hopeless state, it is said that there is no one symptom which indicates death with certainty, excepting slow breathing.

Treatment.—The disease is clearly inflammatory; and the treatment of inflammation is that which is demanded for its cure. From the effusion which is generally produced by the disease, one would suppose that there is an inflammation of the arachnoid. The fluid which is effused in greatest quantity, is found in the ventricles lined by the arachnoid, and upon the brain in the cavity of the arachnoid; and, therefore, one would suppose that the chief seat of inflammation is in that membrane. The effusion, I need not say, is the mere result of inflammation.

Treatment of the Premonitory Symptoms.—During the *premonitory symptoms*, we have first to empty the bowels well; and, for this purpose, calomel in full doses answers better than any thing else;—at least, it is best to lay a foundation with it; and then to carry it off by another purgative, such as castor-oil. It is always best, in the first instance, to premise a dose of calomel. Other purgatives then answer to a certainty; and the bowels are well cleared. This open state of the bowels is to be preserved by doses of mild purgatives, such as castor-oil, repeated from time to time. Perhaps one or two very full doses of calomel would be advantageous. If the calomel should operate too much, it might be useful to give small doses of Hydrargyrum cum Cretâ; but the proper treatment is certainly to empty the bowels well; and, if requisite, to give mercury in repeated doses, for the purpose of producing a mercurial action on the system. If there be any tenderness of the abdomen, this of course should be carefully attended to; and leeches should be occasionally applied. In such a case, it would be well to avoid giving acrid purgatives;—lest we increase the inflammatory state; and, if mercury be still given, it should be in the form of Hydrargyrum cum Cretâ; or castor-oil may be exhibited from time to time, in order to empty the intestines. Wherever the abdomen is tender, there leeches should be applied. The warm-bath is useful in almost all diseases of children; but, to render it advantageous, it should be employed twice a

[a] "Observations on the Dropsy in the Brain. By Robert Whytt, M.D."

lay; and I should think it an excellent remedy in the premonitory stage of ıydrocephalus. The diet should be mild; and leeches should be applied to he head, from time to time. If all this be done, we shall very probably et rid of the morbid state; and the disease itself will be prevented.

Treatment of the First Stage.—But when the disease is *fully formed*, and ıot merely *hanging over* the patient, then we must act with the greatest igour. We have an acute inflammatory complaint to treat; and therefore ve must bleed freely and early; and it is admitted, on all hands, that we hould exhibit mercury with the greatest freedom. Those who are not ware, or do not attend to the circumstance, of the power which mercury ccasionally exercises over an active inflammatory state of the system, all allow hat in this disease it is of the greatest use. In the treatment of this disease, all persons praise mercury. As to bleeding, it is a very good practice o open the jugular vein, or a vein in the arm, if the child be old enough. Abundance of leeches should be applied to the head; while we should arefully attend to the abdomen; and if there be tenderness, we should pply them there likewise. Very large doses of calomel are borne in this isease;—both from the circumstances of the disease being of a highly inammatory nature; and subsequently, in the second stage, from the whole ystem being in a state of torpor. During the compression of the brain, r the softening of it, very large quantities of calomel are admissible. The owels, I need not say, ought to be thoroughly cleared several times a day; nd mercury given as rapidly as possible. The bowels will bear many doses f calomel in the twenty-four hours; but if, from their irritability, they will ot bear calomel, we must try whether Hydrargyrum cum Cretâ will answer etter; or we may lose the mercurial effect. It is a good practice to rub ıercurial ointment into the parts, as fast as it can be done. The patient hould be kept as upright as possible; and it is desirable, if the child be ot, to apply cold to the head; and, in these cases, ice is the best applicaon. After proper bleeding, local and general, sinapisms or blisters may e applied to the abdomen. In the latter stage of the disease, a blister to ıe nape of the neck, or the warm-bath, may still be of use; but we canot expect great benefit from them, in such an active inflammatory disease this. A bladder of ice should be kept on the child's head, while it is in ıe bath.

Treatment of the Second Stage.—In the *second stage* of the disease, when ıere are signs of torpor and paralysis;—when the pupils are dilated, and ıe patient cannot see;—when the pulse is perhaps slow, and the apolectic symptoms prevail;—the same plan should be pursued, according to ıe strength of the patient. If the inflammation be still going on, the gns of compression may not arise from effusion, but from the great conestion of blood;—at any rate, the inflammation may still exist. When eeches can no longer be applied, still we may continue the exhibition of ıercury, and antiphlogistic treatment, as far as possible. We may now pply a blister to the whole head: there is no danger whatever from it, in ıis stage of the complaint; and it frequently does great good. When all ıese things have failed, it is said that some children have recovered by the se of elaterium[a]; and others by the employment of digitalis and squills. any thing of this description be given, it should be in small and repeated oses. If elaterium be given with the view of exciting an evacuation of uid, it is best to put a grain into two ounces of liquid; and, if the effusion

[a] From ἐλαύνω, *to agitate.*

be going on, to give the child a tea-spoon full of the mixture, every now and then, till it operates in the way desired. As to digitalis and squills, it is best to give them in small and repeated doses. I never myself recovered a child in this state; but different persons have told me, that they have seen a child so recovered.

Treatment of the Last Stage.—In the *last period* of the disease, opium has been given with advantage;—not for the purpose of cure, but to procure sleep and tranquillity; and it has never been productive of harm. In the latter part of the disease, it may be necessary to give good nourishment, in order to support the patient; and even stimulants may be required; for, after the disease has existed for a length of time, we may have a state of irritation of the brain, arising from mere debility. The inflammation may have all subsided; and an opposite plan of treatment to that which was at first imperiously necessary, may be required.

SECTION II.—CHRONIC HYDROCEPHALUS.

There is another form in which water or serum is collected within the head. When speaking of inflammation and its effects, I stated that effusion was commonly the result of inflammation of serous membranes [a]; but I also stated, that effusion in a serous membrane will take place frequently with a very slight degree of inflammation [b]; and sometimes there is scarcely any to be discovered;—perhaps there is none;—at least, we are justified in saying so. The same is the case with respect to sweating. A person may sweat, in acute rheumatism, from the intense heat of the body; but a person will also sweat in the agonies of death, and in extreme debility. So with regard to purging. Purging frequently depends upon an inflammatory state of the mucous membrane; but, in other cases after death from purging, no inflammation can be discovered; and the person has been free from tenderness during life.

Nature. — Chronic hydrocephalus illustrates these general remarks. In chronic hydrocephalus, there frequently is no sign of inflammation to be discovered; sometimes there is. Sometimes it is pure dropsy, independent of inflammation;—at least, there is no inflammation that can be made out; and it is a very slow disease. Sometimes the affection is connate;—born with the patient. Sometimes it does not appear before the first or second year; and it has continued during a tolerably long life. A patient has lived with dropsy of the head, till he had attained his fifty-fourth year. Gall and Spurzheim mention the case of a woman who arrived at this age, in whose head four pints of fluid were found; and the patient did not then die of that disease, but of enteritis.

Quantity of the Fluid.—When the water exists in this chronic form, its amount is sometimes very considerable. In the acute disease, where the effusion is the result of inflammation, there is seldom more collected in a child's head, than from two to six ounces; but in the chronic form it is frequently so considerable, that the bones separate, and the sutures and fontanels [c] do not close. Dr. Baillie, in one of his plates, represents the appearance of the skull in this disease. The fontanels are much larger

[a] See Page 96.
[b] See Page 107.
[c] From "fontanella", the diminutive of "fons, fontis", *a fountain.*

than they should be; and they sometimes acquire a very considerable size. The sutures may be found distinct;—each bone in some cases being separated. These are very common appearances; and such as any one may see.

Separation of the Bones after Cohesion.—There is nothing at all surprising in the circumstance of the sutures gaping, and the fontanels spreading, when the water is collected, provided the bones have never cohered; but it is ascertained that the bones and sutures will open, after they have been firmly united together. Dr. Baillie, in the fourth volume of the "Transactions of the College of Physicians"[a], mentions an instance of a boy, eleven years of age, in whom the fontanels had closed, and the bones become well united by sutures[b]; but in whom they all separated again. Mr. Ford, who was formerly an eminent surgeon in London, observed the same occurrence, in a boy nine years of age;—the bones separated six weeks before his death. I do not know that Dr. Baillie was aware of it; but it is to be remarked that, in Mr. Ford's case, the serrated processes were much fewer than usual;—so that the bones had far smaller points of contact, than they ought to have had; and separation, of course, would be more easy. It is most probable that, if the water had collected in persons in whom there was the natural quantity of serrated processes, the bones would not have separated. I think that, in the instances of this affection I have met with, I have made the same remark as Mr. Ford; and, such being the case, we can conceive that separation would be more easy. Until I read Dr. Yeats's book on Hydrocephalus, (in which Mr. Ford's case is mentioned,) I thought that Dr. Baillie's was the only instance on record.

Occasionally the bones do not give way. There is no dilatation of the cranium at all; and it is said that it is even smaller than natural. I presume, in these cases, the bone cannot give way; and, of course, in such instances, the brain must shrink: the bones, however, generally do give way.

Nature of the Fluid.—In this disease, the fluid is almost always perfectly limpid;—it is generally as clear as the purest water. On being analyzed, it is found to contain scarcely any salt, and scarcely any animal matter.

Morbid Appearances.—When it collects to a very great amount, it is usually found in the ventricles; which are thereby expanded, till the whole brain becomes like a bag. On removing the cranium, we find the brain spread out to a great extent, with the fluid collected within it; and, on making a section, we find that the brain is exceedingly thin,—not thicker than paper; and the fluid immediately gushes out. This state of the parts led to the erroneous belief formerly entertained, that in this disease the brain is destroyed;—as though the person had lived, eaten, and drunk, without a brain. However, although some made this assertion, and believed that a person lived and talked without a brain, others knew the contrary to be the case; and Morgagni reproached those who published so absurd an opinion. If the fluid be collected *above* the brain, and not *in* it, the mistake may easily be made; and it may be imagined that the brain does not exist. I was present at an inspection of this description, where a child had a very large head, and had evidently laboured under hydrocephalus. On removing the bones, cutting into the sac which contained this immense quantity of water, and letting off the fluid, there was nothing

[a] Page 1.

[b] From "suo", *to join together.*

more to be seen. On looking into the membrane which contained the fluid, it was like looking into a well; there was nothing resembling brain to be seen; and it was immediately said—"Here is no brain!" But as the girl had been eating and drinking, sitting up in bed and talking, like other children, till within a few days of her death, that was impossible; and we found the brain under all this fluid, perfectly sound. There was a large cyst which had existed upon the brain, and spread itself out in every direction,—so as to produce an enormous size of the head; and there lay the brain, quite little comparatively, at the very bottom of this cyst. The distention of the cranium, be it ever so great, is generally equal in all directions; but now and then it is not so. Gall and Spurzheim say, that they saw a learned and well-educated man, with a forehead so high that it must have contained three or four pints of water; while the rest of his head was not of an unusual size. The only effect in him was, that he very often fell asleep. Now and then, the bones of the internal ear become separated by the sac; so that deafness is produced. We also observe another effect within the skull. The convolutions of the brain being enveloped by the collection of water, there is an irregular pressure upon the supra-orbital plates of the frontal bone; and therefore there is not that roughness,—that irregularity which is seen in ordinary cases. Usually, the upper part of the orbital bone consists of many depressions and elevations; but in this disease, as the convolutions of the brain are enveloped by water, the upper part of the orbital plates are generally perfectly smooth. The bones are sometimes thickened; but, in a great number of cases, they become thinner than natural. Dr. Gall mentions, that the head of persons in whom this disease exists to any extent, is generally scurfy; and, since I read the statement in his book, I have looked out for this circumstance, and found the observation to be correct. The skin of the head is generally scurfy, in some part, when the cranium is greatly distended.

Size which the Head may attain.—The size of the head is occasionally enormous. There was, in St. Thomas's Hospital, a few years ago, a child (named Elizabeth Phillips) who was born with a head as large as that of a child seven months old. The bones were all distinct; her hair was scanty; and there was an abundance of scurf on her head. She was fat, and as lively as other children of her age; and there was no symptom indicating the existence of fluid, except the size of her head. Though she was only eleven months old, the circumference of her head was twenty-seven inches five-eighths; from the top of the nose to the occiput, it was twenty-two inches; and from ear to ear, across the top of the head, it was seventeen inches one-eighth. Considering the age of the child, the measurement was enormous.

Cardinal the Idiot.—A few years ago, there was in St. Thomas's Hospital a poor man, who has now become a celebrated character; in consequence of a cast of his head having been deposited in almost every museum. His head was thirty-three inches in circumference; twenty-two inches from ear to ear; and twenty-three inches and a half from the nose to the occiput. He was thirty-three years of age; and his cranium was ossified at the sutures. Of course the bones had separated originally; but fresh bone had afterwards been deposited in the membrane between the frontal, occipital, and temporal bones;—so that he had as perfect a cranium as any one else. In him there were found as many as ten pints of water;—nine pints on the brain, and one pint in the lateral ventricles; and what was curious in him was, that the "corpus callosum" was split by the dis-

tention. An opening existed in the posterior part of the falx; through which the water (in all probability) had passed from within to without. I say—"in all probability"; because, in a great number of cases, the water is contained in the ventricles; and it is probable that, in this instance, it had made its escape. His brain only weighed two pounds fourteen ounces and a half; whereas the water in and upon the brain, amounted to ten pints.

Andral mentions, that water has been found in the fifth ventricle. I believe it is sometimes rather a quirk to ask where the fifth ventricle is situated; but there is a little space which may be called "the fifth ventricle"; and Andral says, that Broussais has found dropsy there.

Effect upon the Mind.—In this disease, the mind is generally weak. Sometimes there is downright idiocy; but—as the brain is only expanded, and not destroyed—there is occasionally considerable intellect. Cardinal (the man at St. Thomas's Hospital [a]) had occasionally epileptic fits; and his mind was certainly weak. He prided himself on being able to say "the belief"; but he generally stumbled when he got to "Pontius Pilate." If he were asked his duty towards his neighbour, he got on pretty well at first; but he soon made a trip; and it was also observed, that his memory was not like that of other people. He was an idiot;—at least, he was what is commonly called "a *soft* kind of person." He was also exceedingly vain, and pretended to have violent sexual desires; and, notwithstanding his great big head, he used to try to get hold of the nurses; so that one day we heard he had been behaving very badly;—and then he would say "the belief" to you. He could walk, of course; but—being top-heavy, and having thin spindle-legs—he did so with the greatest caution, lest he should overbalance himself. Now and then, if he was not delirious, he was so ill-tempered, that we could scarcely manage him.

There is a case mentioned by Dr. W. Heberden, in the "Transactions of the College of Physicians" [b], in which a chronic accumulation of water occurred in a man eighty years of age. At least eight ounces of fluid were found in the ventricles, and four ounces on the brain, after death. There was some little organic disease about the "plexus choroides";—a solid tumour of calcareous matter; together with ossification of the basilar and internal carotid arteries, and their chief branches. Now this man, although twelve ounces of fluid were found in his head after death, had suffered nothing,—except that he had been deaf many years (which many persons of eighty are) and had vertigo once or twice,—till six weeks before his death; and then he had a fit, from which he quite recovered; and was perfectly well before he died. This shews how nature will accommodate herself to an inconvenience, if it come upon her gradually. There is a singular circumstance mentioned by Morgagni. A considerable quantity of water pressed on the brain;—so much, that had it taken place suddenly, death most probably would have occurred; but from its taking place very gradually, no further mischief was produced.

In Acephalous Monsters.—It is right I should mention, however, that this disease may exist when there is no brain. Dr. Gall asserted at first, that when there was water in the head, the brain was always present; but he corrected this statement, in a subsequent edition of his work; and acknowledged that people were sometimes formed without a brain. In fœtuses, where there has been nothing but the "medulla oblongata", they have sometimes had water in the head instead of brain;—not that the brain

[a] See Page 556. [b] Volume 5; Page 173.

has been destroyed by the water; but it has been deficient by original formation: the fœtuses have been monsters.

Very little Inflammation.—In these cases there are generally no marks of inflammation; but we generally find, at last, that there is irritation. The vessels of the head are enlarged, and the head itself is hot. The person has more or less feverishness, and emaciation occurs; which, in the course of a year or two, is generally followed by death. In the greater number of cases, this is the course of the affection; but there are cases where no such thing occurs. In Cardinal, there were no signs of inflammation at all. He ate and drank just like other people.

Hydrocephalus with Bifid Brain.—In the first volume of the "Edinburgh Medico-Chirurgical Transactions"[a], there is recorded a case, in which a female child, only seven months old, had a head which measured twenty-nine inches and a half in circumference; and from which there were let out, after death, one hundred and thirty-six ounces of perfectly clear fluid; such as is usually found in chronic hydrocephalus. This fluid was contained in a bag; but then the brain was split in two. When the brain is first formed, the two halves are not united; but they afterwards come together;—just as in the case of the lips. The portions of the lips, however, do not always cohere; and precisely the same occurrence takes place with regard to the brain;—so that it remains divided; and the whole of the ventricles form a continuous bag with the arachnoid, and the surface of the brain. In the case to which I have just referred, on opening the head, a ventricle was seen at the bottom;—simply from the brain not having united (as it should have done) in the progress of the formation of the body. This was merely a case of hydrocephalus;—water in the ventricles; the two halves of the brain not having united, as they ought to have done. The rest of the brain was at the bottom.

Rupture of the Brain.—There is, however, a very curious instance mentioned, of the actual rupture of the brain. In the case recorded in the "Edinburgh Medico-Chirurgical Transactions", there was a deficient cohesion of the brain; but in the eighth volume of the "Medico-Chirurgical Transactions of London"[b], a case is mentioned where, in this disease, there was so great a distention of the brain, that at last it actually ruptured. Both the brain and the membranes gave way, under the posterior fontanel; and an external swelling was seen to be produced;—so that the whole head became œdematous; and fluid oozed from the mouth and nostrils, for eleven months. The child lived that period, after the giving way of the brain, and even of the "dura mater"; but of course the rent must have been very local.

Treatment: Tapping.—In this disease, medicine (I believe) is perfectly useless; but still mechanical means have been found very beneficial. If a puncture be made, and a large quantity of fluid evacuated, the child may die very suddenly,—almost immediately; but if a minute puncture be made, and a small quantity only let out at a time, it may be done with perfect safety, and the head has been known to be reduced; but I do not recollect having read of a cure till lately. I never saw a case of this kind; but it has been lately said, that some cases have been cured by a puncture being made; and a certain quantity only of fluid let out at a time.[c]

Pressure by Bandages.—Another mechanical means, also, has been of very great use; as I have, in some degree, witnessed myself;—that is,

[a] Page 205.
[b] Page 51.
[c] Dr. Conquest, to whom the profession is much indebted for his able and enlightened proceedings in this matter, has since published some very satisfactory cases.

bandaging the head. It should be bandaged nicely;—so as to have a uniform pressure throughout. I believe it was Sir Gilbert Blane who first suggested, or first attracted particular notice to this remedy. He has published some cases where, if there was not complete success, yet very great benefit was derived from the plan. I rather think it is said, that some cases have been cured by bandaging. Some surgeons, instead of applying bandages, have employed adhesive plaster,—so as to confine the head; and this has answered still better. The only case in which I have had any experience of this, was at St. Thomas's Hospital, in the child of an Irish woman. I directed the head to be bandaged; and it not only became smaller, but the general health was very considerably improved;—indeed, more so than the head. Unfortunately, the bandage was neglected; and the child immediately grew worse. The bandaging was again attended to particularly, and the child again improved; but I do not know the result of the case, because the mother took it away. Supporting the body, and pressure of the head by means of equal bandaging, appear to be the proper means of treatment; and, after letting out a certain portion of the fluid, I presume it would be well to employ bandaging;—thus carrying on the two plans together.

CHAPTER III.

APOPLEXY.

In this intense description of sleep, there is a great diminution (or entire loss) of sense and motion; slow, laborious, and generally stertorous breathing;—a loss, indeed, of all the animal faculties. It is generally sudden; whence its name (from απο, and πλησσω, *to strike*);—the person being struck down.

SECTION I.—SYMPTOMS.

Sudden Seizure.—If a person be upright, or walking about, or sitting, he falls down; and sometimes dies on the spot. He is dead in an instant;—as if he were shot. If, however, death does not take place instantly, the pulse is generally slow and full; the face is livid and flushed, and also swollen. The lips are particularly livid; and there is generally a little froth (though not to be compared to what is seen in epilepsy) proceeding from the mouth; and a blowing, frequently, from the lips and nostrils. The lips do not act in the same way as they do when we are in moderate sleep, or when we are awake; but the air forces them open, and their elasticity brings them back again; so that the lips are constantly moved, together with the "alæ nasi." The pupils are usually dilated, and the eye is insensible and closed. The cornea looks dull and glassy; the eyes are frequently bloodshot, and have a livid tinge; and so has all the rest of the face. The heat is generally increased;—especially of the head; and it is not unusual to see clammy sweats. But these almost always occur during the last period of the disease. There is at last a difficulty of swallowing. In some cases, if the attack be very severe, there is a difficulty (and perhaps an inability) of swallowing, from the very first; but, at any rate, when the disease terminates fatally, there is an inability to swallow at last.

Seizure, with Premonitory Symptoms.—Although this affection generally comes on suddenly, yet it is occasionally preceded, for a length of time, by drowsiness. Persons fall asleep in company, and at church, (where they will sometimes snore loudly,) even months before the fit. It is common for the attack to be preceded by headach; and by a throbbing, and a sense of tension and weight of the head. Many complain, previously, of dimness of sight and double vision, giddiness and vertigo; and, frequently, the eyes appear red before a paroxysm. Some have flashes of light (like stars) before their eyes, deafness, and tinnitus; together with dreaming, nightmare, and epistaxis.[a] It is not uncommon for persons, before they become apoplectic, to have numbness of the fingers, or of one finger, or of some part of the body. Sometimes there is tingling;—in other instances, slight twitches of the muscles; and occasionally stammering. It is very common for impairment of the memory to occur; as well as more or less depression

[a] From στιστραζω, *to distil from.*

of the spirits. It is easy to conceive, that the circumstances which occasion apoplexy will, in a slight degree, cause simple headach, or throbbing of the head, or double vision, or any of the other symptoms which I have mentioned. Stammering, an inability to use the muscles of articulation properly, and a loss of memory, will also arise from a fulness of the head; and from such a state as, in greater intensity, will produce apoplexy. Sometimes, persons have hemiplegia for a longer or shorter time, before the attack; so that hemiplegia frequently terminates in apoplexy. Independently of these symptoms, the invasion of the disease is sometimes very slow. Instead of persons being knocked down, the disease will come on slowly, whether they have these symptoms or not:—so that, from being sleepy, they at last become apoplectic quite insensibly.

Seizure commencing with Syncope.—The disease comes on in another form which it is very important to know;—where it begins with syncope; from which the patient frequently recovers, for a longer or a shorter time, till he afterwards becomes apoplectic. This form is particularly mentioned by Dr. Abercrombie, in his very excellent work on Diseases of the Nervous System. Before the attack of apoplexy, there is sudden pain of the head;—a sharp, cutting, severe pain; but instead of the face being flushed, full, swollen, or livid, it is pale. Perhaps there is a little delirium, perhaps a wandering; but a sudden pain occurs in the head; the face is pale; the patient feels cold and faint; and there is also vomiting and purging. After this attack of syncope, the patient gets up, and may walk about;—but in a few minutes,—though sometimes not for a few hours, and sometimes not for a few days,—but after this, whatever the interval may be, coma and apoplexy gradually take place. The body then acquires its natural warmth; perhaps is as hot as in common apoplexy; the pulse is no longer faint, but becomes full and slow; and the ordinary state of apoplexy is established.

This form of the disease is almost always fatal. A rupture takes place within the brain;—not producing immediate effusion, in most cases; but sufficient to cause violent pain; and to produce such an influence on the heart, as to impair its action considerably;—so that syncope takes place; and then, after this symptomatic syncope, blood gradually oozes from the vessels, in different parts of the brain; till, at last, pressure takes place, and we have common apoplexy. It is particularly necessary to know this form of the disease, before giving a favourable prognosis. Seeing the patient is very faint, and hearing of the pain of the head, we might think nothing of it; but we must remember, that it may arise from a rupture in some part of the brain; and—in a few minutes, hours, or days—effusion will gradually take place; and that to such an amount, as to produce common apoplexy. After the latter disease, there is almost always found rupture and extravasation.

Duration and Effects.—When the disease does not terminate by instant death, it may last for a few minutes, or for some hours, and even days. Persons have recovered after lying in this insensible state for three days. I believe that when the state is not genuine apoplexy, but merely a symptom of what is called "nervous derangement", in hysterical women, it may last any length of time; and persons will then recover; but if it be genuine apoplexy, persons seldom recover, if the insensible state continue beyond three days.

When the disease does not destroy life, the symptoms gradually recede, till they disappear altogether. Consciousness, perception, a knowledge of existence, and an observation of the external world, return; and the power

of volition is directed to the voluntary muscles. Sometimes, however, there is not a perfect return. Power, consciousness, and perception return, except in one part of the body; so that, after the disease, one half of the body very frequently remains motionless, without being at all subject to the volition of the patient; and sometimes, in addition to this loss of *power* over half the body, there is also a loss of *sense*;—at least with regard to touch. This state may exist on both sides of the body; but it is generally more complete on one side than the other. And this state may gradually subside, or continue for an indefinite time. But there is not necessarily an entire loss of sense and motion, in this disease; for, in most cases which do not immediately terminate fatally, if we pinch or otherwise molest the patient, he will evince consciousness by groaning, till within a short period of death. Frequently, too, after these attacks, the mental powers are weakened; so that the patients are never the men mentally that they were before;—never have the same power of attention,—the same memory,—the same power of mind altogether, that they had before the disease.

If the affection, however, gradually destroy the patient, the power of sensation and volition does not return. The power of deglutition, and the power of respiration remain, unless the disease kill the patient directly; but if the patient remain insensible, the power over the muscles of deglutition is gradually lost. He swallows worse and worse, till he cannot swallow at all; the pulse becomes weaker and weaker; the body cooler; respiration quicker, and at length irregular; and thus the scene is closed. The heart, however, will beat a few strokes, after the very last inspiration has taken place.

Convulsions.—Sometimes convulsions ensue; and I should presume that, in these cases, there is not only compression of the brain, but more or less laceration, or even inflammation. There must be some cause of *excitement*, besides the compression which produced apoplexy;—something injuring one portion of the brain so much, as to produce convulsions. These convulsions sometimes affect only one half of the body. Blood taken from the temporal artery, in this disease, is often as dark as venous blood; and the blood taken from the veins, is very often buffy and even cupped.

Contracted Pupil.—Sometimes, in an attack of this disease, the pupil is not dilated; but, on the other hand, extremely contracted; and there is no worse sign in apoplexy than this. I recollect a German friend of mine, who had the largest pupil I ever saw. I have frequently looked at him with astonishment. The iris never appeared larger than a thread;—forming a very fine ring. He took it into his head not to live any longer; and therefore poisoned himself, by taking half an ounce of pulverised opium. I do not know the cause of the act; but, some hours after taking the opium, he fell into a state of coma. It is a striking circumstance, that coma did not come on for a considerable time; and, as he mentioned to his friends what he had done, they sent for all the doctors they could find, and for me among the rest. He lay upon the bed; and of course we proposed giving him emetics; but he, being as much himself as any one in the room, declared we should not give him any thing. We had sulphate of copper and zinc in abundance; and endeavoured to put the solution into his mouth, and pour it down his throat; but he so kicked, thumped, and beat us, that it required a dozen of us to master him. He said that, if he thought proper to die, no person had a right to interfere with him. Finding he would not swallow what was reasonable, we got a stomach-pump; and, with great difficulty, we passed it down, and emptied the stomach; and then poured in so many wash-hand basons of water in succession, that at last the

water came out as clear as it went in; so that we completely evacuated the stomach;—he, all the while, exclaiming against the barbarity of keeping in this world a man who had no desire to stay. After all this, apoplexy came on. He became senseless;—his pulse slow, his face swollen, his lips livid, and his eyes suffused; and there was also stertorous breathing. We opened the jugular vein, and a vein in the arm; bled him freely, and dashed pails of cold water on him (which is one of the best remedies); but it was all of no use. His passion, I presume, had a great deal to do with it; for he was in a violent rage to the last moment. He was sensible; and the pupil was so contracted, as to be reduced to the size of a pin's point. It would have been difficult to pass through the iris any thing of a larger diameter than a pin. I need scarcely say that he died. I believe that when apoplexy has come on from opium, and perhaps from other narcotics, a contraction of the pupil has been observed; but when apoplexy is of the ordinary kind, and has not arisen from narcotics, this symptom is mentioned by authors as being almost always a fatal sign. I never saw a patient recover, in whom the pupil was so contracted; though, of course, I have seen them recover where it was dilated. Whatever danger there may be from other symptoms, if the pupil be contracted, we ought to give a guarded prognosis. It is mentioned, by many authors, that this state of the pupil is unfavourable; and, so far as I have made observation myself, I think the statement fully verified.

Anomalous States of the Pupil.—I may mention, while on this subject, that the state of the pupil, in affections of the head, is very various and very singular. When apoplexy is produced by external mechanical causes, in injuries of the head, notwithstanding the comatose state, the pupils are obedient to light and darkness;—following the introduction or exclusion of the light, just as in health. This has been observed by Sir Benjamin Brodie; who has written an interesting paper on it, in the fourteenth volume of the "Medico-Chirurgical Transactions."[a] He also mentions having seen *dilatation* of the pupil alternate with *contraction*. At one time, the pupils were extremely dilated; and at another, extremely contracted; and this alternation had been repeated several times. He also mentions (what we might expect) that he has seen dilatation cease, when venesection was practised; and then when the effect was gone off, the pupils were dilated again. That also we should suppose. When a bone compressing the brain was elevated, the dilatation ceased. Dr. Hennen states, in his "Military Surgery", (which I need not say is an excellent work,) that he has seen the pupil *dilated* when light was *admitted*, and *contracted* when it was *removed*; and Sir Benjamin mentions seeing eyes in the opposite states; that while there was a morbid *dilatation* of *one* eye, there was a morbid *contraction* of the *other*; and sometimes he has observed the pupil of *one eye only* to be dilated. These are irregular circumstances; and, as we may meet with one or all of them, it is well to know them; otherwise we might pay no regard to them when met with.

SECTION II.—MORBID APPEARANCES.

Occasional Absence of Morbid Signs.—On opening the bodies of patients who have died of this disease, we may perhaps find nothing. I have seen

[a] Page 325. For the facts mentioned on Sir Benjamin Brodie's authority) in the text, see Pages 352 to 354 of that volume of the "Transactions."

it stated, that a person could not have died of apoplexy; because nothing unusual was found in the head, after death. But I have opened many persons who have died of apoplexy, and have found nothing that would have led me to suppose they had been apoplectic. Most probably there had been extreme fulness of the vessels during life; and, after death, the fulness had completely gone off. Sometimes there has been a retraction of the vessels; and sometimes copious blood-letting has been had recourse to; but the brain has been so compressed, that the removal of blood was not sufficient to reinstate the brain in its former powers. Indeed, we frequently find, after this disease, that the great turgescence of all parts of the face, will go off;—if not *entirely*, yet to a *great degree*; and we must suppose, therefore, that the same thing may occur internally. I recollect a patient who died of this disease. He was lying in the dead-house; but the veins looked so full and tempting, that I begged some of them might be opened, and the subject bled freely to a pint; and, although the face was livid and swollen, the lividity went down, and the face recovered its former size. We may therefore presume, that a change may take place in the branches of the *internal* carotids, similar to that which occurs in the branches of the *external* carotids.

Turgescence of the Vessels.—But, in the second place, we may find great fulness of the vessels. The sinuses are generally filled with blood; and the vessels of the "pia mater" are exceedingly distended;—so that they present an obvious and decided turgescence.

Effusion of Serum.—Sometimes we find an effusion of serum *in* or *upon* the brain. Sometimes there is simply this; but sometimes it is united with a general fulness of the vessels. It is said, that if the disease arise after ischuria renalis, serum is generally found; but I recollect opening one patient, in whom there was neither a fulness of the vessels, nor any serum effused in or upon the brain. I never opened more than one who had died of apoplexy after the suppression of urine.

Extravasation of Blood.—In the fourth place, we sometimes find extravasation of blood. This may be upon the surface, or in the substance; and, in the latter case, I believe it is found, more frequently than otherwise, near the ventricles. It is seldom seen in the latter alone. If we find blood effused into a ventricle, it generally arises from its having been effused into the substance of the brain near the ventricle, and projecting through the cerebral substance;—so as to make its way into this cavity. The blood may be effused, of course, in any part of the brain;—in the cerebrum, in the cerebellum, and even in the "pons varolii", so as to lacerate it; and if it be effused near a ventricle, it frequently makes its way into it. Andral has made a large number of dissections; and states, as the result, that the blood almost always finds its way to the ventricles by rupture. Of three hundred and eighty-six cerebral hæmorrhages read of by him, he finds that two hundred and two took place in the substance of the hemispheres; sixty-one in the "corpora striata"; and thirty-five in the "thalami nervorum opticorum"; so that the hemispheres are by far most frequently the seat of hæmorrhage.

Apoplectic Cells.—The new cavities formed by the extravasation of blood, may be of all sizes;—varying from the size of a small pea, to that of a walnut; and, indeed, much beyond that. There is great variety, also, in the number of these effusions. Sometimes we find only one; in other instances we may find two; and in some cases we may find several. The blood which is effused looks, at first, like currant-jelly, with a reddish fluid around it. In about a fortnight, this clot becomes much firmer; and

at length it becomes soft, and has merely a reddish fluid around it. It is sometimes completely absorbed;—so that a cavity is left; and that is called "an apoplectic cell." This cavity is sometimes lined by a new serous membrane; sometimes it contains clear fluid; and occasionally it is empty, and may remain so for a great length of time; perhaps for life. It is said, by some, that a coagulum may remain for a long time in the brain, without much mischief; but, where it does exist, it generally gives rise to paralysis.

Apoplectic Cicatrices.—When the process of absorption occurs, we find, in the first place, that the serum becomes absorbed; that the clot becomes firmer and paler; and then, frequently, a number of filaments are produced, running from the walls of the cavity. These filaments, at first, are loosely attached; they then become firmer; at length sometimes the cavity will shrink; all the parts will contract, and become hard together,—so that a cicatrix is produced; and this cicatrix will become very firm. Sometimes there is no cell left. The blood is entirely absorbed; a cicatrix is produced; the sides of the cavity approach together; the filaments also are contracted, I suppose; and the whole becomes quite firm. In these circumstances, there is generally a change of colour;—sometimes to green, sometimes to yellow, and sometimes to purple.[a]

Cerebral Softening around the Clot.—When there is a clot effused in the brain, it is generally found that the substance of the brain around it is softened. Dr. Baillie mentioned[b], long ago, that if blood be effused into the substance of the brain, the cerebral substance around the clot is very frequently softened. Sometimes, however, there can be no doubt that a clot is the result of softening. I am quite satisfied of this from my own observation; for I have seen a person, with a pain in his head, gradually lose his memory, even have a cerebral affection, and then suddenly become apoplectic and die. On examination, I have seen a portion of his brain softened like pap; and in the midst of it an effusion of blood. This is nothing more than might be supposed likely to happen. If the cerebral substance of the brain be much softened, the large vessels will at least give way, and let out blood; so that we may have a softening of the brain, though the presence of blood injecting the surrounding substance. I feel satisfied that, through the vessels becoming softened, a clot of blood may be formed; and then we have more or less apoplexy. At St. Thomas's Hospital, I opened a man who came in with hemiplegia; which is much the same thing in point of pathology. He came in with paralysis of the left side;—the arm, the leg, and the whole of the side, were paralyzed. In the posterior part of the right "thalamus nervi optici", there was found a cavity; the brain was evidently injured; and the part looked just like an ulcer in a mucous membrane. I presume that, in this cavity, blood was effused; it coagulated, and was then partly absorbed. It produced a destruction of the cerebral substance around it; and the blood, being partly absorbed, gave rise to the dark colour. I have always seen the injury on the opposite side to that on which the paralysis occurred.

[a] Nature makes an attempt to restore the part;—just as she would in any other situation in the body. The best representation I know of these morbid alterations, is that by Cruveilhier. One of his plates depicts the progress of the changes. Fasciculus 10, Plate 8, Figure 1, represents the substance of the brain into which there has been an effusion of blood. Figure 2 represents a cavity in which a clot had formerly existed; and which, Cruveilhier says, was filled with serous fluid when he opened it. Dr. Baillie's plates are not coloured; and therefore they do not shew the affection so well.

[b] In his "Morbid Anatomy"; Chapter 24; Section 24.

Occasional Presence of Inflammation.—Sometimes, besides congestion and effusion, we find marks of more or less inflammation. The membranes are thicker than they should be;—looking as if chronic inflammation had been going on. In the man just referred to[a], the arachnoid on the surface of the brain was quite opaque; and there was also a considerable effusion of serum; but then he died from an inflammatory attack of the brain. His head suddenly became very hot; he became stupid; and then effusion took place into the substance of the brain, and likewise into the ventricles. This was a subsequent process; and is a very common mode in which paralytic persons die. There is a disposition to disease. In most chronic diseases effusion takes place; and, there being no strength of constitution, the patients die. They sink from inflammation within.

Diseased State of the Vessels.—This laceration,—this rupture of the vessels with effusion of blood, very generally takes place from some disease of the vessels themselves. Now and then, the vessels within the head have been found aneurismal. Very frequently, too, they are found more or less ossified. Sometimes they become calcareous;—more or less earthy, and very brittle. It is said that even the veins outside the head, are occasionally found diseased in a similar way. The vessels are so brittle that they will crack; and apoplexy takes place.

Small Vessels usually Ruptured.—Now and then, a very large vessel in the head has been found ruptured;—even a large artery. Generally, however, it is the *small* vessels that suffer; but even the sinuses have been found in that state. An instance of the lateral sinus being ruptured, is mentioned in the "Journal Universel" for 1820. There is another instance mentioned in the same work, of the lateral sinus being ruptured, in a person intoxicated. In the "Edinburgh Essays and Observations"[b], there is another instance mentioned, where the lateral sinus was ruptured, and apoplexy was the consequence. A practitioner informed me, that he was once sent for to a man, who had been carrying a very heavy load; and he found the longitudinal sinus ruptured. We must suppose there was a disposition, general or local, to disease of some kind. Usually, it is the small vessels that give way; and next to them come the arteries. The sinuses are certainly more rarely affected than either.

Hæmorrhage External to the Skull.—The hæmorrhage, it is said, is sometimes found outside the skull; so that, on removing the skin, the hæmorrhage has been seen there. This is by no means uncommon after external violence; but, when it does not arise from that source, it happens from a bone being carious, and a vessel of the "dura mater" thus becoming injured.

Effusion of a Urinous Character following Ischuria.—It is said that, in cases where apoplexy follows the suppression of urine, a great quantity of fluid has been found in the brain; and even fluid of a urinous character. Whether that is true, I will not take upon me to say; but some people have even found gin in the brain;—at least so it is said. It is stated that an old woman, who had been much addicted to drinking gin, died at the Westminster Hospital. She died with her stomach full of it; and there was a distinct smell of gin in the ventricles of the brain. It is also said, that tincture of assafœtida[c] has found its way to the ventricles; or that there has been a strong smell of it in persons who have died apoplectic.

[a] See Page 565.

[b] Volume 5; Part 2; Page 106. (Fifth Edition.)

[c] From "asa" (Hebrew), *to heal.*

An effusion has taken place into the ventricles of persons previously taking assafœtida; and it is said that there has been a strong smell of it in the brain. These things *may be*, and I suppose *have been*; but I have not seen them. Certainly, when persons have been unable to make water, and the urine has been retained, there can be no doubt that they have occasionally vomited urinous fluid, and even expectorated a fluid strongly smelling of urine. If this be the case, it is possible that such an occurrence may take place in the ventricles of the brain; but I can only say that I never saw more than one instance of apoplexy from ischuria; and in that case there was no effusion (of any kind) into the brain.

SECTION III.—CAUSES.

a. Predisposing Causes.

Hereditary and Constitutional.—The predisposition to this disease may be constitutional, or even hereditary;—an hereditary make of the head, neck, and body at large. Men who have a large thick head, are those that are usually affected; because that is not the shape for intellect. It is a *long*-headed man that is generally thought clever. Men with short necks, circular breasts, and not very tall, are certainly very liable to apoplexy. This is, of course, a constitutional make; and if it happen to be hereditary also, the predisposition to apoplexy may be said to be hereditary, as well as constitutional.

Indolence and Excess of Food.—In the next place, indolence of body and mind will predispose to it. Persons who satisfy themselves with little exercise, and little mental exertion, have more or less congestion; and at last become apoplectic. If persons sleep too much, they become more or less plethoric, and liable to become apoplectic. Food too rich and too abundant, will have the same effect. It is said that Boerhaave had a student, who took it into his head that sleep was the natural state; and he slept as hard as he could; till at last, from the want of external excitement, he fell into apoplexy.

Hypertrophy of the Brain.—Hypertrophy of the brain tends to produce this disease;—an occurrence which we might *à priori* expect. Overnourishment of the brain is likely to dispose to congestion, and to irregularity of the circulation. I once saw an instance of this kind; and only once. It occurred in a young gentleman, eleven years of age, who had a head bigger than most men;—in fact, it was too large for his body. He was remarkably clever, and was not contented with the society of other children, but associated with his father and mother. He studied many things; but more particularly political economy. He was seized one day with hemiplegia, and had double vision; and the attack was soon followed by coma. Previously he had had double vision, and pain of the opposite side to that in which hæmorrhage afterwards took place. After death, the only thing I could discover was congestion in the brain; and I fancied that the "corpus callosum" was softened. A few minute tubercles were found in the arachnoid; but nothing to cause apoplexy. His brain was far larger than it ought to have been in a child of his age; indeed, the brains of very few adults attain so large a size. In the "Dictionnaire des Sciences Medicales" (under the article "Rare Cases"), there is mentioned the case of a German, who died apoplectic at the age of thirty. He had very powerful mental faculties. His head began to grow at seven years of

age; and at thirty it was twenty-seven inches five lines in circumference. The rest of his body was not proportionate; and, like my patient, he died apoplectic.

Decline of Life.—Apoplexy is also predisposed to by the decline of life. Of those persons who die apoplectic, more than half have passed the meridian of life; with the exception of children, who die in consequence of effusion. Apoplexy occurs in children, every day, from an inflammatory state of the head, which causes more or less effusion; but apoplexy from congestion of blood, and effusion through diseased vessels, more frequently takes place after the middle period of life.

Cessation of Discharges.—It occasionally takes place from the sudden cessation of a discharge;—from the cessation of the menses, or from amenorrhœa; but not so frequently as might be imagined. The most we generally see, when women do not menstruate regularly, is headach and giddiness. The suppression of hæmorrhoidal discharge, has produced apoplexy; and the cessation of a long-continued cutaneous eruption, will do the same; and likewise metastasis, on the cessation of gout; and even, it is said, the removal of tumours.

Organic Disease of the Head.—Apoplexy is strongly predisposed to, by organic disease in the head;—in the brain, or in the membranes, or on the inner table of the bones, or in the whole substance of the bones. When there is organic disease outside the brain,—whether of the bones, or the pericranium, or the inner tables, or the "dura mater",—then a person, from the excitement going on there, is very much disposed to this disease.

Anxiety.—Anxiety of mind has a tendency to produce it. When persons are very anxious, they soon experience heaviness of the forehead; and apoplexy is soon induced.

Manner in which these Causes Act.—Many of these things act by merely giving rise to excessive fulness; and if there happen to be, in the individual who is exposed to these predisposing causes, any organic disease of the vessels or membranes of the brain, it is easy to perceive how easily the excessive load of blood there, may occasion apoplexy. When there is organic disease of the vessels, of course, it does not require a full habit, full living, a short head, and a thick neck, to induce the disease. If any of the vessels be diseased, though a person may be as thin as a lamp-post, and nearly as tall, he will be liable to apoplexy; and people wonder that a person so spare, should die of such a disease. It is so frequently the result of blood being effused through the state of the vessels, that we must expect to see this disease in thin people;—not so often as in fat persons, certainly; but very frequently. It may arise without any fulness of the vessels whatever; but simply from one vessel, or a set of vessels, being brittle, or softened, or ulcerated, or labouring under some other disease; and it will arise from mere fulness of all the vessels;—the vessels themselves being sound, but suffering more or less congestion. We may therefore expect apoplexy in two very opposite descriptions of people; and when it arises from the state of the vessels, none of these other predisposing causes are required. A person may live the most abstemious life possible; and yet the vessels may let out the blood, and the person die apoplectic;—so that no exciting cause may be required for it; nor any of those predisposing causes which I have mentioned, as operating by occasional fulness of the head.

b. Exciting Causes.

Stooping.—As to the exciting causes of the disease, they may be equally influential in producing it, whether there is mere fulness, or organic disease of the vessels. Stooping, especially if a person make an effort while doing so, is a common cause of apoplexy. If there be previously great congestion of blood, even without disease of the vessels, stooping will increase it to such a degree, that apoplexy may occur. Supposing there is brittleness of the vessels, stooping will have the same effect as if there were great congestion. So that a common exciting cause of the disease, for the most part, will produce apoplexy, whether it arises simply from an over-fulness, or from disease of the vessels; because stooping, for example, is a violent effort, which will throw a great quantity of blood on the head; and will operate by forcing the blood through, or opening the vessels.

Heat and Cold.—Exposure to a very great fire, or being in a very close apartment, are causes of the disease; and so likewise are the rays of the sun;—insolation. Cold causes stupor. When persons are exposed to intense cold, they become exceedingly heavy;—they are disposed to sleep; and it requires a strong exertion on their part, to prevent them from going to sleep. When they travel over regions of snow, and have nearly perished from cold, if they give way to sleep, and lie down, they are sure to die. Yet they will be careless; and, though their friends tell them of their danger, and entreat them not to lie down, the propensity to sleep is so great, that they cannot resist it; and the cold at last produces apoplexy. When a person falls into a sound sleep, I believe that death from cold is by no means unpleasant. Of course, it is unpleasant to be killed; but when persons are benumbed, they lie down quietly, in an apoplectic state. It is said by Portal, a French physician, that he found a rupture of a vessel in a person who had died in this state. It would appear others had observed, that cold killed merely by numbness;—taking away all excitement from every part of the body, and the brain among the rest. The late Dr. Kellie, in the first volume of the "Edinburgh Medico-Chirurgical Transactions"[a], says that he found serous effusion, and great congestion of the head, in two persons who were destroyed by cold.

Tight Bandages on the Neck.—Tight bandages round the neck, have frequently produced apoplexy, or threatened to do so;—that is, the person would have had it if they had not been loosed. It might be supposed that the tight bandage which is applied by Jack Ketch, would occasion this disease; and Sir Benjamin Brodie says that, in a person who was hanged, he saw effusion of blood. Dr. Monro, likewise, says that he found, in two cases, congestion of the scalp, and congestion within the head. But this is not always the case. Persons who are hung, do not die of apoplexy; but of a want of breath. Occasionally it has happened that apoplexy has been produced;—for Sir Benjamin Brodie (on whom we may place implicit reliance) has found not only extreme congestion, but even rupture.

Drowning.—Sometimes, great cerebral congestion has been found, after drowning; but there are several authors who deny the truth of this statement. Drs. Good, Winslow, and Currie, say that, after drowning, no congestion was found. Morgagni says that, after hanging, he found no congestion. De Haen says that, after hanging and drowning, nothing was to be found; and so says Dr. Kellie. It appears, therefore, that a person may be hanged or drowned, and no congestion or rupture take place; but, in other cases, there may be rupture. People, from drowning, hanging, suffo-

[a] Page 84.

cation, and cold, do not die necessarily of apoplexy. There *may* be apoplexy in addition; but not necessarily so. I presume that a great deal will depend on the strength of the vessels. If the vessels be very strong, they will not give way;—they will not allow great congestion to take place; but if, on the other hand, they be weak, they will allow it; or, if they be diseased, they will allow the blood to be effused.

Narcotics and Intoxication.—Narcotics will give rise to this disease. They produce various disturbances of the brain;—sometimes delirium, sometimes more or less phrenitis, and sometimes apoplexy. They cause apoplexy, by inducing compression, where there is great congestion of the head; but, independently of producing this compression of the vessels, they do harm by their peculiar narcotic power;—by destroying the vital powers of the body; just as cold will produce death, independently of congestion. Intoxication, too, will frequently produce the same effect.

Other Exciting Causes.—Among the exciting causes of the disease, we find mentioned "lying on a millstone"; but I do not suppose that any one lies down in such a situation. If it do produce death, it is by the centrifugal force driving all the blood to the head; so that apoplexy is induced.

Anger has sometimes destroyed life by apoplexy. Ischuria renalis has been also found to produce apoplexy.

Inflammation.—Inflammation and suppuration of the brain frequently produce apoplexy. The inflammation goes on to such a pitch, that apoplexy at last ensues from the congestion. Suppuration within the brain causes such a collection of pus, as to compress it; and the compression may produce apoplexy.

Depressed Bone.—The pressure occasioned by a depressed bone, likewise gives rise to apoplexy. After an injury inflicted on the head, persons are frequently brought to the hospital perfectly comatose,—in a state of apoplexy; and, when the bone is raised, they recover.

Is the Brain Compressible?—Some, however, deny that pressure will produce these effects;—at least, they deny that the brain is ever compressed. They say that the cavity of the cranium must always be full;—that if the veins be compressed, so that the blood cannot escape, so much less blood goes up to the arteries; or that, if we quicken the pulse, and increase the usual quantity of blood in the arteries, the veins contain proportionately less. Dr. Kellie, who takes this side of the question, says that he bled animals to death; and that he still found a great quantity of blood in the head;—so that the cavity must be filled. If we press more in one way, more comes out the other; or, if we endeavour to withdraw the blood, we cannot; because the cavity must be filled, and therefore we can only take away a certain portion.

All this may be true; but yet I should think there may be more blood in the head at one time, than at another. The cranium may be full; but I should think there may be different degrees of packing. A portmanteau may be filled; but it may be packed tightly, or packed loosely; and when we see that, if a person stoops, he becomes stupid and sleepy and giddy; and that all the vessels of the external part of the head are distended with blood; and when he suffers what, in a higher degree, would be apoplexy;—I cannot help thinking, that there is more blood in the head at one time, than at another. I should conceive that the cerebral substance may be pressed in a different degree. There must be a certain quantity of blood in the brain, resisting the entrance of more; but I should think that more might might be *forced* upon the brain;—so as to compress the cerebral substance, and bring it into a smaller bulk.

When the face is red and full, all the external veins turgid, and the person is labouring under evident external plethora of the head, while (at the same time) he has signs of apoplexy, after death, all the internal vessels of the head are almost sure to be found in a state of congestion; and hence, to all appearance, there is far more blood in the head at one time than at another. If a person tie his cravat tightly, he instantly has the external veins of his face filled; his eyes become red; he feels, at the same time, stupid and giddy; and if he do not loosen it soon, he is very likely to drop down. Some have denied that there can be congestion of blood in the head, from this circumstance;—that, after hanging and drowning, there has frequently no apoplexy been observed;—no congestion of blood, and no effusion; but, I presume, this will all depend on the strength of the vessels, or on the vessels not being diseased. If they be in this healthy condition, I presume they will resist an overload of blood, and not give way;—that they will not allow either rupture, or congestion of blood. It is well known that persons with hypertrophy of the left ventricle of the heart, frequently become apoplectic;—there being such a quantity of blood forced violently towards the brain. But it is said, that we every day see a quantity of blood violently driven up to the head; and yet no apoplexy is produced. I presume the reason is, that the vessels are so strong, that they will not become over-distended;—they will not give way; whereas, in other persons, they are diseased or feeble, and *do* give way; so that congestion is produced. I cannot see the force of the argument that has been adduced. I will not deny, that there may be only a certain quantity of blood in the head; but I do think that the cerebral substance may be more compressed at one time than at another;—that the contents of the cranium may be packed more closely.

Will Pressure cause Apoplexy?—Some contend, however, that we are able to say nothing about the existence of pressure; or, allowing that pressure does take place, they deny that it will produce apoplexy. Serres asserts, that actual compression does not produce apoplexy. He trephined several dogs, and then wounded the brain through the aperture,—so as to produce effusion of blood; and yet, he says, apoplexy did not occur. Whether we can depend upon his statements or not, I will not pretend to say; because some say we cannot. But if we can, I presume the reason there was no apoplexy was simply this; that if an opening were made in the cranium, the pressure would be *without* and not *within*; because the opening would allow the contents of the skull to be pushed forward. But, he says, after he had cut out a piece of bone, he closed the opening with a cork, so as to press on the brain; and no apoplexy was produced. This, however, appears to me questionable. That the brain will bear pressure, without much effect being produced,—provided it take place gradually,—is proved by Dr. Heberden's case of gradual compression; which I mentioned while describing chronic hydrocephalus.[a] Sudden pressure caused by a less quantity would, I presume, have produced apoplexy. Dr. Marshall, formerly a lecturer and anatomist in London, mentions the case of a maniac who, a few hours before death, had become rational; and he found rather more than a pint of serum in and upon the brain;—shewing what may be borne, if the part be accustomed to it gradually.

Tumours within the Head.—When there is any tumour within the head, it will act (I presume) not merely by being a source of occasional irritation, but by occupying so much space in the cranium, that the least additional

[a] See Page 557.

presence of blood upon the brain is likely to produce effects, which would not be produced if the tumour were not there. If the capacity of the cranium, for example, be at all diminished by the presence of a foreign body, of course it can less easily bear any additional quantity of blood which may be forced up; and therefore tumours may act in two ways;—first, by exciting a sudden determination of blood to the head; and, secondly, by filling up the cavity of the cranium so much, that even a little additional flow of blood cannot be borne;—there is no room for it. We sometimes see cases of persons, who have died with a tumour within the head; which produced only occasional paralysis, or occasional loss of motion; – a kind of stupor. In such a case it might be said, there was no organic disease; because the symptoms were only occasional. That I know has occurred; and, I presume, from this circumstance;—that the tumour has gradually accustomed the part to its presence; and when apoplexy and paralysis have occurred, (as they have from time to time,) it has not been from the tumour being there; but from an additional flow of blood, which could not be borne. Thus the tumour itself was not the cause of the occasional fits of apoplexy; but it was the additional congestion of blood, which could not be borne, in consequence of the presence of the tumour, or something occupying the cavity of the cranium. For it is a fact, that we sometimes see persons with considerable pressure; but as it came on slowly, the apoplexy, or paralysis, has only been occasional;—has occurred only when an additional quantity of blood has been forced to the head; which could not be borne, on account of the narrowed dimensions of the cranial cavity.

SECTION IV.—TREATMENT.

In this, as in every other instance of disease, if there be an evident exciting cause still in existence, and removeable, we should remove it.

In Cases of Depression.—Supposing it to arise from the depression of a piece of bone, that is a surgical case; and no medicine in the world can remove the symptoms, while the bone remains in that position. In all probability, it would be a proper practice to attempt the elevation of the bone. The pulse has sometimes been quite imperceptible, while the bone was depressing the brain; but immediately on the bone being elevated, it has become strong. Sir Benjamin Brodie mentions such a case.[a] He says the pulse was only 40, while the bone was pressing on the brain; but on its elevation, it instantly rose to 60.

Intoxication.—If we know that the apoplexy has arisen from any thing taken into the stomach, we should adopt proper steps to evacuate that organ;—that is to say, emetics, or mechanical means (the stomach-pump).

Treatment in Ordinary Cases.—If it be an ordinary case of apoplexy, however, the first thing to be done is to raise the person's head and shoulders, to loosen every thing about his neck, and to open a vein in the arm, or the jugular vein. As to the quantity of blood to be withdrawn, I need not say any thing; for that must depend on numerous circumstances.[b] The next thing

[a] "Medico-Chirurgical Transactions"; Volume 14; Pages 355 and 356.

[b] Dr. Marshall Hall has drawn attention to an important difference in the treatment of mere *congestion* and of actual *rupture*.—"In the former, there is extreme tolerance of loss of blood; in the latter, the system is extremely, and even dangerously, susceptible of this loss." He, therefore, attaches importance to "placing the patient in the perfectly upright posture, before the blood is allowed to flow: we must watch his countenance, and his breathing; keep our finger on his pulse; and, the moment the slightest

should be to give a full dose of purgative medine;—a drop or two of croton-oil, or a scruple of calomel. Perhaps it would be well to give a dose of calomel, whether alone or in combination; because early ptyalism, after apoplexy, often appears useful. There is effusion left, for which ptyalism is apparently useful; and it is well to lay the foundation for it, by beginning with calomel as a purgative. As it is best to open the bowels very speedily, a strong purgative injection should next be given. The state of the brain causes the heart to be more or less torpid, and likewise the alimentary canal;—giving rise to a slow pulse, and torpidity of the bowels; and a clyster of oil of turpentine (two or three ounces) answers very well. Whether it is objectionable on account of stimulating the brain, and producing vertigo, I do not know; but I am not aware that I ever saw harm arise from it. A good clyster is one of the best things;—sulphate of magnesia or an infusion of the extract of colocynth, answers very well. It is made in a moment; and may be exhibited in gruel, or barley-water. It is very useful to apply water to the head;—much more so than a blister. The head generally is hot; and ice, applied in a bladder, is exceedingly serviceable. The patient should be kept very low; and sinapisms, applied to the feet or legs, may be useful. But the great point is to raise the person; to keep him as upright as possible; to loosen every thing about the neck; to bleed freely; to give an active purgative; and instantly, without waiting for the operation of this purgative, to introduce a strong acrid injection into the rectum, and to apply ice to the head. It would be well, afterwards, to continue the calomel till the mouth is tender; and that on two accounts. First, the head is frequently hot in this disease;—it is so often an inflammatory disease; secondly, we frequently find the blood buffed and cupped [a]; and I may say, in the third place, we often find paralysis occurring; and that appears to be the result of effusion, the excess of which should be absorbed. Calomel may be useful in that respect.

Necessity of Caution in the Treatment.—Great care, however, must be taken not to carry this too far; for there can be no question that persons will sink after a time, entirely from these measures being pushed beyond their proper extent. Although we starve the patient the first few days, we must ultimately give him support. I am sure that some persons have had apoplexy, from having been bled too frequently, even locally; and from having been deprived too long of food. It is all very well in the first instance; but if the patient begin to sink, we should not continue to evacuate. It is necessary to get the mouth sore, and then to apply a blister behind the ears, and over the head; and after a time, if we please, over the *whole* of the head; but great care must be taken not to evacuate too much.

Serous and Sanguineous Apoplexy.—There was formerly a distinction drawn between *serous* and *sanguineous* apoplexy;—"serous", where it

ndication of approaching syncope takes lace, arrest the flow of blood, and place the atient recumbent." ("Principles and Practice of Medicine"; Page 256; Section 177.)

[a] According to Dr. Milne Edwards, "Cyclopædia of Anatomy and Physiogy"; Volume 1; Page 414,) the buffy coat ay appear in plethoric persons, without the xistence of inflammation. The same auor also quotes the experiments performed y M. Ratier, to prove that various circumances, altogether independent of the physiological state of the individual, may also exert a great influence on the formation of the buffy coat. Dr. Babington (in the same work, Page 420) states that the buffy coat may even be absent in the most intense inflammation; for the circulation may be so over-charged (either actually or relatively), or the nervous power so oppressed, that the requisite degree of propulsive force is not exerted by the heart and arteries; nor the vital energy, on which slow coagulation depends, imparted to the blood.

arose from effused serum; and "sanguineous", where there was great congestion of the vessels, or rupture. Taking this distinction literally, it is altogether absurd; as will immediately appear, when we consider the indications of cure. It was supposed, that when there was *sanguineous* apoplexy, we were to bleed, purge, and starve; and when it was *serous*, we were to support the patient well;—because it was a case of apoplexy from the oozing of water. That was absurd; because we may have serum where the inflammation is more or less severe;—in a case where it is quite proper to bleed, purge, starve, and apply cold. Common inflammation of the arachnoid membrane, whether it be active or not, will produce it; and, in the next place, where we have effusion of serum, there is often great congestion of blood. We may have it in both cases; and nothing is more common, when a vessel is ruptured in the head, than to find serum effused upon the brain, and outside the head. Serum, in this case,—as in its effusion in all other parts of the body,—may be the result either of weakness, of congestion, or of inflammation; and therefore we see, that no treatment of apoplexy can be founded on the presence or absence of serum, even could we tell it beforehand;—any more than an indication of practice can be drawn from serum in other parts. Serum may be effused in *peritonitis*; and yet we may have to treat the case as *active* peritonitis; or we may have to support the patient well, and to give stimuli; and the same remark applies to the brain. Hence this distinction is not founded on pathological principles. Where a person appears plethoric, we must treat him by depletion; but where he looks pale, watery, leucophlegmatic[a], and has a weak pulse, (as if the effusion were serum,) then we should not employ active depleting measures, but be exceedingly careful; and perhaps we may have to support him. There is a distinction to be drawn; not because there is serum or no serum; but because in the one case there is a state of fulness and congestion, and in the other a state of debility. It is necessary to consider the powers of the patient. In some of these cases, the patient looks as though he would be dropsical in the head; and every other part of the body is pale and white; and if an effusion of serum took place, it would be more from weakness than any thing else; yet in such persons as these, after death, we continually find congestion, and more or less organic disease, giving rise to the effusion of serum. We must depend on the state at large, and proceed on general principles; and not as to whether there may be serum or not; for we cannot tell its presence *à priori*.

After-Treatment.—After the fit is over, and the patient has recovered, it is necessary to pursue the general treatment which was adopted during the fit; only on a more moderate scale. If it be necessary to bleed copiously, to treat the case very antiphlogistically (or in a very depleting mode), of course the patient should be very abstemious in his diet, should keep an open state of his bowels, and use (though in great moderation) all those measures which are calculated to prevent a phlogistic condition from occurring. If a patient have not borne an evacuation during the disease, of course a more generous diet must be allowed;—we need not be so strict. Dr. Babington, from his extensive experience, became convinced that many persons were made to suffer exceedingly, from having antiphlogistic measures carried too far;—not only from the very outset, but afterwards. He says that he found great advantage, after a time, from the moderate exhibition of tonics.

[a] From λευκος, *white*; and φλεγμα, *phlegm*.

Apoplexy from Ischuria.—There is one kind of apoplexy in which it is necessary to give a particular remedy, or we shall be sure to lose our patient; and that is apoplexy arising from the suppression of urine. I believe, in that species of the affection, evacuants do little or no good; but that cantharides, employed both internally and externally, are the proper remedy. It is well to resort to them always; and to give a grain two or three times a day. I should not recommend the tincture; for I believe it is uncertain in its operation. I have given two or three drachms, two or three times a day, without any effect; and sometimes I have given the same quantity, and found great irritation. I do not think there is a more uncertain medicine in the Pharmacopœia, than tincture of cantharides; nor do I think there is a more certain one than the powder. One or two grains, given every night, or night and morning, will be almost sure to make the bladder perform its functions. The only experience I have had of cantharides internally, has been in cases of gleet; but it has been unsatisfactory, on account of the people to whom it was administered being out-door patients;—so that I had no great control over them; and therefore I cannot speak as to its powers. I have no experience of it in apoplexy from ischuria. I applied it in one case; but the patient died in twelve hours;—so that there was no time for it to do him good. But a gentleman told me, that he had seen it successfully exhibited in two cases. In the first case, Sir Astley Cooper suggested its employment; and, although an unfavourable prognosis had been given, the patient recovered. The second case, shortly afterwards, fell under the same gentleman's care; and he adopted the same remedy with equal success. It does appear that, in this kind of apoplexy, stimulation of the urinary organs is the proper remedy.

Increase of Apoplexy.—It is said, that apoplexy and palsy have very much increased of late years. Dr. William Heberden, the son of the author of the "Commentaries", has written a very excellent paper, upon the increase and decrease of different diseases; and he states, that the increase of apoplexy and palsy has, of late, been gradual and constant.[a] His paper was written about forty years ago.[b] Whether people drink more porter and strong malt-liquors now than formerly, I do not know. The upper orders drink less wine; but the lower orders may drink more porter. I do not know how it is to be explained; but there are double the cases now, in proportion to the population, that there were a hundred years ago. Sir Gilbert Blane mentions, that he had more apoplexy in the hospital, than in private practice; and the people who go there certainly drink more porter, than their superiors in society. I suppose porter or spirits, or both, have more tendency to produce the disease, than wine. If it were the wine which produced the disease, as that is now so much less drunk than formerly, the proportion of cases would not be what Dr. Heberden has stated.

[a] "On the Increase and Decrease of different Diseases, particularly of the Plague."

[b] In the year 1801.

CHAPTER IV.

CEREBRAL AFFECTIONS FROM REMOTE CAUSES.

INDEPENDENTLY of inflammation and congestion, a highly important series of morbid phenomena may arise; presenting many points of resemblance to cerebral inflammation and apoplexy; and resulting from peculiar affections of the general system, or of various organs. The causes of these affections may be reduced to the following heads:—1. Intestinal irritation. 2. Exhaustion from loss of blood. 3. Excessive study; shock; alcohol. 4. Chlorosis; dropsy; ischuria.

SECTION I.—CEREBRAL SYMPTOMS FROM INTESTINAL IRRITATION.

[The first of these affections consists of irritation from indigestible food, scybala, or other morbid contents of the stomach, or bowels; excited into activity by some *shock* of the system, or of the nervous system;—such as a fall or other accident, parturition, &c.

Symptoms.—The symptoms are, rigor, frequently severe heat of surface, and violent pain of the head, with intolerance of light and sound; symptoms, in a word, of the most acute encephalitis. The breath is tainted, the tongue loaded and swollen, and the secretions are morbid; but it would still be difficult to establish a distinct and confident diagnosis without the criterion afforded by the effect of blood-letting in the erect posture.

Diagnosis and Treatment.—The first step to be taken, in a doubtful case, is very slowly to administer an enema, of from three to three and a half pints of warm water; and to examine the state of the fæces, and observe the effect upon the disease, and upon the system. If there be scybala, if the symptoms be subdued, and especially if there be faintishness, the case is, indubitably, not cerebral inflammation, but intestinal irritation. If the case still remain doubtful, we must prepare the arm, open a vein, and then place the patient upright, and let the blood flow until the lips become pallid; if the case be encephalitis, an extreme quantity of blood will flow,—even thirty or forty ounces or more,—before there is any appearance of syncope; if it be intestinal irritation, syncope occurs before one fourth of that quantity of blood has left the circulating system. The importance of this distinction is immense; for the injudicious use of the lancet has, in too many instances, led to the most serious and even fatal consequences.

This affection sometimes assumes a far less acute form. I [a] recently met with such a case, which had been mistaken for encephalitis. The patient slowly but perfectly recovered from attacks of vertigo, &c., by maintaining

[a] Dr. Marshall Hall.

a regular state of the bowels, by diet, and rest; and afterwards by gentle exercise, change of air, &c [a]]

SECTION II.—CEREBRAL SYMPTOMS FROM EXHAUSTION.

Causes of Exhaustion.—[Exhaustion, in early infancy, has its origin (chiefly) in diarrhœa, or catharsis; in the later periods of infancy, in the loss of blood, with or without a relaxed or evacuated condition of the bowels. The state of diarrhœa has generally depended upon improper food, or intestinal irritation. It has very frequently succeeded to weaning, or to other changes in the diet, or to constipation. The catharsis [b] has followed the administration of an aperient medicine; which, at such a moment of disorder of the stomach and bowels, is likely to act excessively. The exhaustion from loss of blood generally follows the inappropriate or undue application of leeches, or the use of the lancet.

In the adult, exhaustion chiefly arises from loss of blood; but it may have its origin in undue lactation, leucorrhœa, &c. If the more immediate effects of exhaustion be well known, the more remote have been overlooked, or mistaken for other morbid affections. Yet, to the physician, the symptoms of reaction from loss of blood,—so similar to those of some affections of the head, and of the heart,—present subjects for his observation of the utmost moment in actual practice. The diagnosis of these cases is most important; for the prognosis and treatment alike depend upon it.

The remote effects of exhaustion, are particularly apt—from their similarity to inflammatory diseases, and from the present though transient relief afforded by the further detraction of blood—to deceive the unwary. They consist in:—1. Sickness and vomiting. 2. Excessive reaction; sometimes accompanied with delirium, mania, coma, amaurosis, or deafness. 3. The sinking state. Of these, the two last claim our special attention.

Excessive Reaction.—Excessive reaction is formed gradually; and consists, at first, in forcible beating of the pulse, of the carotids, and of the heart; and eventually, perhaps, of beating or throbbing in the scrobiculus cordis, and in the course of the aorta. This state of reaction is augmented, occasionally, by a turbulent dream, mental agitation, or bodily exertion. At other times, it is modified by a temporary faintness or syncope. There is also sometimes irregularity of the heart, and of the pulse. The respiration is apt to be frequent and hurried, and attended with alternate panting and sighing; the movement of expiration is sometimes obviously and singularly blended with a movement communicated by the beat of the heart; the patient requires the smelling-bottle, the fan, and the fresh air. The skin is sometimes hot; and there are frequently general hurry and restlessness. In this state of exhaustion, sudden dissolution has sometimes been the immediate consequence of muscular effort on the part of the patient, or of his being too suddenly raised from the recumbent into the erect position.

Its Resemblance to Arachnitis.—In the more exquisite cases of excessive reaction, the symptoms are still more strongly marked, and demand a fuller description. Sometimes it resembles arachnitis. In those cases, the beating of the temples is at length accompanied by a throbbing pain of the head, and the energies and sensibilities of the brain are morbidly augmented. Sometimes there is intolerance of light; but still more frequently intolerance

[a] "Diseases and Derangements of the Nervous System; by Marshall Hall, M.D." Page 351.

[b] From καθαιρω, *to purge.*

of noise, and of disturbance of any kind; requiring stillness to be enjoined, the knocker to be tied, and straw to be strewed along the pavement. The sleep is agitated and disturbed by fearful dreams; and the patient is liable to awake, or be awoke, in a state of great hurry of mind, sometimes almost approaching to delirium. Sometimes there is slight delirium, and occasionally even continued delirium; more frequently there are great noises in the head;—as of singing, of crackers, of a storm, or of a cataract. In some instances there are flashes of light; sometimes there is a sense of great pressure or tightness in one part of the head, or round it;—as if the skull were pressed by an iron nail, or bound by an iron hoop.

The Sinking State.—This is adopted, not to express a state of negative weakness merely,—which may continue long, and end in ultimate recovery,—but to denote a state of positive and progressive failure of the vital powers; attended by its peculiar effects, and by a set of phenomena very different from those of exhaustion with reaction.

If in reaction the energies of the system are augmented, in sinking the functions of the brain, as also of the lungs and heart, are singularly affected. The patient is no longer affected by noises as before; there is, on the contrary, a tendency to dozing; and gradually some of those effects on the muscular system which denote diminished energy of the brain supervene;—as snoring, stertor, blowing up of the cheeks in breathing, &c. Instead of the hurry and alarm on awaking observed in cases of excessive reaction, the patient, in the state of sinking, requires a moment to recollect himself, and recover his consciousness. He is perhaps affected with slight delirium, and is apt to forget the circumstances of his situation; and, inattentive to the objects around him, to fall again into a state of dozing.[a]]

a. Spurious Hydrocephalus.

History.—It is very necessary to know, that symptoms like those of acute hydrocephalus, or many of them, may occur in a state of the system, where the loss of blood, or even purging and starvation, would be fatal. I believe we are indebted for our knowledge of this state, to Dr. Marshall Hall. It was imagined (and I myself fell into the error) that Dr. Gooch was the first person who described it; but Dr. Marshall Hall wrote to me on the subject; and it appeared, on referring to his book, that the priority of discovery was due to him; and that Dr. Gooch was himself indebted to Dr. Hall for a knowledge of the fact. It is a condition of which I was not aware when I began to practise; but it is of the highest importance to be acquainted with it; because inappropriate treatment will, to a certainty, destroy life.

Symptoms.—It now and then happens, that a child becomes exceedingly drowsy, has dilatation of the pupils, perhaps squints, and may likewise experience more or less delirium;—so as to appear to be labouring under hydrocephalus. But usually, in such a state, there is no pain of the head, or it is only transient; and the skin is cool, or absolutely cold. The pulse (as in hydrocephalus, and other inflammatory diseases) is quick; but it is weak; and the face is not flushed as it is in inflammatory diseases; but is perhaps pale, or flushed only transiently. In this state, if we apply leeches, or if we purge, in all probability the patient will sink. This state will sometimes happen from the first. A child, perhaps after diarrhœa,—after something which has weakened him very much, falls into a state of torpor

[a] "Principles of Medicine; by Marshall Hall, M. D." Part 1; Chapter 7.

of the brain. It becomes heavy, stupid, and half blind. The pupils are dilated, and there is perhaps even squinting; but I do not know that the latter is common. This set of symptoms will come on, at the end of the inflammatory stage of hydrocephalus; and sometimes it is the result, as I just now remarked, of some previous disease.

Diagnosis.—[The condition of the cheeks, with regard to colour and warmth, may be considered as the *pulse* of very young infants;—indicating the degree of remaining power, or of exhaustion. In the present case, especially, there is no symptom so important,—so distinctive. It is from the condition of the cheeks, in conjunction with a due consideration of the *history*, that the diagnosis of this morbid state, and the indication of the appropriate remedies, are chiefly to be deduced. The general surface, and especially the hands and feet, also afford important sources of information, as to the condition of the nervous or vital powers. Next to these, the degree of frequency of the pulse, and the character of the breathing, are points of the greatest importance. During the stage of irritability, the breathing is quick; during that of torpor, it is slower, irregular, suspirious, and (finally) crepitous. The pulse changes in its beat;—from being full, becoming smaller; but retaining, perhaps, its former frequency. We should be especially on our guard, not to mistake the stupor, or coma, into which the state of irritability is apt to subside, for natural sleep, and for an indication of returning health. The pallor and coldness of the cheeks, the half closed eyelid, and the irregular breathing will sufficiently distinguish the two cases.[a]]

Morbid Appearances.—When children have died in this state, frequently nothing morbid has been found in the head; or the vessels of the brain have merely been found unusually serous. There may be a little effusion; but, in many instances, the vessels have been less distended with blood than usual.

Treatment.—When a child is in this condition, it is best to give it beef-tea and ammonia every three or four hours. The rapidity with which improvement takes place, is very great.

In most inflammatory diseases, a stage may come on, in which perseverance in the antiphlogistic plan is highly improper. A state of irritation comes on, in the stead of inflammation; and the treatment appropriate to the one, is most inappropriate to the other. I was recently sent for to a person who had evidently laboured under phrenitis. He had been bled, purged, and so on; but the time had arrived for discontinuing antiphlogistic treatment, and adopting the opposite plan. His pulse was 120, and feeble; there was no flushing of the face, and no redness of the eyes; but there was delirium and feebleness of pulse;—indicating that no more evacuations were necessary. So far from that, we agreed to give him a full dose of opium. He took four grains, which would have been highly injurious in the inflammatory stage; but it immediately put an end to all the symptoms. He had a quiet sleep; and awoke without delirium, and with a strong pulse. Now it is just the same in children. After hydrocephalus has lasted some time, we may judge by the pulse and paleness of the patient, that evacuations will *increase* instead of *diminishing* the mischief[b]; and it is right to be aware, that just such a

[a] "Diseases of the Nervous System; by Marshall Hall, M.D." 1841. Paragraphs 742 and 743.

[b] Of the whole number of fatal cases of diseases in infancy, a great proportion occur from this inappropriate or undue application of exhausting remedies. This observation may have a salutary effect in checking the ardour of many young practitioners; who are apt to think, that if they have only bled,

state will come on without inflammation. There may be a state of irritation and debility, without inflammation having been present;—as we shall see in the disease called "delirium tremens."

b. Apoplexia Exsanguinea.

I stated [a] that children were occasionally subject to hydrocephalus from mere exhaustion; that their pupils became dilated; that they would fall into a state of coma, and perhaps be convulsed; and that if we bled them, we should destroy life; whereas, if we gave ammonia and beef-tea, and supported them well, they generally recovered. In like manner adults will sometimes fall into a state of apoplexy from downright exhaustion; and this is called "apoplexia *exsanguinea*." Dr. Abercrombie says, that he has seen adults comatose and collapsed; the pulse not full; the lips not purple; and the face not turgid.

Symptoms.—It will be recollected that, in apoplexy, the face is turgid, and more or less livid [b]; but, in this form of the disease, the face is collapsed and pale; and, notwithstanding the pulse may be full, Dr. Abercrombie states that, in this condition, the diagnosis is to be drawn from the paleness of the face. He says, that he has seen it arise from neglected diarrhœa. Starvation might probably sometimes have the same effect. He says that he has seen the state, in an old lady, amount to a loss of memory and squinting; and he mentions one case, in which a person was regularly deaf (paralyzed in one of the senses) when in the erect posture;—when less blood goes to the brain, and more freely escapes from it; whereas, as soon as the patient lay down, the deafness ceased, and the face became flushed.

Treatment.—It is very necessary, in looking at a case of apoplexy, to ascertain whether it is of the kind we see in nineteen cases out of twenty; or whether it arises from a state of exhaustion of the brain. If it be a case of the latter description,—if the face be pale and collapsed, we have reason to believe that the patient has had causes of debility applied; and then, certainly, it would be necessary to give ammonia. Ammonia is preferable to wine; because wine might perhaps induce too great a stimulation of the brain, which would last afterwards; whereas the stimulus of ammonia is very evanescent. There will of course occur cases, in which we shall be unable to make up our minds as to what ought to be done. The same circumstance occurs in the treatment of inflammation. I have already stated [c] that, at last, we are unable to make up our minds, how far there is *irritation*, and how far *inflammation*. In such cases it is best to mix the treatment. We should evacuate as much as we can; apply blisters rather than leeches, leeches rather than cupping, and cupping rather than bleeding at the arm: and, at the same time, allow a moderate diet and ammonia. The operation of the latter very soon ceases; and, if we see that it does harm, the effect is over, and there is no serious mischief. This is the advantage of combining both plans.

and purged, and given calomel enough, they have done their duty; when, in fact, in subduing a former, they have excited a new disease; which they have not understood, and which has led to the fatal result.—"*Diseases of the Nervous System; by Marshall Hall, M.D.*" 1841. *Paragraph* 736.

[a] See Pages 578 and 579.

[b] See Page 560.

[c] See Page 140.

SECTION III.—EFFECTS OF A SHOCK, MENTAL OR PHYSICAL.

Mental Shock.—[The effect of a *mental* shock is, frequently, a state bordering on delirium, or mania. Suicide is a frequent event at such a moment. There are a sense of weight or pain about the head, and sleeplessness. There is great danger of mistaking the symptoms for mere mental affliction. We ought to *treat* it as a serious malady. The timely use of the lancet, would have prevented many an act of suicide.

A. B., aged forty, became ruined in character and fortune; and, when in the midst of his difficulties, experienced a sense of heaviness and pressure in the head, and passed sleepless nights. After several days he attempted suicide, by dividing the muscles and blood-vessels of the arm deeply. He lost a large quantity of blood, and became faint. On recovering from this state, he said to his medical friend—"Had you bled me a few days ago, I should not have done this act; had Sir Samuel Romilly been timely bled, he would still have been alive!" From this time all the symptoms subsided.

I[a] twice visited, at the distance of ten miles from town, Miss ——. She was of a chlorotic pallor; and had experienced a *heart*-rending disappointment. She was in bed; affected with a rather frequent pulse, slight delirium, alternating with equally slight coma, or dozing, a mucous rattle in the respiration, a tympanitic state of the abdomen, with the discharge of offensive fæces. In spite of every remedy, she gradually sunk, and expired. This case appears to have been the effect of a mental shock. At least, no other causes of those effects could be discovered.

Traumatic Delirium.—To the same class of affections, doubtless, belongs the nervous delirium, or "delirium traumaticum", described by Dupuytren, as following serious accidents and operations. It is characterized by sleeplessness, delirium, and jactitation; the eyes are injected; the countenance is flushed and animated; the forehead covered with profuse perspiration; the patient is insensible to the pain of his accident or operation; there is no fever or constipation. The patient may fall asleep, awake composed and rational, relapse, &c. It is a short mania of five or six days' duration; and attended by great danger. There are no distinct traces of morbid change, on examination. The brain and spinal marrow are found apparently healthy. The remedy proposed by Dupuytren is a small enema, with five or six drops of Tinctura Opii, repeated three or four times, at intervals of six hours.

This affection is frequent after attempts at suicide. The shock of an operation, not in itself extremely formidable, has proved fatal. But what is more remarkable is, that this event has frequently been foretold in the most positive terms by the patient. These facts cannot be uninteresting to the physiologist and pathologist.[b]]

SECTION IV.—DELIRIUM TREMENS.

I now proceed to speak of a disease which resembles, in many of its symptoms, inflammation of the brain; and yet, in a great number of cases, would prove fatal, if treated on the common principles applicable to phrenitis. The disease to which I allude, is called "delirium tremens";

[a] Dr. Marshall Hall.

[b] "Diseases of the Nervous System; by Marshall Hall, M.D." 1841. Pages 357 to 359.

which is rather an improper term, because the delirium cannot tremble. It would be better to say "delirium *cum tremore*"; but it has derived its name from the patient's being in a state of agitation, and being delirious. I speak of it now, because it may be readily contrasted with the delirium of phrenitis [a], arachnitis [b], and hydrocephalus acutus [c]; of which I have already spoken.

Causes.—This state of delirium with universal tremor, is rather the effect of morbid irritability than of inflammation. It is such a state as occurs in fever, when delirium exists. It is very much the same condition, as that which recurs after great loss of blood; in which there is headach, vertigo, and disturbance of the mind. It is just such a state, as frequently takes place after active inflammation of the brain. When the last stage of phrenitis has arrived, the patient will fall into a state of irritation of the brain, which resembles delirium tremens.

It is a disease which occurs in adults, and not in young subjects; except in affections which I have already mentioned as analogous to this.[d] It generally occurs, too, in adults who have been addicted to dram-drinking; —not *always*, but *generally*. It is said to have appeared sometimes after acute rheumatism, sometimes after scarlet-fever, sometimes after typhus-fever, sometimes after injuries of the head, and immediately after apoplectic and paralytic fits, and sometimes after long continued exposure to lead; but the most frequent circumstance producing the disease, is a continued habit of dram-drinking.

Symptoms.—As the disease is, for the most part, one not of *inflammation* but of *irritation*, the face is not flushed, but pale. When I described that state in infants which is frequently mistaken for arachnitis, and in which stimulants are proper, I mentioned that the face is not flushed, but pale; or that if it be flushed, it is only transiently.[e] Now in this disease the circumstances are quite analogous. The eyes are not red, and there is no intolerance of light or noise;—at least nothing worthy of being mentioned, compared with what is seen in phrenitis; and frequently there is none whatever. The tongue is generally neither dry, brown, rough, nor white,—as it is in inflammation; but is usually moist, and covered all over with a white, soft, creamy mucus. Generally there is no great heat of body; and the skin is not dry, as in most inflammations; but is covered by a profuse sticky, clammy perspiration; and sometimes this is of an offensive character. If the perspiration be clammy, of course it is a morbid secretion. It is secreted in a morbid state, or it would not be clammy; and if it be secreted morbid as to *consistency*, it may be secreted morbid as to *smell*;—so that the perspiration is not only clammy, but offensive. This is a very common occurrence. The pulse is quick;—a circumstance which may be expected under simple *irritation*, as well as under *inflammation*; and at last it becomes very rapid; but it is neither full nor hard.

Approach of Delirium.—At length, as in other diseases, the pulse will become fluttering;—what is called, by some writers, "pulsus *vermicularis*";—like the undulation of a worm. There is constant watchfulness in the disease;—the patient can get no sleep; and there is constant delirious talking. He is constantly endeavouring to get out of bed, and out of the room; but we may easily induce him to lie down in bed, or lead him back to it, if he have escaped. There are no violent efforts in the disease;—no such efforts as are seen in "delirium *ferox*"; but he is ever-

[a] See Page 524.
[b] See Page 525.
[c] See Page 549.
[d] See Page 580.
[e] See Page 578.

lastingly chattering, and everlastingly restless; so that he will go on talking, and trying to get out of bed. He will sit up too in bed;—constantly moving his hands and arms backwards and forwards, but not violently; and then, in the midst of all this, he tries to leave his bed. The delirium generally respects imagined wrongs; and an imagined unfortunate state of private affairs. He fancies that his affairs are in a dilapidated state; and that different persons are endeavouring to injure him. There is this extraordinary extravagance about imagined wrongs, and deranged affairs, rather than any preposterous hallucination. There is, of course, great anxiety occasioned by the patient dwelling on these topics. The attention of the patient may be excited to any subject, for a moment; but, a moment afterwards, he has forgotten what the subject was. His ideas roll off again to some other matter; and he forgets what he had been talking about. There is no spite,—no malice in this disease; the patient does not attempt to injure those around him. The whole body is in a state of tremor; and the tongue among other parts. There is great debility, with loss of appetite. There is likewise a catching of the tendons (called "subsultus tendinum"); and a picking of the bed-clothes. It is common, in cerebral affections attended with delirium [a], for a person to be catching at something which he imagines to be before him; and now and then there is hiccup.

Premonitory Symptoms.—The attack is sometimes very slow, and sometimes very sudden. If it come on slowly, there is at first anorexia, loss of appetite, and want of sleep at night; besides which, the patient is restless during the whole of the day;—fidgety, and plaguing people about him with his own matters. The eye, at the same time, is observed to be dull.

Stages of the Disease.—[Most writers on this subject, have adopted Dr. Blake's division of the disease into three stages;—as being best calculated to obviate the obscurity and confusion in which its history was formerly involved, and to direct us to our mode of treatment. The first stage is characterized by general debility, anxiety of countenance, depression of spirits, a slow pulse (frequently as low as forty-four in a minute), interrupted slumbers, cramp in the extremities, vertigo, nausea, and occasional vomiting. By timely and judicious treatment, its further progress may be arrested; and, by subsequent prudence on the part of the patient, its recurrence may be prevented. Generally, however, after a shorter or longer period,—according to the constitution, age, and previous habits of the patient,—it is succeeded by the second stage, or that of delirium; the symptoms of which have been already described.[b] Either these symptoms increase in violence; and others (which very nearly resemble those of the last stage of typhus) supervening, the patient dies suddenly in a convulsion; or the long-continued delirium—with subsultus tendinum, picking of the bed-clothes, &c.—is succeeded by a short interval of quietude, and he expires without a struggle; or, after two or three days, or (it may be) a week, yawning and drowsiness come on, and are followed by sleep; which is generally profound and of long duration;—lasting from six to twelve or eighteen hours. The patient wakes collected, and greatly refreshed; and his recovery may be looked upon as almost certain.[c]]

Diagnosis.—The diagnosis of the disease, therefore, appears to be made out from the weakness of the pulse; the want of violence in the patient; the want of a flushing in the face, and redness of the eyes; the want of

[a] From "deliro", *to rave.*
[b] See Page 582.
[c] "Cyclopædia of Practical Medicine"; Volume 1; Page 511.

furious delirium; the want of sleep; the circumstance of the patient being in a state of tremor of the whole body; with a tongue not dry, but covered with a creamy mucus; with a skin not dry, but sweating profusely; the circumstance of the patient talking incessantly about his own affairs,—about some imagined distress; his attempting to get out of bed; and his being everlastingly restless, but easily managed and laid down, or brought back to bed.

Prognosis.—[Some difficulty will be experienced in forming a just prognosis in this disease;—it being so very insidious in its effects. In giving it we must, of course, be guided by the constitution and habits of the patient; as well as by the violence of the symptoms with which he is affected. In a worn-out and diseased habit, much addicted to the abuse of spirituous liquors or diffusible stimuli of any sort, and one that has, perhaps, suffered frequent attacks of this disease, more is to be feared; as, in such cases, the indirect debility (or exhaustion) may be such, as to require an effort too great for the worn-out nervous system to support, in its endeavours to restore order. On the contrary, in a young and healthy subject, this disease is seldom fatal when properly treated; but, in either case, we should be considerably assisted in forming our opinion, by attention to the favourable or unfavourable symptoms already detailed.[a]

The state of the pulse, though not always an infallible guide in disease, has been to me a comparatively sure one in this complaint; as, when its frequency did not exceed one hundred strokes in a minute, I looked on the patient (generally speaking) as safe; but, on the contrary, when (from its rapidity and the tremor of the hands) it could scarcely be counted, I considered him in imminent danger.[b]]

Treatment: Opium.—The remedy for the disease is opium, in full and repeated doses. One or two grains will not be sufficient. It is necessary to give from three to five grains; and to repeat these doses according to circumstances. In some cases, it is necessary to give five grains every six or eight hours; and this plan must be continued till sleep is procured. Three grains would be a proper dose to begin with; and, while the patient continues well, it need only be given in small doses; but full doses must be resumed when the symptoms return. Dr. Sutton[c] says, he learned the practice in Kent; where there is a great deal of the affection;—on account of the people being so addicted to dram-drinking. Smuggling is carried on to a great extent, on the east coast of Kent; and the people therefore drink to great excess; and delirium tremens consequently prevails extensively. He found eminent practitioners adopting two different modes of treatment;—the one antiphlogistic, and the other narcotic; and he soon saw the superiority of the latter.

I was sent for to a case, which had been phrenitis, and properly treated as such; but it afterwards became delirium tremens. The patient's pulse was rapid and soft; his tongue not dry, and his body not hot; but there were delirium and tremor. Four grains of opium were sufficient to send him to sleep; and he awoke almost well.

This treatment with opium, which requires to be backed by good nourishment, is the same that should be adopted after profuse hæmorrhage, and after the spurious form of hydrocephalus, if I may use the expression;—

[a] See Pages 582 and 583.

[b] "A Practical Treatise on Delirium Tremens; by Andrew Blake, M.D." Pages 40 to 42. (First Edition.)

[c] "Tracts on Delirium Tremens, Peritonitis, and some other Internal Inflammatory Affections; and on Gout; by Thomas Sutton, M.D." This work is short and excellent; and it will be worth the while of every gentleman to read it.

that state of the system, which resembles hydrocephalus in appearance only.[a] It is also the treatment we should adopt in delirium mitius; and wherever there is great irritation of the brain with debility.

Recovery from this disease, under the opiate treatment, is very frequent; whereas, under any other, patients continually die. However, the affection will cease spontaneously, like almost any other complaint. It lasts, in general, from three days to a week; and patients may then sink gradually, or pretty suddenly; or, at the end of that time, they may recover; but it is rare. Now and then, it has been known to be followed by apoplexy or mania. I recollect seeing a case of this description, which terminated in complete mania. If the disease yield under the use of opium, the opium may be continued twice a day, for some little time, and then relinquished slowly;—just as the symptoms of the disease decline.

Ptyalism, Stimulants, &c.—Some writers have recommended a gentle ptyalism to be produced; and some, notwithstanding the profuse sweat, have advised cold affusion. I have no experience of either of these modes. Good food undoubtedly is necessary; and sometimes it is found requisite to indulge the patient with drams. In all cases where patients have acquired bad habits, they must be indulged, whenever a great demand is made upon the system,—as after an operation or an accident. The system has become accustomed to drams; and without them it cannot conduct its affairs; and we must allow them, or any thing else that has become a bad habit. However, good food is generally necessary;—beef-tea and milk. Slops the patient cannot take.

Complicated with Inflammation.—Notwithstanding, however, that this is the frequent and most common character of the disease, the disease is not always of this nature. We may have patients with this mild state of delirium, easily led back to bed, easily put down in bed, and trembling from head to foot; with the tongue in a state of tremor too; and yet inflammation may be present;—requiring to be treated as we would treat phrenitis. In such a case as this, we find sufficient signs to point out that it is a disease, not of irritation merely, but of inflammation in some degree. The patient will be more or less flushed; his pulse more or less full and firm; and the delirium will be rather violent. I have seen cases deserving to be called "delirium tremens", in which the patient was trembling, talking about his own affairs, believing that he was an injured person, easily led back to bed, with a moist skin and a moist tongue; and yet this disease was not benefited by opium, and was not cured till bleeding and starvation were had recourse to. It is therefore necessary to remember, that we are not to prescribe for a name, but for the condition of the patient. There may be a pulse that will justify us, if not in bleeding, in purging;—at any rate, in abstaining from opium. Antiphlogistic[b] treatment is sometimes required in this disease; but usually it is only required in moderation; and there may be cases where it is perfectly right to employ moderate antiphlogistic treatment, and to give opium also. We may administer opium; but it will be fruitless, unless we adopt some antiphlogistic measures. We must keep the head cool; and ice will effect this purpose best. Leeches may also be applied. It is said by Dr. Latham, whose experience must be greater than mine (for I only see cases now and then), that blisters are always bad in this disease; and he says that, in decided cases of the affection,—although it may have come on after apoplexy,—opium is equally useful;—provided it is a proper case for opium. The circumstance of the affection coming on

[a] See Page 578.

[b] From *αντι, against*; and *φλιγω, to burn.*

after apoplexy, does not prevent opium from being equally proper;—that is, if the delirium do not arise from *inflammation*, but from mere *irritation*. After inflammation of any organ whatever, when we have put antiphlogistic treatment in force, opium is proper. I mentioned [a], in speaking of inflammation, that when we have reduced the powers of the patient, and mastered the disease, opium answers a good purpose; because a state of irritation is likely to come on; but if we gave it before, it would be likely to do harm. This disease has nothing peculiar in it; it is merely an instance of a general state of irritation. Opium is found useful in irritation of almost all the various organs of the body; provided that no inflammation exists; or that any which does exist, be removed by proper treatment, before administering the opium.

Morbid Appearances.—It is said that after death, a little congestion may be found in the head; and sometimes a slight effusion.

SECTION V.—CEREBRAL SYMPTOMS FROM CHLOROSIS, DROPSY, AND ISCHURIA.

[Besides those remote causes already mentioned, symptoms of encephalic disturbance may arise from the presence of various other diseases.

Chlorosis.—The influence of that anæmial state, which occurs in chlorosis, upon the encephalon, well deserves our attention. Dr. M. Hall mentions a case which was characterized by the presence "of mild delirium, succeeded by slight coma, which was intermittent in its character; the respiration became momentarily suspended, and the inspiration sudden and sometimes *catching*; the abdomen tympanitic, with the escape of much flatus; the pulse 130 or 140, full and throbbing. On examination, there was an effusion of opaque lymph under the arachnoid, at the summit and base of the brain; together with an effusion of serum into each ventricle.

"This case is important in every point of view. It is important with regard to the nature of the disease of which it is an example;—demonstrating, as it does, the tendency of that disease to induce, not merely external dropsy, but effusion under the arachnoid, into the pleura, and into the pulmonary cellular membrane, &c. It is important, too, as an unequivocal representation of the disposition to such organic changes, in cases of bloodlessness and exhaustion. It is also important as establishing the fact, that not only serous effusion, but the deposition of coagulable lymph, may take place, without inflammatory action, in similar circumstances; and that, consequently, such deposit of lymph is no proof of inflammation.

Dropsy.—"In the midst of dropsy, the patient is not unfrequently attacked with symptoms denoting a cerebral or true spinal affection. There are delirium, or coma, or convulsions; apoplexy, hæmorrhage, hemiplegia; or meningitis.

"I [b] have particularly noticed such an affection in children, in exanthematous dropsy. Dr. Wells mentions this affection.[c] Dr. Bright gives such a case [d]; where, on examination, 'a slight serous effusion under the arachnoid' was found.

Ischuria.—"The next disease to which I [b] must refer, as intimately con-

[a] See Page 137.
[b] Dr. Marshall Hall.
[c] "Transactions of a Society for Promoting Medical and Surgical Knowledge"; Volume 3; Page 177.
[d] "Medical Reports"; Volume 1; Page 97.

nected with the brain, is ischuria, or suppression of urine; to which may be added other morbid conditions of this secretion, besides that marked by the presence of albumen. Dr. Prout, Dr. Abercrombie, and Dr. Wilson, have lately treated this subject.

There is frequently considerable disease of the kidneys. The suppression may be partial, or complete; it leads to fever, thirst, a urinous smell of the perspiration and taste in the mouth, vomiting, hiccup, delirium, coma, convulsions."[a]]

[a] "Diseases of the Nervous System; by Marshall Hall, M.D." 1841. Pages 355 and 356.

CHAPTER V.

TUMOURS IN THE BRAIN.

I MENTIONED[a] that pus, when formed, might be found either in a cyst or diffused; that sometimes the surrounding part is in a state of irritation, and sometimes perfectly healthy; and that sometimes, by the presence of pus, the surrounding parts become diseased.

Scrofulous Tubercles.—But, besides this, we frequently have tumours of a scrofulous nature, in the brain and nerves. These occur most frequently in infancy; but they are not so often found in very young infants, as in those a little older. They are so much more frequent in infants than adults, that even in phthisical adults we seldom see them. They are most usually observed in the hemispheres of the brain; and they are found more frequently in the cervical, than in other portions of the spinal marrow. I recollect a case of paralysis of the lower extremities, in which a scrofulous tumour was found in the cervical region of the spinal marrow. It is a constant observation, that scrofulous tumours of this kind, are found more frequently in that situation, than in any other. They frequently appear to have originated, both in the head and spinal marrow, in the "pia mater"; which corresponds with the cellular membrane in other parts of the body. They are not numerous in the nervous system; for it is common to find but one. Like the tubercles of other parts, they are of all sizes; and they agree with them in another respect;—they are sometimes inclosed in a cyst, and sometimes they have none. I have seen many preparations exhibiting a large mass of scrofulous deposit in the cerebellum. There was in Bethlehem Hospital an idiot, who laboured under St. Vitus's dance. He was also addicted to the vice of masturbation; and in his brain there was this appearance;—a scrofulous deposition in the cerebellum.

The symptoms of a scrofulous tumour will be inflammation, paralysis[b], and convulsions.[c] The nature of the substance deposited can make no difference. If it produce irritation, we may have convulsions of various kinds;—epilepsy, St. Vitus's dance, and so on;—any convulsions, or spasmodic diseases; and any sort of paralytic affection; together with pain in the head, delirium, and symptoms indicating inflammation.

Scirrhous and Osseous Tumours.—We sometimes find *scirrhous* tumours in the head; and they are sometimes enormously large;—so as to occupy the greater part of the hemisphere. They have also been seen to occupy the entire cerebellum. Sometimes, in the membranes, they are of an exceedingly hard character;—having undergone a cartilaginous, or fibro-cartilaginous change. Sometimes this transformation proceeds even to the formation of bone;—so that bony tumours are found within the head, within the brain, and upon the membranes; and there are likewise bony tumours in the cerebellum. We know that it is common to find plates of bone along the longitudinal sinus; and sometimes a spicula of bone (an exostosis) has been seen. The symptoms of all these tumours are the same.

[a] See Pages 531 and 532.

[b] From παραλυω, *to weaken.*

[c] From "convello", *to pull together.*

Encephaloid Tumours.—Occasionally we have *encephaloid* tumours in the brain;—a deposition of new matter, which is not seen in the healthy body; and which, being *like* brain though different in its nature, has been called "encephaloid."[a] Very frequently, hæmorrhage takes place from it;—so that it becomes a bloody tumour; and used to be called "fungus *hæmatodes*." This most frequently occurs in young subjects. It was supposed to be the cancer of young subjects. It is called by Dr. Hooper "hæmatoma."[b] When cut into, it (like the brain) is soft and white; and in some parts it is red.

Melanosis.—Sometimes we may have that black deposit in the brain, which is called "melanosis."[c] This is not a malignant disease;—doing no harm except, mechanically, by its bulk; but it frequently co-exists with scirrhus, and with encephaloid disease.

Scirrhous tumours (that is to say, fibrous formations, transformations, and ossifications) are found much more frequently in the membranes, than in the brain itself; but encephaloid, melanotic, and scrofulous deposits, are found most frequently in the brain.

Encysted Tumours.—Encysted tumours, of all kinds, are found in the head, and spinal canal. Sometimes these common encysted tumours, or serous cysts (called "hydatids" in common medical language, though they are not so), are found in the "plexus choroides"; and they are just the same on either side. Small cysts are frequently seen in the membranes, as well as in the "plexus choroides"; and sometimes they are found in the substance of the brain itself. Dr. Hooper has given some very admirable representations of these cysts.

Hydatids.—Besides these encysted tumours, real hydatids are occasionally found in the substance of the brain, as well as in the spinal marrow; and on the exterior of these parasitical animals we occasionally find an appendage, approaching to a tail. These animals are also frequently found in the brute creation. The contents of the serous cysts (not hydatids) are very various. Like the contents of serous cysts in other parts of the body, they are sometimes clear liquid, sometimes soft pultaceous substance, and sometimes blood.

Obscurity of the Symptoms during Life.—No one can tell beforehand, the existence of any of these things. Some of the diseases are present, of which I formerly spoke;—such as delirium[d], convulsions[e], paralysis[f], or pains in the head[g]; sensations of coldness and of heat;—all sorts of uneasy sensations; and we suspect, from the continuance of these symptoms, that there must be organic disease. When we find paralysis, we suppose that organic disease is coming on; but it is almost impossible to say what it is. If we see organic disease in another part of the body, ("fungus hematodes in the extremities", for instance,) and the patient then becomes paralytic, and has convulsions,—we may suppose that the same disease which has taken place externally, is coming on in the head; but these symptoms will only enable us to say, that we *presume* there is organic disease.

All these things (scirrhus, encephaloid matter, melanosis, and scrofulous formations) which occur in the head and in the spinal canal, are also frequently found in the distant nerves; where they cause only *partial* palsy.

[a] From ενκεφαλον, *the brain*; and ειδος, *likeness*.
[b] From αιμα—αιματος, *blood*.
[c] From μελας, *black*.
[d] See Page 519.
[e] See Page 562.
[f] See Page 563.
[g] See Page 526.

CHAPTER VI.

AFFECTIONS OF THE INTELLECT.

Mental Functions depend on the Size of the Brain.—Having spoken of the diseases occurring in the brain, I now proceed to speak of those original aberrations of formation which are occasionally discovered. It is well known, that the nervous system is more complicated in the series of animals, as we rise from those which display the least mental functions, till we arrive at man, who displays the very highest intellectual faculties. The lower the animal is, the smaller is the brain; and in the very lowest we have nothing that corresponds to brain; but where there is mind, there must be something to direct the functions;—to experience sensation, there must be an organ. Accordingly, it is universally allowed, that the nervous system receives additions, in proportion as we ascend in the scale of being.

In the ninety-fourth number of the "Edinburgh Review"[a], which at first was disposed to laugh at this as nonsense, we find the following remarks:—"As we ascend the scale, we are enabled to associate every faculty which gives superiority, with some addition to the nervous mass; even from the smallest indications of sensation and will, up to the highest degree of sensibility, judgment, and expression.—We discern a line of ganglions; then a spinal marrow; a cerebellum is then added; and, lastly, a brain. The latter is observed to be improved in structure, and (with reference to the spinal marrow and nerves) augmented in volume, more and more, until we reach the human brain;—each addition being marked by some addition or amplification of the powers of the animal; until, in man, we behold it possessing some parts of which animals are destitute, and wanting none which theirs possess." It may therefore be supposed, that if certain parts of the brain be deficient, the mind will, in a correspondent manner, be defective; and this, accordingly, is the case. I will first enumerate, as morbid anatomists do, the deficiencies which are found in the brain;—not referring at all to phrenology; but taking up the subject as it is treated by morbid anatomists.

SECTION I.—MALFORMATIONS OF THE BRAIN.

Deficiency of the Convolutions.—In the first place it is found, in the higher beings who have a deficiency of the cerebral mass in any respect, that the convolutions are too small, or that there are too few of them on one or both sides. It is well known, of course, that the convolutions give a great extent of surface to the brain;—just as the "valvulæ conniventes" of the intestines, give an increase of surface to the interior of that canal; so that if there be fewer convolutions than usual, there must be so much less external part of the brain. Thus we find occasionally, in human beings, that there are too few convolutions on one or both sides; or we find them too small. Occasionally, one or two convolutions, usually found, have been entirely absent.

[a] Volume 47; Pages 442 and 443. (May, 1828.)

Deficiency of the Hemispheres.—Secondly, all the upper parts of the emispheres, down to the vault of the ventricles, have been found to be bsent; so that the ventricles lie entirely open, or are only covered by a erous membrane;—that is to say, in all probability, by the arachnoid coat hich lines them. Sometimes one lobe of the brain has been absolutely anting; and sometimes one has been only too small.

Deficiency of the Thalami, and Corpora Striata.—Thirdly, the "thalami ervorum opticorum", and the "corpora striata", on one side or both, have een found too small, or have been absolutely wanting; or their place has een supplied by a cyst; though sometimes it has not. A deficiency is ometimes seen in the grey substance of the brain; and sometimes in the *hite* substance. If the hemispheres be wanting, there is nothing beyond ne "crura cerebri", except a few scattered fibres;—such as are seen in ne fœtus before the hemispheres are formed; and, indeed, there are nen no central white parts.

Deficiency of the Medullary Matter.—Fourthly, the central white parts e found, sometimes, in a state of deficient development. Occasionally the corpus callosum" is a mere membrane; and it has been found absolutely anting, in an idiot thirty years of age. In some brutes (for instance, rds and reptiles) the same is observed naturally. There is no "corpus llosum", nor any fornix; and therefore such a brain as we have men-oned, resembles the brain of some brutes.

When there is this smallness or deficiency of certain parts, other parts e not naturally so developed in man as they are in brutes. They appear rger in such a human being, but it is merely by comparison; and it is und that the parts are larger in brutes. They appear larger, if the other arts be wanting; but it is merely a deception. We never find the tubercula quadrigemina" a hollow tube, as in birds;—we never find the urth ventricle so large as in some brutes. The middle lobes of the erebrum, though naturally smaller in brutes than in man, are in this case st as large as those in man.

Deficiency of the Cerebellum.—The cerebellum is sometimes deficient. may be small, or the medullary centre may be small, or the lobes may small;—they have been seen to be a mere sac. This is observed in me brutes; and sometimes in the human embryo. The reason of this traordinary formation is, that development has ceased, in most instances, a certain period. We know that the brain, in the human body, is dif-rent at first from what it is at last; and occasionally the development of stops; and, as the adult person grows up, we see that it is totally different om what it is in other beings. When this is the case, the cerebellum is defective as to be a mere sac; the "tuberculum annulare" is wanting, ough the middle lobe of the brain is present; because the "tuberculum nnulare" is found to be in proportion to the size of the cerebellum. here there is no cerebellum, still the "corpora quadrigemina" may ist; because they have a relation, not to the cerebellum, but to the inal marrow. As to the pineal gland, we find that in all formations of ie brain.

Absence of the Spinal Marrow.—The cerebrum and cerebellum may be sent, although there is the spinal marrow, and the "medulla oblongata"; t if there be no spinal marrow, it is found that there is neither cerebrum, r cerebellum, nor "medulla oblongata." As to the spinal marrow itself, may be entirely absent, and sometimes it is found divided, and it is said at when it is divided into two, the brain is always absent. Sometimes it only channelled down the centre; and, when this is the case, there are

frequently other malformations;—such as a want of brain, or a want of bone in the spine. When there is a channel, it is found to arise from the want of the cortical substance of the spinal marrow; and the channel seems continued all the way up to the fourth ventricle. The division, or the channel, may be large or small; and it may not run the whole extent. The channel itself is found at all ages. Two instances of maniacs are recorded, in one of which two central canals were observed in the spinal marrow; and in another only one. Many brutes have this central canal. Sometimes the spinal marrow is not wanting, but is very small; and sometimes the smallness is local;—occurring only at one spot; just as smallness occurs, sometimes, only in one part of the brain.

Does not Influence the Nerves.—It does not follow that the nerves should correspond to this deficiency. There may be a deficiency of the nerves, when the brain is wanting; and a deficiency, too, when the *spinal marrow* is wanting; but occasionally the nerves are found perfect, although the brain and spinal marrow are found wanting. There they are, ready for action; but they want the brain and spinal marrow to put them in motion. When there is this deficiency in the nervous system, the corresponding parts of the body are sometimes small, and likewise atrophied; yet occasionally the body is perfectly sound,—in all other respects well developed,—even where this deficiency of the nervous system exists; except that the *heart* is never found where there is no *head*. Serres says that *he* has found a heart where there was no head; but nobody else ever did.

Where there is no head, I believe the *lungs* are never found; but, notwithstanding there may be no head, there is always some rudiment of the *alimentary canal*; and for this simple reason;—it is formed first.

Causes of these Deficiencies.—The causes of all these wants (smallnesses, and deficiencies) in the nervous system are, first, original defective power; the parts are not developed, through some deficiency in the formative power, independently of all external circumstances. There is a want of power in particular rudiments of the embryo, to develop the various parts. Secondly, they are wanting (I believe) through some previous irritation. They have existed; but some irritation has also existed, which has wasted them, or arrested their progress. Thirdly, pressure (we know) will cause atrophy in future life; and so it will occasionally prevent the development of parts in the fœtus.

Corresponding Deficiency of Intellect.—If the brain be the organ of mind, which I suppose no one will doubt at the present day, it follows that this deficient development must be attended, in some way or other, by a correspondent deficiency in the mind. If the brain be altogether wanting, there can be no mind at all; and, accordingly, we continually find fœtuses formed without any head; and, of course, they cannot manifest mind. But some are born, and live some days, with merely a little brain (if we may call it brain at all) about the "tuberculum annulare"; and they will cry, and suck, but do no more; and presently they die. Some (who have just sufficient brain to eat and drink, breathe and grunt) live to be two or three years of age; while others, with a little more brain, will never be able to talk; but they will laugh, cry, be pleased by certain external objects, and displeased with others. Some, again, with more brain, are able to go about; and may be taught to do certain things mechanically, as it were; but they never can exercise judgment. They may be brought to go to bed at a certain time, to get up at a certain time, and to eat at a certain time; but they never go beyond that. Others have sufficient brain to perform the lower offices of life, but not to perform any duties that

argue the least intellect; and some, who have still more, can perform the offices of life, but are known in the world as "innocents";—very weak persons. So we go on, till we come to fair average people; and we pass them, and come to very intelligent characters.

However, these intellectual varieties do not depend upon the development of the *whole* of the head. It is found, unquestionably, that they depend upon the development of the anterior part; for many of these weak people have heads sufficiently large in every part except the front. On the other hand, persons with a very small development of all the parts of the brain except the front, may be sufficiently clever persons. These are undoubted facts; and whenever we see a deficient development of the anterior part of the brain, and (necessarily) of the anterior part of the head, it may be taken for granted, that the individual can only manifest a very limited display of intellect.

SECTION II.—IDIOCY.

Under the term "unsoundness of intellect", are comprised idiocy and insanity. By "idiocy", or "idiotism", is meant the absence (or rather the deficiency) of intellect;—a deficiency amounting to such a degree, as to disqualify an individual for the common offices of life. Generally speaking, a madman has a *wrong* opinion, or a *wrong* feeling; but an idiot may be generally said to have *none*. The madman is *wrong*; but the idiot is *defective*.

Legal Definition.—According to our law, "the individual, in order to be constituted an idiot, must be unable to number to twenty, or to tell his age, or to answer any common question; by which it may plainly appear, that the person has not reason sufficient to discern what is for his advantage or disadvantage." To quote again from the same work (Burn's "Ecclesiastical Law"),—"That man is not an idiot, who has any glimmering of reason; so that he can tell his age, know his parents, or such like common matters."

Not Referrible to the External or Internal Senses.—This deficiency of intellect, does not refer to any deficiency of the *external senses*. Idiots can often hear, see, taste, feel, and smell, just as well as other people. Neither does it at all refer to what phrenologists call "the *knowing faculties*"; by which a person judges of music, colours, distance, size, or number, and can recollect words. An idiot may do all these things;—may understand music to a certain extent; may distinguish colours very well; and also size, distance, and numbers; but he may be a complete fool for all that. Many idiots are defective in these respects. Very great idiots know nothing at all; they can merely eat, drink, and slumber. Many persons who can count above twenty are idiots,—notwithstanding what the law says; and medical men would declare many persons to be idiots, although they could count more than a hundred. Some idiots take a great delight in music. I do not know that they can ever be great musicians; but they know what music is;—they understand it; and some sing very well. Some will sketch, likewise, exceedingly well; and some have an excellent memory of words; so that they will remember long passages.

Spurzheim saw, at Hamburgh, a young man, the anterior part of whose brain was favourably developed; but whose forehead, above that part, was scarcely an inch in height; and in whom the movements of the superior

parts of the brain were consequently impeded; and he had only the functions of the inferior anterior parts. Now this individual recollected names, numbers, and historical facts; and repeated them all in a mechanical way; —proving that he had a much better memory than many acute men; but the functions of comparison, penetration, and sagacity, were utterly wanting. Spurzheim likewise says that he saw, at a poor-house, a boy who excelled in verbal memory; but as to *judgment* he was an idiot. Dr. Roberts, he says, shewed him an idiot, who repeated whole passages from the bible;—simply from having heard them read. He adds, that he saw an idiotic child, who sang several airs; and if others began to sing, she accompanied them in harmony. It is very possible, therefore, for an idiot to have a pretty tolerable share of those particular faculties, by which a person understands distance, knows colours, can recollect numbers, calculates, distinguishes one object from another, and so on. Neither does the deficiency of *these* things constitute a person an idiot; for many very clever persons are deficient in these particulars. Many clever persons cannot tell red from green: and many clever persons cannot tell "God save the king", from "Rule Britannia." Others, again, can never be made to calculate; and some persons can scarcely keep their own accounts, though otherwise they are reflecting and very clear-headed persons. On the other hand, a person may be an idiot, though he *has* these faculties. An idiot may have them; but their absence does not constitute a man an idiot.

Varieties of Idiocy.—There is every degree of deficient intellect;—from the *slightest* to the most *perfect* idiotism;—from one in which an individual merely eats, drinks, discharges his fæces and urine at all times and in all places, slobbers, and grunts; up to that in which a person is merely called "imbecile",—merely (perhaps) "a little soft." All these varieties are seen in life. Such a degree as makes a man "soft", but will not qualify him to have the legal privileges of an idiot, is pourtrayed by Shakspere, in the "Twelfth Night", and the "Merry Wives of Windsor." We cannot have a better description of an idiotic, or weak person, than is there given. Sir Andrew Ague-cheek, in the "Twelfth Night", is a very fine illustration of idiocy. He says—"Methinks, sometimes, I have no more wit than a Christian, or an ordinary man has; but I am a great eater of beef, and I believe that does harm to my wit. I would I had bestowed that time on the tongues, that I have on fencing, dancing, and bear-baiting. O, had I but followed the arts!"[a] Then, in the "Merry Wives of Windsor", an equally sagacious individual, in the character of Slender, says—"Though I cannot remember what I did when you made me drunk, yet I am not altogether an ass. I'll ne'er be drunk whilst I live again, but in honest, civil, godly company, for this trick. If I be drunk, I'll be drunk with those that have the fear of God; and not with drunken knaves."[b] These are two illustrations of individuals, who were weak enough to be below other people; and yet not so weak as to be called downright idiots.

As idiotism (which is, more or less, a deficiency of intellect) varies, so insanity, being a disturbance of the mind, must have infinite varieties. Many faculties of the mind may not be disturbed at all, and others may be disturbed in various proportions; therefore the varieties of insanity can never be perfectly described. No two sane persons are alike in character, any more than in features; and idiots vary in the same way. Many may

[a] Act 1; Scene 3. [b] Act 1; Scene 1.

be idiots to the same degree; but there are various other parts of their character which do not correspond. For example:—some have *one* of the faculties of which I have been speaking, and which phrenologists call "the *knowing* faculties" (such as music), very strong; and others will have *another* faculty very strong; and all may have them in various degrees. So, again, some idiots will have one *propensity*,—one *feeling*, very strong; while others will have a *different* propensity or feeling very strong, and some will have several;—so that they vary in their character (to say nothing of idiotism) just like the rest of the world.

Generally conjoined to other Deficiencies.—Although the deficiency of any of these knowing faculties, and the deficiency of any feeling (such as good-will towards mankind, revenge, passion, lust, and so on), does not constitute idiotism, yet if the anterior superior part of the brain be so defective as to constitute the individual an idiot, there is seldom so great a defect in that part of the brain, without there being a good deal wrong in other parts. We never find an exceeding degree of monstrosity, without finding minor degrees. When a fœtus is formed without a heart, there are generally supernumerary fingers and toes. Wherever there is a *great* monstrosity of body, there is almost always a *minor* monstrosity; and so when the head is defective in *one* part, to such a degree as to constitute idiocy, there is generally more or less defect in *other* parts. Thus it is very common to see an idiot with these various *knowing* faculties defective, as well as those which constitute him an idiot; and it is very common for him to have certain propensities deficient, or some in excess. There are generally other parts of the brain wrong; although the erroneous state of other parts does not constitute the disease.

Moral Qualities of Idiots.—Some idiots, in conformity with all that I have been saying, are exceedingly gentle and good-natured. They never do any harm; and do every thing that they are bid. Some, on the other hand, are very passionate;—never can be trusted; and if we excite their feelings into violent passion, they will take any thing they can procure, and commit murder, if possible. Some are exceedingly mischievous and sly, without being passionate. Some are very much disposed to steal; and will purloin every thing they can. Others, again, are exceedingly low-spirited and gloomy; and some have violent sexual desires. These desires frequently go wrong; partly from some error in the faculty itself, and partly from some deficiency in intellect; so that many of them are, not merely *lustful*, but *beastly* in various ways.

Prone to Imitation.—Some are very prone to imitation; and I knew an instance of an idiot, who had all the imitative disposition of a monkey. He was in the workhouse at Clapham. When the surgeon went to visit the patients in the workhouse, he universally observed what was done; and, as soon as the surgeon was gone, he would feel the pulses of the various patients; and get a piece of tape, and begin bandaging up their arms, in order to bleed them. Whatever he saw done, as soon as he had an opportunity, he regularly went and did the same. Cases of a similar description are mentioned by Pinel, and other writers on insanity. There is no doubt about there being a propensity in the human mind to imitate. All acknowledge this;—phrenologists and anti-phrenologists; and this was so strong in this idiot, who had no sense to restrain him, that it led him to do ridiculous acts.

Frequently Coexistent with other Diseases.—This state of mind (idiotism) is very often conjoined—like all diseases of the nervous system—with *other* diseases of the nervous system. It is frequently connected with epilepsy,

with chorea, and with paralysis; so that we continually see idiots epileptic, or constantly shaking, and more or less paralytic.

Brain Deficient, or of Bad Quality.—When the disease is congenital, there is generally a defect of brain at the superior anterior part; and generally the whole head is too small. Gall says, that if the head be only from fourteen to seventeen inches in circumference, and only from ten to twelve from the root of the nose to the "foramen magnum", there is always more or less stupidity; that heads of eighteen inches and a half in circumference are small, and give but a mediocrity of talent; and that the full size is from twenty-one to twenty-two inches in circumference. However, idiotism may be produced without a defect of brain. The brain may be plentiful enough; but of bad materials. Dr. Spurzheim says that he dissected an idiot, two years of age, in whom the grey and white substance were of a greyish-blue colour; and, instead of being of the ordinary texture, were of a gelatinous quality. Such a brain as that, although there was plenty of it, was not of a sufficiently good quality to execute its functions. In such an instance, the brain may be very large; but the additional size will not counterbalance the bad quality.

Quality of the Brain changes with Age.—It has happened, sometimes, that an individual has been born an idiot, though with a sufficiently well developed head; and the brain has appeared suddenly to improve in quality. The brain improves in quality, as the body grows. It becomes of a different quality, as age advances, to a certain point. It attains a perfection of structure;—not as to *size* and *development* merely, but perfection as to *quality*; and then it afterwards declines (like all other parts of the body) in quality and size. In some individuals, the improvement of quality does not take place at the ordinary period; and the result is, that they remain children longer than other people; and recover from their idiocy at a certain period of life. The same circumstance occurs with regard to puberty. Many instances of this are on record. There is a case mentioned by Wilson, of puberty not taking place till the individual was twenty-eight years of age. There was no beard, or hair on the pubes, and the testicles were small, till the individual was twenty-eight; when suddenly he got a pair of whiskers, a tolerable beard, hair below, and good testicles;—fell in love, and was married. Now it is just the same with the brain altogether. The brain, in some individuals, does not go through its changes of structure at the usual period; so that the individual is sometimes idiotic during the first part of his existence; and, as he grows up, becomes like other people.

Torpidity of the Brain removed by Accident.—Most frequently, of course, this is not the case;—the same defective power of development continues; but to illustrate that a torpid brain has sometimes been excited to action by some external circumstance, an instance is mentioned of a boy, who possessed inferior talents till a tile fell on his head; when he began to shew great intellect. Dr. Mason Good says, that he knew a lad cured of his idiocy, by a fall from the first-floor to the street.[a] As an instance of a similar kind, I may mention that a German writer relates a case of fracture of the skull, by falling from a great height, which cured deafness; and, after the fracture, the man became able to speak. This was upon the same principle as idiots being cured by the fall of a tile or any thing else. In the twenty-fifth volume of the "Philosophical Transactions", is related a case where want of hearing was cured by a fever. The patient was

[a] "Study of Medicine"; Class 4; Order 1; Genus 6; Species 2; Variety 3.

seventeen years of age, and had never heard; but fever came on, and produced such excitement, that he afterwards heard like other people; and, having heard, he began to speak;—though he had never spoken before.

In cases of torpidity of the brain, where there is such a degree of inactivity as to produce idiotism, we may expect the head to be of the same size as in other persons; and it may be large;—from the brain being blubbery, or from there being a collection of water; as was the case with the head of Cardinal.[a] He ought to have beaten Lord Bacon, and Sir Isaac Newton too, if intellect depended on the mere *size* of the head.

Congenital Idiots die early.—When an idiot is so congenitally, he seldom lives to be above thirty. The defective power which causes the brain to be in such a state, is generally connected with such a want of energy throughout the whole body, that the patient seldom lives beyond thirty; and the greater the idiocy, *cæteris paribus*, the shorter time does he live.

Idiocy from Excessive Activity of the Brain.—Just as the brain may be *originally* torpid and inactive, so it may fall into the same state from excessive action. Precisely the same effect may be produced, if there be excessive action before the brain has acquired its full growth. This is very likely to be the case; for many precocious children, who have been shewn to the world as prodigies of talent, have (through the excessive application imposed upon them by their preceptors) become idiotic; and, when they have not become idiotic, they have frequently died. The powers of the body have been exhausted, and some organ more than another has fallen a victim to disease;—so that they have died. Intense application will produce temporary idiotism. Many persons who have bent their minds upon a particular object, and have worked night and day, have frequently fallen into a state of fatuity, which has lasted only for a certain time. The brain has been over-fatigued; and, after a time, it has recovered itself.

Causes of Idiocy in After-Life.—Fatuity or idiocy may come on in after-life (when persons have not been born idiotic) from other causes;—for instance, from blows; and from any of the diseases which I before mentioned, when treating of the morbid anatomy of the brain.[b] Any such disease as causes paralysis;—tumours pressing on the anterior part of the head[c]; softening of the anterior lobes (those parts which, I stated, are deficient when a person is a congenital idiot[d]); pressure[e], softening[f], or any thing which impedes the functions in any way;—all these will produce idiotism. Fever, being so often accompanied by violent irritation of the brain, will frequently leave idiocy; and insanity has done the same. When persons have been long insane, it is very common for them to lose their faculties altogether. Idiocy is a very common result of insanity.

Distinction between Fatuity and Idiocy.—The words "*idiocy*" and "*fatuity*" are not applied indiscriminately. They are nearly the same thing; but "*idiocy*" is generally used, by modern writers, for that which is congenital,—born in a person; while "*fatuity*", I believe, is generally applied to that imbecility which comes on in after life. The person not having been an idiot at first, but having become so, it is said that "he has become *fatuous*"; and if insanity have been the particular disease which has preceded the imbecility, then the imbecility is called "dementia"—

[a] See Page 556.
[b] See Pages 529 and 563.
[c] See Pages 571 and 588.
[d] See Page 593.
[e] See Page 571.
[f] See Pages 532 and 565.

(*unmindedness*). Hence, if a person be born an idiot, his case is one of "idiotism"; if imbecility come on afterwards, from a common cause, it is called "fatuity"; but if it be preceded by insanity,—if it be nothing but the degeneration of insanity, then it is called "dementia."

Diagnosis.—If there be great deficiency of the anterior part of the head,—if it be a question of idiotism and imbecility of mind, the case is very easily ascertained; but the head may be large, and yet the person may be an idiot. In the latter case we have to question him as to common circumstances,—to ask him how many halfpence there are in a sixpence, and how many sixpences in a shilling. If he was born in April, ask him whether he was born the January before; and things of that description. We should ask him questions on the most ordinary subjects; and generally put money before him, and make him count it;—count it as simple pieces of money; and then make him shew the value of the whole; and we soon find out whether he is an idiot or not. If he stumble at such questions as these, we may give an opinion that he is not qualified to manage his own affairs.

Prognosis.—But besides such an examination as this, it is right to look at the individual's head; and if it appears morbidly small, our opinion as to his idiocy would not be increased, but our prognosis would be exceedingly affected by it. If there is an absolute want of brain, we may take it for granted that the prognosis ought to be unfavourable. There is little hope of its growing to such an extent, as will enable him to be clever, like other people. This will also guide us very much in our attempts at benefiting the sufferer. If there is a great deficiency of brain, all attempts at benefiting him will be hopeless. The schoolmaster may flog; but he will never make any thing of such a head. We might also derive great advantage from inspecting the head, and observing the general character; so as to give directions to his friends how to manage him. We should observe what passion is strong enough to render it necessary for those about the person to be on their guard against it. This will be of use; as well as observing the imperfection of the head, for the purpose of ascertaining the degree of idiotism that exists in the individual.

Treatment.—As to curing the disease, all that can be done is to put the patient in as healthful circumstances as possible;—to feed him well, to give him fresh air, and improve his body altogether, on the one hand; and to cultivate particularly those parts of the mind which are best developed, on the other. If there be found any talent for music or calculation, we must make the best of it. A story is told, that may be true, of a boy who was an idiot up to eighteen years of age; when he saw a beautiful girl, and was struck with love for the first time. It shed such a flame throughout his brain, that he became as clever as the rest of the boys in the village. I have no idea of love being so employed; but if we find a faculty tolerably strong, it should be made the most of;—whether it be an intellectual or a knowing faculty; and if other faculties be not excited by it, yet it may be strengthened, and the individual may be rendered much less deficient than he otherwise would be. He may be unable to gain the command of *all* his faculties; but, by strengthening *one*, he may be rendered not so miserable an object, as if he were altogether neglected. This is an important point; because to set down an individual as an idiot, when he has some one faculty that might be made something of, would be cruel; and if we see the development of any thing that would enable us to make the experiment, it ought not to be passed by.

Cretinism.—With respect to the importance of good air and good food, in lessening idiotism, I may mention that particular form of idiotism, called

'cretinism"; which is produced by bad air or bad water. I should conceive there can be no doubt on the subject. It is found in the valleys of the Alps. It is impossible to travel in Switzerland among any of the valleys, without seeing plenty of cretins. The air is stagnant and wet;—full of the exhalations from marshy ground. The water, for the most part, is very bad; and the people are so ignorant, in many parts, that they drink water containing a great deal of chalk, although good is to be had. They are miserable objects;—mostly always short. In fact, they are dwarfs; and, in general, have enormous heads. Their features are shrivelled; they look like decayed autumnal leaves, or something like a shrivelled apple; and all of them have noses resembling the "ace of spades." Their limbs are soft and flabby; their mouths are wide,—extending from ear to ear; their lips are very thick; and they have a dry-looking skin. All of them are more or less idiotic, and many of them have a goitre;—an enlargement of the thyroid[a] gland.

These poor creatures are found, after death, to have the bones of the head very thick; and sometimes there is a quantity of water in the head. The cavity of the skull is not so large as the external appearance of the head would lead us to suppose. Sometimes the diminished capacity arises from the excessive quantity of bone, and sometimes from a collection of water. In other cases the brain, although large enough, is of bad quality. The tongue, in some cretins, is hypertrophied;—too large for the mouth; and a large number of them are deaf and dumb. There is a great difference in their dispositions. Some should never be trusted;—they are such destructive creatures, that they do all the mischief they can; while others are innocent, and as tame as lambs. Some females have a great number of these children. They have desires, like other people; and they fall in love with each other, and marry. Certainly *nobody else* would marry them.

It is said, that if two persons with a bronchocele[b] marry, their progeny generally have a goitre; and if their goiterous progeny marry any other persons with a bronchocele, then the third generation are sure to be idiots. Many persons assert this; but I do not know whether it is true; though I have endeavoured to ascertain it. There is a great relation between goitre and cretinism, no doubt; and what affects the thyroid gland, if it also affects the head and brain, may produce idiotism.

This is all that need be said about idiocy. It is more an object of curiosity, and medical jurisprudence, than of medical treatment; but it is very interesting, both in a physiological and a pathological point of view; and sometimes it is important in practice.

SECTION III.—INSANITY.

Various Terms employed.—I will now proceed to the description of that kind of unsoundness of intellect which is called "insanity."[c] Unsoundness of intellect comprises idiocy, imbecility, and insanity. Insanity is called "lunacy",—"mental derangement",—"mental aberration",—"hallucination"[d],—"alienation",—"madness."

[a] From θυρεος, *a shield*; and ειδος, *resemblance*.

[b] From βρογχος, *the windpipe*; and κηλη, *a tumour*.

[c] From "in", *not*; and "sanus", *sound*.

[d] From "hallucinor", *to err*.

Definition.—In describing mental deficiency, I stated that it was not every kind of mental deficiency that made an individual imbecile, or an idiot. The various feelings of the mind may be deficient, and very inconsiderable;—so inconsiderable as to be all but absent; and yet the individual may not be an idiot.[a] I stated that certain intellectual faculties (such as the faculty of music or calculation) might be deficient,—very deficient, and the person not be at all an idiot.[a] So aberration of mind, in insanity, does not exist merely because there is something wrong in the mind. There may be much very wrong in the mind, and yet the person not be at all *insane*;—just as there may be a great defect in the mind, and yet the person not be at all an *idiot*.

a. Varieties.

Derangement of Volition and Sensation.—In the first place, derangement of *volition* does not constitute insanity. A person may have palsy of motion; and yet he is not insane. He may wish to move his limbs, and be unable to do so; or he may wish to move them in one direction, and they may go in another, in a completely opposite direction; but he is not, on that account, insane. Neither does a want of the *external senses* constitute insanity, any more than it does *idiotism*. There may be merely palsy of the senses;—there may be a want of sensation from disease of the external organs of sense; and yet the person may be perfectly rational. Neither does it refer at all to the *knowing faculties*, such as music and calculation; which may be called "*internal* senses." These may be more or less wrong; and yet the person not be insane. Just, therefore, as the want of effective volition,—just as the want of external sensation,—just as the want of any one of the knowing faculties, does not make a person an idiot; so a wrong operation of volition over the voluntary muscles,—an arm going one way when the person wishes it to go in another,—is not insanity. A person labouring under chorea, or under tetanus, is not insane.

False Perceptions.—A wrong sensation does not constitute a person insane. He may have double vision;—he may see two fingers, when only one is held up; yet he is not on that account insane. Neither if a person see images,—figures,—spectres, is he on that account insane, if he do not believe that their existence is real. Some persons see objects which really do not exist;—images of objects which have no existence; and they *know* that such things do not exist; and, therefore, they are not insane. They are aware that it is a mere deception. Some see, in these circumstances, appearances of human beings, brutes, and various animals; but they are perfectly aware that it is entirely a morbid appearance.

One of the most remarkable instances of this description, occurred at Berlin; in the person of a bookseller named Nicolai. He saw an immense number of objects,—people and brutes,—at certain times; but he was aware that it was all the effect of morbid excitement. He had gone through considerable mental application; and, being aware that this was all a delusion, he was no more insane for seeing them, than a person would be for thinking he saw *two* fingers, when we held up but *one*.[b] Brutus

[a] See Pages 594 and 595.

[b] I [Nicolai] saw, in a state of mind completely sound, and (after the first terror was over) with perfect calmness, for nearly two months, almost constantly and involuntarily, a vast number of human and other forms; and even heard their voices;—though all this was merely the consequence of a dis-

and Socrates are said to have seen,—the one the shade of Cæsar, and the other the "familiar spirit", as he called it; but if neither the one nor the other believed this, they were not mad; or if they merely believed it in

eased state of the nerves, and an irregular circulation of the blood.

It being a matter of considerable importnce, that an incident of this nature should e observed with the strictest attention, and elated (together with all collateral circumtances) with the most conscientious fidelity, I shall not omit any thing of which I retain a clear recollection. The truth of what I am going to advance, will not require a further testimony; as Dr. Selle—who was my physician, and was daily informed by me of every trifling occurrence nd change that happened—is still living; nd will, by all who know him, be most eadily admitted as an unobjectionable witness. During the ten latter months of the ear 1790, I had experienced several melancholy incidents, which deeply affected ne,—particularly in September; from which ime I suffered an almost uninterrupted seies of misfortunes, that afflicted me with he most poignant grief. I was accustomed o be bled twice a year; and this had been done once (on the ninth of July), but was mitted to be repeated at the end of the ear 1790. I had, in 1783, been suddenly aken with a violent vertigo; which my hysicians imputed to obstructions in the essels of the abdomen, brought on by a edentary life, and continual exertion of the ind. This indisposition was successfully emoved, by means of a more strict diet. n the beginning, I had found the use of eeches applied to the arm particularly effiacious; and they were afterwards repeated wo or three times annually, when I felt ongestions in the head. The last leeches hich had been put on, previously to the ppearance of the phantasms of which I am bout to speak, had been applied on the rst of March, 1790; less blood had, conequently, been evacuated in 1790, than as usual with me; and, from September, was constantly occupied in business that equired the most unremitting exertions; nd which was rendered still more perplexg by frequent interruptions.

I had, in January and February of the ear 1791, the additional misfortune to exerience several extremely unpleasant cirumstances; which were followed, on the enty-fourth of February, by a most viont altercation. My wife and another perm came into my apartment in the morng, in order to console me; but I was too uch agitated by a series of incidents, hich had most powerfully affected my oral feelings, to be capable of attending to them. On a sudden I perceived, at out the distance of ten steps, a form like that of a deceased person. I pointed at it; —asking my wife if she did not see it. It was but natural that she should not see any thing: my question, therefore, alarmed her very much; and she sent immediately for a physician. The phantasm continued about eight minutes. I grew, at length, more calm; and, being extremely exhausted, fell into a restless sleep, which lasted about half an hour. The physician ascribed the apparition to a violent mental emotion, and hoped there would be no return; but the violent agitation of my mind had, in some way, disordered my nerves, and produced further consequences; which deserve a more minute description.

At four in the afternoon, the form which I had seen in the morning reappeared. I was by myself when this happened; and, being rather uneasy at the incident, went to my wife's apartment; but there, likewise, I was prevented by the apparition; which, however, at intervals disappeared; and always presented itself in a standing posture. About six o'clock, there appeared also several walking figures; which had no connexion with the first.

After the first day, the form of the deceased person no more appeared; but its place was supplied by many other phantasms;—sometimes representing acquaintances, but mostly strangers: those whom I knew, were composed of living and deceased persons; but the number of the latter was comparatively small. I observed that the persons with whom I daily conversed, did not appear as phantasms;—the latter representing, chiefly, persons who lived at some distance.

These phantasms seemed equally clear and distinct at all times, and in all circumstances;—both when I was by myself, and when I was in company; and as well in the day as at night, and in my own house as well as abroad: they were, however, less frequent when I was in the house of a friend; and rarely appeared to me in the street. When I shut my eyes, these phantasms would sometimes vanish entirely; though there were instances when I beheld them with my eyes closed; yet, when they disappeared on such occasions, they generally returned when I opened my eyes. I sometimes conversed with my physician and my wife, of the phantasms which at the moment surrounded me. They appeared more frequently walking than at rest; nor were they constantly present. They frequently did not come for some time; but always reappeared for a longer or shorter period, either singly or in company;—the

accordance with the belief of the day, then they were not mad; but if they knew better, and yet believed these things, then they were deranged. Hence there may be false perceptions, and yet the individual may not be mad; but a person may be mad, and also have false perceptions. Many men, absolutely mad, think they see things which they do not; but many persons, without a false perception, see something that has no existence; but, knowing it has no existence, they are not deranged. Again: many persons, absolutely mad, never see any unnatural appearances whatever.

Monomania.—But in a great number of cases of insanity, we find an absurd belief; and this may refer to something past. There may be a fixed opinion, altogether absurd, upon matters that have passed; and there may be also an absurd opinion as to something *present.* For instance:—persons so affected, may see things which other people do not; and they may positively believe it. Insanity, therefore, may be an absurd belief, as to things present and things past; and thirdly, that absurd belief may refer to a mere abstract opinion. Persons may believe something so prepos-

latter, however, being most frequently the case. I generally saw, however, forms of both sexes: but they usually seemed not to take the smallest notice of each other; moving as in a market-place, where all are eager to press through the crowd:—at times, however, they seemed to be transacting business with each other. I also saw, several times, people on horseback, dogs, and birds. All these phantasms appeared to me in their natural size, and as distinct as if alive;—exhibiting different shades of carnation in the uncovered parts, as well as in different colours and fashions in their dresses; though the colours seemed somewhat paler than in real nature. None of the figures appeared particularly terrible, comical, or disgusting;—most of them being of an indifferent shape, and some presenting a pleasing aspect. The longer these phantoms continued to visit me, the more frequently did they return; while, at the same time, they increased in number about four weeks after they had first appeared. I also began to hear them talk; the phantoms sometimes conversed among themselves; but more frequently addressed their discourse to me: their speeches were commonly short, and never of an unpleasant turn. At different times, there appeared to me both dear and sensible friends, of both sexes; whose addresses tended to appease my grief, which had not yet wholly subsided. Their consolatory speeches were, in general, addressed to me when alone. Sometimes, however, I was accosted by these consoling friends, while I was engaged in company; and, not unfrequently, while real friends were speaking to me. These consolatory addresses consisted, sometimes, of abrupt phrases; and, at other times, they were regularly executed.

Though my mind and body were in a tolerable state of sanity all this time, and these phantasms became so familiar to me, that they did not cause me the slightest uneasiness; and though I sometimes even amused myself with surveying them, and spoke jocularly of them to my physician and my wife, I yet did not neglect to use proper medicines;—especially when they began to haunt me the whole day, and even at night, as soon as I awaked.

At last, it was agreed that leeches should be again applied to me, as formerly; which was actually done on the twentieth of April, 1791, at eleven o'clock in the morning. No person was with me, except the surgeon; but during the operation, my chamber was crowded with human phantasms, of all descriptions. This continued uninterruptedly, till about half an hour after four o'clock;—just when my digestion commenced. I then perceived that they began to move more slowly; soon afterwards, their colour began to fade; and, at seven o'clock, they were entirely white. They moved very little, though the forms were as distinct as before;—growing, however, by degrees, more obscure; yet not fewer in number,—as had generally been the case. The phantoms did not withdraw, nor did they vanish;—a circumstance which, previously to that time, had frequently happened. They now seemed to dissolve in the air; while fragments of some of them continued visible a considerable time. About eight o'clock, the room was entirely cleared of my fantastic visitors.

Since that time, I have felt, twice or three times, a sensation, as if these phantasms were going to reappear; without, however, actually seeing any thing. The same sensation surprised me, just before I drew up this account;—while I was examining some papers, relative to those apparitions, which I had drawn up in the year 1791.—"*Sketches of the Philosophy of Apparitions. By Samuel Hibbert, M.D.*" *Chapters* 1 *and* 5; *Pages* 4 *to* 8, *and* 41 *to* 44.

terous, that every body will consider them mad for so doing. A case is recorded of a butcher, who firmly believed he saw a leg of mutton hanging from his nose; and therefore he was certainly mad. Another is told of a baker, who fancied himself butter; and refused to go into the sunshine, lest he should melt. A painter thought he was soft;—he was so in mind. He thought he was so much putty; and that he could not walk without becoming compressed, like putty. Others have fancied themselves glass; and would not sit down lest they should crack.

Case of Luther.—Luther, although so able a man, was mad on some points. All people have their weak points; and he had his. He fancied the devil was in him;—as did also the Roman Catholics; and that he heard him speak. Luther's christian name was Martin; and in Hudibras[a] there is the following couplet upon it:—

> "Did not the devil appear to Martin
> Luther, in Germany, for certain?"

It is stated, in a note to this passage, that "Luther, in his works, speaks of the devil appearing to him frequently; and how he used to drive him away by scoffing and jeering him; for Luther observes that the devil, being a proud spirit, cannot bear to be contemned and scoffed." Luther used to talk to the devil; and the Popish writers not only believed that the devil was in him; but some of them affirm that he was begotten by an incubus (a kind of young devil); and that at length, when he died, the devil strangled him.[b]

Dr. Ferriar, of Manchester, had a patient of the same persuasion as Luther. He fancied he had swallowed the devil; and he would not discharge the contents of his alimentary canal, through a benevolent feeling;—lest he should let him loose into the world. I heard a gentleman speak of a man, who would not make water lest he should inundate the country. He thought the urine would come from him in such torrents, that the country would be washed away. A similar case to this was relieved by lighting a fire round the patient, and making him endeavour to put it out, lest the house should be burned down. Many persons fancy there are frogs, serpents, and snakes, within them; and one woman fancied there was a whole regiment of soldiers in her. One man, named Vicentinus, fancied he was too large to go through a door-way; and when he was pulled through he screamed, and fancied he was being lacerated, and actually died of fright.[c] Another woman, instead of fancying that she had a regiment of soldiers in her, fancied that she had a monster in her genitals; and when she got rid of this idea, by the contrivance of her physician, she took another fancy; namely, that she had been dead, and had been sent back to the world without a heart, and was the most miserable of God's creatures. At the "Retreat", near York, one patient writes—"I have no soul. I have neither heart, liver, nor lungs; nor any thing at all in my body; nor a drop of blood in my veins. My bones are all burnt to a cinder. I have no brain; and my head is sometimes as hard as iron, and sometimes as soft as

[a] Part 2; Canto 3; Lines 155 and 156. The poet adds:—

"And would have gull'd him with a trick;
But Martin was too politic."

[b] "We thinke that to be a lie which is fathered upon Luther;—to wit, that he knew the devill, and was very conversant with him, and had eaten many bushels of salt, and made jollie good cheere with him; and that he was confuted, in a disputation with a real divell, about the abolishing of private masse. —*Scot's "Discovery of Witchcraft."*

[c] Quoted from Marcus Donatus, by Dr. A. T. Thomson; in a Lecture on Medical Jurisprudence, published in the "Lancet" for March 11, 1837. (No. 706; 1836-7, Volume 1, Page 841.)

a pudding." One man, it appears, thought he had not got his own head. He is described in Moore's "Fudge Family at Paris."[a] He says:—

"Went to the mad-house.[b] Saw the man
Who thinks,—poor wretch!—that (while the fiend
Of discord here full riot ran[c])
He, like the rest, was guillotined;

But that when, under Boney's reign,
(A more discreet, though quite as strong one,)
The heads were all restored again,
He, in the scramble, got a *wrong one.*

Accordingly, he still cries out—
'This strange head fits him most unpleasantly';
And always runs (poor dev'l!) about,
Inquiring for his own incessantly."

Bishop Warburton, in a note to one of his works, speaks of a person who thought he was converted into a goose-pie; and Dr. Arnold saw a man who fancied himself in the family-way. Pope, in his "Rape of the Lock"[d] describes many of these fancies. He says, in giving a sketch of hypochondriacal persons[e],—

"Unnumber'd throngs on every side are seen,
Of bodies changed to various forms by Spleen.
Here living tea-pots stand; one arm held out,
One bent;—the handle this, and that the spout.
A pipkin there, like Homer's tripod, walks;
Here sighs a jar, and there a goose-pie talks."

A man in the University of Oxford, fancied himself dead; and lay in bed, waiting for the tolling of the bell; but, not hearing it at the time he expected, he fell into a violent passion, and ran and tolled it himself. He was then spoken to, on the absurdity of a dead man tolling his own bell; and it is said that he returned, and was afterwards sound in his intellect. However, he must have been pretty nearly in his senses at this time;—he must have been ready for sanity; or such a change would not have been effected by a mere mental cause, like this.

Simon Browne, a dissenting minister[f], wrote the best answer[g] to Toland's work, entitled "Christianity as Old as the Creation"; but, notwithstanding the great powers of mind displayed in this work, he thought that, by the judgment of God, his rational soul had perished; and that he had only brute life; and he absolutely inserted this in the dedication of his work to the Queen.[h] This dedication, however, was afterwards suppressed.[i]

[a] "Letter 9. From Philip Fudge, Esq., to the Lord Viscount Castlereagh."

[b] The Bicetre.

[c] Alluding to the French Revolution.

[d] Canto 4; Lines 47 to 52.

[e] In "the cave of Spleen."

[f] "Born at Shepton Mallet, in Somersetshire, about the year 1680." ("Life and Works of William Cowper. Edited by the Rev. T. S. Grimshawe, A.M." Volume 5; Page 411.)

[g] "Defence of the Religion of Nature, and the Christian Revelation."

[h] Caroline, consort of George the Second.

[i] Madam — Of all the extraordinary things that have been tendered to your royal hands, since your first arrival in Britain, it may be boldly said what now bespeaks your Majesty's acceptance is the chief. Not in itself, indeed; it is a trifle unworthy your exalted rank, and what will hardly prove an entertaining amusement to one of your Majesty's deep penetration, exact judgment, and fine taste; but on account of the author, who is the first being of the kind, and yet without a name. He

Baron Swedenborg, a very learned and able man, thought that he had communications with the Almighty for thirty years; and that he had been shewn, by the Almighty, the mysteries of nature. Many think he was right; but no one could have that idea without some insanity. As some believe this, I mention it as an instance (adduced by others) of partial insanity. It is similar to the case of the celebrated Pascal; who, while he was working the problem of the cycloid curve, with great powers of intellect, was tied (by his own desire) in his chair; lest he should fall into a yawning gulf before him. He laboured under this partial insanity, while his powers of mind were otherwise as strong, and he was as much in his senses, as other people who have no madness whatever. One patient in the "Retreat" near York, wrote the following verses on the patient who described himself as having neither heart, liver, brain, nor any thing else.[a]

"A miracle, my friends, come view!—
A man (admit his own words true)
Who lives without a soul;
Nor liver, lungs, nor heart has he;
Yet sometimes can as cheerful be
As if he had the whole.

was once a man, and of some little name; but of no worth;—as his present unparalleled case makes but too manifest; for, by the immediate hand of an avenging God, his very thinking substance has, for more than seven years, been continually wasting away, till it is wholly perished out of him,—if it be not utterly come to nothing. None, no, not the least remembrance of its very ruins remains; not the shadow of an idea is left; nor any sense—so much as one single trace, perfect or imperfect, whole or diminished—ever did appear to a mind within him, or was perceived by it. Such a present from such a thing, however worthless in itself, may not be wholly unacceptable to your majesty;—the author being such as history cannot parallel; and if the fact—which is real, and no fiction or wrong conceit—obtains credit, it must be recorded as the most memorable, and, indeed, astonishing event in the reign of George the Second;—that a tract, composed by such a thing, was presented to the illustrious Caroline; "*his royal consort*" need not be recalled: fame, if I am not misinformed, will do that with pleasure to all succeeding ages.

He has been informed, that your majesty's piety is as genuine and eminent, as your excellent qualities are great and conspicuous. This can, indeed, be truly known to the great Searcher of Hearts only. He alone, who can look into them, can discern that they are sincere, and the main intention corresponds with the appearance; and your majesty cannot take it amiss, if such an author hints, that this secret approbation is of infinitely greater value than the commendation of men; who may be easily mistaken, and are too apt to flatter their superiors. But, if he has been told the truth, such a case as his will certainly strike your majesty with astonishment; and may raise that commiseration in your royal breast, which he has in vain endeavoured to excite in those of his friends; who, by the most unreasonable and ill-founded conceit in the world, have imagined that a thinking being could, for seven years together, live a stranger to its own powers, exercises, operations, and state; and to what the great God has been doing in it, and to it. If your majesty, in your most retired address to the "King of kings", should think of so singular a case, you may perhaps make it your devout request, that the reign of your beloved sovereign and consort may be renowned to all posterity, by the recovery of a soul now in the utmost ruin,—the restoration of one utterly lost, at present, amongst men. And should this case affect your royal breast, you will recommend it to the piety and prayers of all the truly devout, who have the honour to be known to your majesty: many such doubtless there are, though courts are not usually the places where the devout resort, or where devotion reigns; and it is not improbable, that multitudes of the pious throughout the land may take a case to heart, that under your majesty's patronage comes thus recommended.

Could such a favour as this restoration be obtained from Heaven by the prayers of your majesty, with what transport of gratitude would the recovered being throw himself at your feet; and, adoring the divine power and grace, profess himself, Madam, your Majesty's most obliged and dutiful servant, Simon Browne.—*Dr. Hawkesworth's "Adventurer"; No.* 88.

[a] See Page 603.

His head (take his own words along)
Now hard as iron, yet ere long
Is soft as any jelly;
All burnt his sinews and his lungs;
Of his complaints not fifty tongues
Could find enough to tell ye.

Yet he who paints his likeness here,
Has just as much himself to fear
He 's wrong from top to toe.
Ah, friends, pray help us, if you can;
And make us each again a man;
That we from hence may go!"[a]

In insanity, therefore, we see that *all* the faculties are not deranged. There may be merely an absurd belief upon some one point; and the patient may otherwise be in his senses. Many, indeed, who are deranged, will read and understand what they read. They will paint, exhibit mechanical contrivances, work, and talk rationally on many subjects;—nay, some will shew extreme sagacity in accomplishing their mad purposes, in concealing their mad impressions, and convincing others of the truth of their mad notions. In a case tried before Lord Mansfield, the patient[b] was so clever, that he evaded all the questions put to him; and seemed to every body perfectly sane. Dr. Battie, however, came into court; and, knowing the point of the man's derangement, asked what had become of the princess, with whom he had been in the habit of corresponding in cherry-juice? Instantly the man forgot himself; and said it was true he had been confined in a castle; where, for want of pen and ink, he had written his letters in cherry-juice, and thrown them into the stream below, where the princess had received them in a boat.[c]

Increased Power of some Mental Faculties.—This, however, is not all; for some persons, in insanity, have some of their mental faculties increased. Dr. Rush says, that he had a deranged female patient, who composed and sang hymns and songs delightfully; and yet she had never shewn any talent for either music or poetry before. There was excitement of one part of the brain, while another part was going wrong. He knew two cases where, in insanity, a great talent was shewn for drawing. Dr. Willis had a patient who, in the paroxysms of insanity, and then only, remembered long passages of Latin authors, and took extreme delight in repeating them; Dr. Cox mentions a musician, who talked madly on all subjects but music; and his talent for that appeared increased. His performances on the violin were strikingly singular and original. Dr. Rush mentions the case of a gentleman who was deranged; but who often delighted and astonished the

[a] See "Remarks on Mental Affections", by Thomas Bakewell; published in the "Imperial Magazine", Volume 4, Column 1002. (No. 46; November, 1822.) Mr. Bakewell is the proprietor of a well-conducted Lunatic-Asylum, called "Spring-Vale", near Stone.

[b] Mr. Wood, a merchant of Philpot Lane, who indicted Dr. Munro for confining him in a mad-house, while (as he alleged) perfectly sane.

[c] This trial having taken place in Westminster, he commenced another action in the city of London; and, on this occasion, no effort could induce him to expose his insanity; so that he was defeated only by bringing against him the evidence taken at Westminster.—"*Inquiries concerning the Intellectual Powers. By John Abercrombie, M.D.*" *Part* 3; *Section* 4; *Division* 2; *Subdivision* 3. (*Ninth Edition; Pages* 324 *and* 325.) The case is detailed at length in "Elements of Medical Jurisprudence; by Theodric Romeyn Beck, M.D. Edited by John Darwall, M.D." Chapter 12; Section 2.

rest of the patients, and the officers of the institution, by his displays of oratory when preaching. Pinel, the French physician, mentions the case of a man, who was very vulgar at other times; but who, in his paroxysms of insanity, while standing upon a table in the hospital, discoursed very eloquently upon the revolution; and with the dignity and propriety of language of the best educated man.

Similar Occurrences in Fever.—Circumstances similar to these, have been seen in fever. When the brain is under the excitement of fever, a person who has shewn but little talent for singing before, may sing very correctly; and sometimes, although an individual may be delirious, yet he will speak very eloquently upon certain subjects. This state, however, does not last long.

General Insanity.—Some patients are not so happily circumstanced as those we have mentioned; but, in their insanity, are wrong upon *all* points. Persons may be deranged on only one or more points, while the rest of the faculties are *sound*; or they may be deranged on one or more points, while one faculty (or more) will be increased; but patients may be wrong on *all* points. In the latter case, they will ramble from one point to another, display great inconsistency, and exhibit a wild association of ideas. They will be incapable of fixing their attention sufficiently to speak correctly, or to read. So wrong are they that, very likely, they do not recognise those with whom they were formerly intimate; or, if they do recognise them, it is in a very strange manner; and they have generally a very imperfect memory altogether; most likely, have false ideas of nearly every thing with which their memory is charged. Their absurd opinions, too, are general. Perhaps they reason very incorrectly on every thing; or they probably make no attempt at reasoning at all. In partial insanity, which is called "monomania"[a],—insanity on a single point, when they do reason correctly from a starting point, it is to be remembered that the starting point itself is partly incorrect. But, in intense insanity, they do not make an attempt to reason at all; or they reason in the most incorrect manner.

Influence of the Propensities and Sentiments.—So much with respect to the intellectual *faculties*. But in insanity the *propensities* and *sentiments* are frequently disturbed. Some are so far disturbed as to be superstitious; some, again, are very respectful; some, again, are very impious. There was one madman who cursed God for his creation; and especially for having given him a human form; and he wished to go to hell, to avoid the disgrace of associating with the Deity. A person saying to him it was a bad day, he replied—"Did you ever know God make a good one?" Some are peevish; some are modest; some are very silly; some are lascivious; some are depraved in their sexual feelings; some are very cheerful; some are melancholy; some are fearful. Sometimes violence and tranquillity, or melancholy, alternate. Shakspere describes these changes:—

> . . . . "This is mere madness!
> And thus, awhile, the fit will work on him.
> Anon, as patient as the female dove,
> When that her golden couplets are disclosed,[b]
> His silence will sit drooping."[c]

Identity of Mania and Melancholia.—There is no real difference between

[a] From μονος, *one*; and "mania", *madness*. (See Page 602.)

[b] Hatched.

[c] "Hamlet"; Act 5; Scene 2.

"mania" and "melancholia." The latter term is employed by many writers to signify madness connected with great depression of spirits; and it is applied by Pinel to *partial* insanity;—that is, to designate monomania. But this is improper. There is no essential difference between mania[a] and melancholia.[b] One faculty of the mind is disturbed in one case; and one in another. One person may be gloomy, and another cheerful; but the latter is just as mad as the former. A person may be gloomy to day, and cheerful to-morrow.

Influence of the Feelings.—In insanity, every feeling of the mind may, in its turn, be excessive; or every feeling may be defective, or at least overcome by other feelings; and every feeling may likewise be depraved. In consequence of the varied state of feeling in insanity, we have various physiognomies. One madman has the physiognomy of pride;—holding up his head as high as he can, and looking with scorn on those around him. Others have the physiognomy of suspicion—a hanging down of the head; in others we see the physiognomy of rage—a frowning of the eye-brows, and a derangement of the features. The passion displayed in insanity, varies according to the state of the feelings.

The Feelings only Affected: Destructiveness.—In some instances of insanity, the *feelings* only are affected. There is no aberration of intellect; but it is a disease of some of the feelings. There can be no question that some have an irresistible desire to commit murder. They are sane in every point but that; but they are irresistibly impelled to commit murder; and the moment they have committed it, they have confessed it, and expressed the greatest regret. Many have felt the fit of desire coming upon them; and have entreated their friends to confine them, to prevent them from doing it. This derangement of the feelings will sometimes take *one* turn, and sometimes *another*. There can be no doubt, that some have felt an impulse to destroy in a particular manner;—by burning. Some have felt an impulse to destroy *themselves*; and others, not only to murder individuals, but to murder *particular kinds* of individuals;—to murder their *children*.

When I was at the University of Cambridge, there was a person who was said to have attempted, three times, to set the college on fire; and at last he was tried for it; but, as he was acquitted, I suppose he had not made the attempt. It was ascertained that, when he was young, he had attempted to drown a child; yet nobody ever suspected him of being mad.

The murderer of Mr. and Mrs. Bonner, at Chiselhurst (in Kent), was a footman in the family; and, one night, he left his room, went up stairs with a poker to the apartment of his master and mistress, and beat their brains out. He was asked his reason; but he could give none. He said that he had always been treated by them with the greatest kindness; and all he knew was, that he felt suddenly, in the night, a desire to kill them; and he supposed the devil had prompted him to the act. No other sign of insanity was detected in him; and as, at that time, it was not supposed that such an occurrence could arise from insanity, without other proofs of insanity being evident, he was hanged.

Gall mentions the case of a person at Vienna, who went to witness an execution; and was seized with a propensity to kill. At the same time, he had a clear consciousness of his situation. He expressed the greatest aversion to such a crime. He wept bitterly, struck his head, wrung his

[a] From *μαινομαι, to rage.*

[b] From *μιλας, black*; and *χολη, bile.*

hands, and cried to his friends to take care and fly away. He felt the inclination; he regretted it; and entreated every one to prevent it, by putting him in prison.

Pinel mentions the case of a man, who exhibited no unsoundness of intellect; but who confessed that he had a propensity to murder, which was quite involuntary; and his wife, notwithstanding his tenderness for her (which was real), was near being murdered;—he having had only time to warn her to fly. In the interval he expressed the same remorse; felt disgusted with life; and attempted, several times, to put an end to his existence. In a work by Mr. Hill, we read of a man who was tried at Norwich, in 1805, for wounding his wife, and cutting his child's throat. He had been known to tie himself with ropes for a week, to prevent him from doing mischief to others. One of the members of a family in London, whose maid-servant was executed for attempting to poison the whole family with arsenic, is said to have used these words:—"Do, for God's sake, get me confined; for, if I am at liberty, I shall destroy myself and wife. I shall do it unless all means of destruction are removed; and therefore do, good friend, have me put under restraint. Something from above tells me I must do it; and I shall." Arsenic was put into a pudding; and the maid-servant was executed for it; but many persons were perfectly convinced of her innocence.

Respecting the disposition to destroy by fire, Gall mentions that he saw a person in prison, at Fribourg, who had set fire to his house four times in succession; and who, after he had set fire to it, tried to put it out. Once he seized his child, lest it should be burned. The moment he had set his house on fire, he was contented;—the orgasm was over; and he was as anxious as any one to see it put out.

Propensity to Steal.—Some have an irresistible desire to steal; without any other mark of insanity. Gall says that the first king of Sweden was always stealing trifles. Instances are mentioned of a German, who was constantly pilfering; and of another who had the desire entered the army;—hoping that the severe discipline there would restrain him; but he gave way to the desire even there, and was very near being hung. He then became a friar, with the same hope; but he still felt the same desire, and carried all the things he could to the cell; but, as he could only get trifles, he was not noticed; and he went on with his propensity. Gall also mentions that a person at Vienna, in the habit of stealing, hired a lodging to deposit his thefts; and, when he had got a stock, he sold them. He only stole household matters. The wife of a celebrated physician, at Leyden, never went into a shop to buy any thing without stealing; and a countess at Frankfort had the same propensity. Another lady, notwithstanding all the care with which she was brought up, had the same desire to pilfer. It is related of a physician, that his wife was always obliged to examine his pockets in the evening, and restore the things she found there to his patients. He always took something, as well as his fee. Meritz speaks of a criminal who, at the moment he was about to be executed, stole the confessor's snuff-box. Dr. Burner, who was one of the physicians to the king of Bavaria, speaks of a person whom he knew very well, who enjoyed abundance, and had been well educated; but who, notwithstanding, was always stealing; and was made a soldier by his father, and at last got hanged. The son of a celebrated and learned man, himself very clever, and respectably connected in every respect, could not resist this propensity; and I could go on mentioning instances without end, of individuals who apparently did this

from insanity;—not from any criminal motives, but absolutely from a blind desire too strong for them to resist.

Inordinate Sexual Desire.—The sexual desire has been so inordinately strong, in some people, that it has been said that a criminal, going to execution for a rape, has been anxious to repeat the crime as he was proceeding to the gallows. I know it is so with respect to an irregular mode of gratification;—masturbation. I was told, by a medical man, of an individual who was rather idiotic; and who had the desire so strong, that he would entreat his family to run out of the room. He could not resist the impulse to gratification; though he cried, and lamented its power over him.

Two-fold Definition of Insanity.—The definition of insanity, then, is two-fold. It may be stated to be—"an aberration of any mental power from a healthy state; with an inability on the part of the individual to discern its unhealthiness"; because, if an individual be aware of the absurdity and non-reality of what he fancies, he is not mad. If a person see the devil in the middle of the day, and is sure it is not the devil at all, of course he is not mad; but if the man see it, and believe it, and endeavour to make others believe it is a reality,—provided he has been better educated,—he must be mad. But this is not the whole of the disease; and not the form in which it will sometimes appear; and therefore we must include in the definition —"without an ability, on the part of the patient, to discover that it is an unhealthy state, or to resist it." If an individual have feelings so strong that he cannot control them, he is not an accountable being;—he is insane. This is the definition of Spurzheim; and it is the best I have seen. I have met with no other that satisfies me. It is a *general* definition; and it includes all the forms we can give, in a *minute* definition of insanity. I have reflected much upon it; and think it will apply to every case.

Intellectual Aberration as to Facts.—With respect to the first part of the definition,—that in which is mentioned an intellectual aberration,—it may relate to a matter of external sense, or to a fact which may be present or past; and in that case there can be no doubt of a person's insanity. If a person firmly believe something to be actually a fact,—to be present,—to be existent, which we know is not the case, and which all the world knows is not the case (as, for example, that a leg of mutton is hanging to his nose[a]);—then we know he must be mad. If the aberration refer to a matter of fact that is present, we may declare him to be mad; or if it refer to something which is past, on which we are equally certain, and on which he has had an opportunity of being well informed when in his senses, it is fair to conclude that he is mad. If he be certain that he lived two hundred years ago, then there can be no doubt that he is mad.

Intellectual Aberration as to Opinions.—Supposing, however, that it does not refer to a fact past or present, but to a mere opinion, then there may be considerable difficulty. In order to constitute him mad, it ought not to be a subject on which there is some difference of sentiment among other persons; but an opinion palpably absurd to all other people in the situation of life, or superior to him. If we did not make an allowance for education, for country, and for external circumstances, every sect in religion (for example) might consider the votaries of another sect to be mad. Every Trinitarian would consider a Unitarian to be mad; and every Unitarian would consider a Trinitarian to be mad. Quakers would consider Jumpers to be mad: and Jumpers would consider Quakers to be mad. Every allow-

[a] See Page 603.

ance, therefore, is to be made, in a matter of opinion, for difference of education, and difference of situation.

The notions entertained by one nation altogether, would be considered perfectly absurd by another nation; and therefore it must be an opinion upon matters, on which all persons of the same country, age, situation, and education, will allow such an opinion to be positively absurd. If, in this country, a woman were to insist on burning herself to death after the decease of her husband, we should consider it insanity; but in India it is *not* insanity; because the people there have been educated in the belief of its propriety. It was mentioned in the House of Commons by Mr. Buxton, in 1821, that in the Presidency of Fort William, two thousand three hundred and sixty-six widows destroyed themselves in the previous four years: and some of these were only twelve or thirteen years of age. One was only eight; and one only eleven was so obstinate, when she was not allowed to burn herself to death, that she fasted from food for four or five days; and, although the local authorities prevented her from immolating herself on her husband's grave, she saved some of his bones;—in order that, when the first opportunity occurred, she might then destroy herself. Now such an act as this would be considered, in our country, as downright insanity;—it could scarcely arise from any thing else.

Necessity for well-informed Juries.—The ignorant have often imputed insanity to philosophers. Democritus was pronounced mad, by the common people, because he dissected a body, in order to investigate the causes of insanity; but Hippocrates told the people that they were mad, and not Democritus. In a case of this description, a jury who were equally well-informed persons with the philosopher, would have been the only people capable of determining the question. If we empannel a jury to determine the madness of a person, they should be equal or superior to him. If we select persons inferior to the person supposed to be mad, they (through their ignorance) may conceive him to be mad, when he is only a man of knowledge superior to themselves. If the matter, therefore, refer merely to *opinion*, there may be considerable difficulty as to the sanity or insanity of the individual; and no one who is not equal to the individual, or even superior to him, is capable of judging; and every allowance should be made for education, and for all external circumstances. If we take these precautions, we may disregard the complaint,—that "the madman was as much in his senses, as the rest of the world; but the majority was against him, and therefore he was placed in custody."

Diagnosis between the Culprit and the Madman.—Supposing, however, that it is another form of insanity;—a propensity; and a propensity to murder; which propensity the patient cannot resist. Here the great difficulty is to ascertain whether this state is real or not;—whether (in case an act of murder has been committed) the individual could not have resisted the propensity;—whether he has been giving way to some vile feeling, or has been the victim of an irresistible passion. Now, in pronouncing a person who has committed a crime to be insane,—as having been unable to resist the temptation,—we must ascertain first whether there has been any motive or not. If any motive can be discovered, then we may be justified in saying that the individual is a culprit,—is not mad. There should, in the first place, have been an evident reason for it. Generally, however, where there is some irresistible feeling, there is, at the same time, some wrong notion. When persons have committed murder, from an instantaneous desire to destroy, generally (though by no means always) they had, at the same time, some wrong notion;—some imagination that it was

a voice from Heaven that called them to commit the deed. Hence we have less difficulty than we otherwise should have. In many of these cases, where there has been no motive, the patient himself, as soon as the deed has been over, has actually declared that he had no motive; and has expressed the greatest remorse for what has been done. On other occasions, he has laughed at the deed;—considered it a matter of indifference;—not concealed it, but given himself up to justice. In other cases, before the deed has been done, patients have requested to be confined, and thus prevented from doing what their feelings prompted.

Indications afforded by the Shape of the Head.—To those who have paid any attention to phrenology [a], not only is this not wonderful, but considerable assistance may be derived from examining the shape of the head. The shape of the head does not shew a man to be mad; for a man with a head of *one* shape may become insane, as well as a man with a head of *another* shape. A stomach of *one* shape or size will be subject to dyspepsia, the same as a stomach of *another* shape or size. It is absurd to suppose that, in insanity, there must be a particular shape of the head; but it is an unquestionable fact, that if a person have any one peculiar feeling of the mind, (which feeling phrenologists believe to be situated in a particular part of the brain,) and the correspondent part of the head be correspondently largely developed, that strong feeling will take the lead of the other feelings. Putting phrenology out of the question, whatever feeling or passion is remarkably predominant in an individual,—so as to take the lead,—if the other proportions of the brain be too small, such an individual is likely to go mad. Now if it be a fact that the brain, in different parts, corresponds with the natural intensity of the different feelings, then that part of the head may be expected (in general) to be proportionately large; and if it be said of an individual supposed to be mad, that he is the victim of a particular feeling, any one who attended to phrenology would certainly examine the head, and see whether there was a large development, corresponding with the passion which appeared irresistible; and if he found such a correspondence, that would be an additional reason for inclining to the belief, that the individual had been the victim of a feeling that was irresistible.

Case of Bellingham.—This was shewn strikingly in the case of Bellingham, who murdered Mr. Perceval. Bellingham was a man of weak intellect; and we see, from a cast of his head, that the anterior parts of the head were miserably developed; whereas the lateral parts (posterior and anterior) were largely developed: so that the man's passions were evidently much too strong for him to resist; and the passions particularly developed in him, were pride and destructiveness. That man was executed, because there was no proof at all that he was insane; but any one, on looking at his head, would incline to a favourable opinion; and though he would not set him at large, to do such mischief again, yet he would not deprive him of life. There is a large development of pride and destructiveness; and that part of the brain, being large, has gained an ascendancy over the rest; and has been liable to excitement. In a great number of cases of insanity, the character of the individual corresponds with the form of the head; and when the question is, whether the propensity to the deed which has been done was irresistible, or whether the patient could have controlled it, we may find it of great service to examine the head. If we have *other* reasons to believe that the deed has been done irresistibly, a peculiar development of the head (if it exist) is an *additional* reason. The shape of the head is not to

[a] From φρην, *the mind*; and λογος, *discourse*.

be depended upon *solely*; but to be taken into consideration, in conjunction with *other* circumstances.

Has there been Previous Injury of the Head, or Apoplexy?—Another circumstance that would render the existence of insanity probable, would be the previous receipt of an injury of the head. If a person have once sustained such an injury, of course the head is very likely to go wrong. If we have no ostensible reason for the act, but (on the contrary) have reason to believe that the man was the victim of irresistible impulse; and if we know that he has had an injury of the head formerly; we should then be doubly inclined to the opinion of his being insane, and should urge the judges to shew mercy, on account of the injury in question. Another thing to be considered is, whether he has had a fit of apoplexy or of paralysis; for if he have, then the head might be supposed to be going wrong, when the man committed the deed.

Has Insanity existed in his Family?—Another circumstance will be the existence of insanity in his family. If an individual do a criminal act, and we have strong reason to believe that he did it through insanity,—although he may never have had an hallucination; yet, if we find insanity in his family, we may conclude the insanity has descended to him. Nay, if we find that *no* injury of the head has ever existed, and there has been *no* insanity in the family; yet if this man was insane on a former occasion, then we have strong reason to believe, that this very act was only the recurrence of insanity;—even though the previous attack may have been short,—though the person's peculiarity of mind have merely amounted to great eccentricity.

These are circumstances that will assist our judgment, when a person has shewn no hallucination at all; but merely done a deed, which we suspect must be the result of insanity. In the first place, there should be no motive for the deed. Secondly, it is to be considered whether, at the moment he did it, the person *confessed* that he had no motive; and gave himself up to justice. Thirdly, consider whether or not the patient was aware that he had done any great injury. In the next place, consider whether the propensity to commit the act has come on in a paroxysm; and the patient has been aware of it, and wished to be confined. Then, if there be an agreement of the head with the passion; if there be insanity in the family; or the individual have been previously insane; or there have been other diseases of the nervous system (such as apoplexy or paralysis); —in these circumstances, the individual is "mad", in the common acceptation of the term; though he is not mad *legally*. In many of these cases, however, there is not such great difficulty; because, some wrong idea has generally been observed.

Many Insane Persons not Legally Mad.—Although it is quite necessary to prove that a man has been wrong in some of his notions (either relating to facts present or past); or in some matters of opinion;—although it is necessary to prove that he is absolutely deranged on that one point, or that he is the victim of some one irresistible feeling, before we can say, *legally* speaking, that he is mad; yet *pathologically* we may say, that a great number of people who are at large, are insane. A great number of people at large have any thing but a healthy state of the brain. They have one feeling too strong, or they have a ridiculous notion upon some point; but it is so slight, that it does not disqualify a person for carrying on the affairs of life; and therefore it is only said, that such an one is "a strange fellow", or "an odd fellow"; and so he passes. Speaking *pathologically*, then, a large number of people, who go about, are more or less "cracked"; but

legally speaking, in order to be accounted mad, a man ought certainly to have a mental power in a state of aberration from a healthy state, to such a degree as to disqualify him from conducting the ordinary business of life; or should be the victim of some strong feeling, which leads to the injury of others, or of himself.

Hypochondriasis.—If it be a mere matter of *opinion* on which a person is, pathologically speaking, mad;—as, for instance, that an individual has an unfounded fear of disease, and of death,—we call it merely "hypochondriasis"; and it does not justify us in calling him "mad." If a man who has nothing the matter with him, is satisfied he is in a consumption, because he coughs twice a day; and, because he spits a drachm of mucus in the twenty-four hours, is satisfied that his lungs are full of abscesses, this is a morbid feeling; but as it would not lead to a criminal act, or to any act which is dangerous to others, we do not say he is "mad." We only call the feeling "hypochondriacal"; but the *nature* of that feeling is exactly the same. Many such persons act, on different occasions, very absurdly. Some will not dress as other people dress; some will not eat as other people eat; and they will do a number of things more or less extravagant; but, as the *degree* of extravagance is less, and as they do no act which is injurious to others, we do not call them "madmen." They merely pass as "*eccentric* individuals"; but some one in the family will carry his eccentricity to a higher pitch; and then it is necessary to confine him. It is absolute madness. Suppose a man squanders all his money away;—not for the gratification of a particular feeling, but in a way which is quite contrary to what all other people do; or suppose he inflicts punishment upon himself, and attempts to murder himself or others, or commit depredations on the property of others;—we are not justified in saying, *legally*, that he is mad; although, *medically*, we are quite satisfied that he is in an unsound state.

Suicidal Mania.—But although, when the person suspected of insanity is *alive*, it is necessary to use all these precautions; yet, when the person is *dead*, we are allowed to incline to this opinion on much more general grounds. When a person is alive, of course it is a serious thing to treat him as a madman; and, whatever his eccentricities may be, we are not allowed to say that he is legally mad, unless perfectly satisfied that he does things not simply *injurious*, but *criminally* injurious to himself or others. If he be guilty of such acts, we may be justified in saying he is mad. But if he has destroyed himself, then, on the slightest grounds whatever,—if he have merely said a word or two of nonsense, we are allowed to say that he is legally mad. When a person has committed suicide (which act cannot be committed again), the least probability of mental derangement is admitted by law. Where a person is alive, it is mercy which induces the law to compel us to give evident proof, before a man is pronounced insane; because it would be cruel to confine him without: but when a person is dead, it is desirable to prevent his being treated as a self-murderer; and it is a mercy to make it appear, as much as possible, the result of a morbid state of mind. There can be no doubt, in my opinion, that many criminals are not called "mad", who really are so. I have no doubt that thousands, whose crimes were the result of insanity,—who were not responsible agents, have been executed unjustly; and that thousands more will be executed.

Difficulty of Detecting the Hallucination.—There may be extreme difficulty, sometimes, in ascertaining that an individual has any absurd belief at all; and there is a difficulty on the other side of the question, respecting this absurd belief. Occasionally, it is almost impossible to ascertain

whether a man is mad;—owing to the cunning of madmen. When persons are mad, they frequently have sufficient cunning to deceive any one who is not thoroughly acquainted, not only with the habits of madmen in general, but with the belief of the particular individual. It requires very great skill, sometimes, to bring a person to speak on the point on which he is absurd.

I have mentioned the case of a man, who underwent a most severe examination without exposing his complaint; until asked by Dr. Battie (who knew the point on which he was insane) what had become of the princess, with whom he had corresponded in cherry-juice.[a] We have another instance too striking to be omitted:—"I well remember", says Lord Erskine[b], "that since the noble and learned Judge[c] has presided in this court[d], I examined, for the greater part of a day, in this very place, an unfortunate gentleman, who had indicted a most affectionate brother, together with a keeper of a madhouse at Hoxton, for having imprisoned him as a lunatic; while, according to his evidence, he was in his perfect senses. I was, unfortunately, not instructed in what his lunacy consisted; although my instructions left me no doubt of the *fact*; but, not having the clue, he completely foiled me in every attempt to expose his infirmity. You may believe that I left no means unemployed, which long experience dictated; but without the smallest effect. The day was wasted; and the prosecutor, by the most affecting history of unmerited suffering, appeared to the judges and jury, and to a humane English audience, as the victim of the most wanton and barbarous oppression. At last Dr. Sims, who had been prevented by business from an earlier attendance, came into court. From him I soon learned, that the very man whom I had been above an hour examining, with every possible effort which counsel are so much in the habit of exerting, believed himself to be the Lord and Saviour of mankind;—not merely at the time of his confinement, (which was alone necessary for my defence,) but during the whole time that he had been triumphing over every attempt to surprise him in the concealment of his disease. I then affected to lament the indecency of my ignorant examination; when he expressed his forgiveness; and said, with the utmost gravity and emphasis, in the face of the whole court,—'I am the Christ'; and so the cause ended."[e]

We see, therefore, the extreme difficulty which we may sometimes meet with, in detecting the madness of an individual; that a very minute inquiry is necessary; and that sometimes no minuteness of inquiry will do, unless we are informed of the particular point on which the individual is deranged.

b. Physical Signs of Insanity, and its Progress.

Besides the varieties of insanity,—the variety of absurd notions, the variety of degree, and the absolute extent of this absurdity, (the person being absurd on *one* notion, or on *every* thing; from having little intellectual power left, or very little perception on a point);—besides the variety of the native characters of individuals, independently of their sanity or insanity; and the variety that must exist as to the *derangement* of feeling, as well as

[a] See Page 606.

[b] On the trial of James Hatfield, for shooting at George the Third.

[c] Lord Mansfield.

[d] The Court of King's (now Queen's) Bench.

[e] The foregoing extract, and some further details of Lord Erskine's speech on the occasion, will be found in Professor Amos's Lecture on Insanity; published in the "Medical Gazette", for July 2, 1831. (No. 187; Volume 8; Pages 420 to 423.)

an *excess* or *defect* of feeling;—besides all these, there are many other circumstances which occur in insanity.

Physical Signs.—The head, for example, is frequently hot (both in the various paroxysms, and at the commencement of the disease); frequently the urine is red; the pulse is quick, full, and firm; the eyes and cheeks are red; in fact, there is more or less of an inflammatory condition of the head. Then there are pains, and all kinds of odd sensations in the head;—cracking, bursting, twitching pains of every description. Insane persons speak of flashes of light, of double vision, of noises in their ears; and nothing is more common than deafness, which is the usual disturbance of the external senses in madmen. Sometimes there is a depravation of smell. Patients will fancy there is some intolerable stench around them, and will speak out of their nose. I believe they are generally very fond of snuff. Occasionally, too, there is a great resistance to external cold; but this is by no means universal; for many insane persons, through this notion, have been left to themselves; their extremities have mortified; and they have died. Now and then, however, there has been observed an extreme insensibility to cold; so that they have exposed themselves to frost and snow, without suffering from it in the least. There is apparently a great insensibility even of the external senses; but this principally arises from the abstraction of mind which, in general, is kept up within; so that the patient does not attend to what goes on around. On the other hand, however, extreme *sensibility* has very often been noticed in the disease. Sometimes we observe a sort of stupor; and this is not constant, but comes on occasionally. There are often various other diseases of the brain; such as epilepsy, paralysis, hysteria, and catalepsy. The integuments of the head, especially the posterior, superior parts, are often loose and spongy; so that if the scalp be gathered up, it will be found fuller than usual, and loose.

The breath is very offensive; and some say there is a peculiar smell of the body;—so that we can smell a madman. Some, however, think it very hard that a person should be called "mad", because he does not smell like a gentleman. The tongue is very frequently foul, and the mouth is filled with a viscid mucus; so that madmen are constantly endeavouring to spit it out. I presume there is sometimes a depraved habit of spitting about, and making things dirty; but, besides that, I have no doubt that the tenacity of the mucus is frequently a cause of it. It causes an unpleasantness; which the patient attempts to remove, by hawking and spitting. Some spit constantly in this disease, when it is not intense. I had a patient who was constantly insane; but who, about every fortnight or ten days, had a paroxysm. When he was in a moderately insane state, he spat nearly a pint a day; but as soon as an aggravation of the symptoms approached, he spat less; and as soon as the paroxysm was established, he never spat at all. Then, when it was declining, he began to spit again; and when it was over, he spat as profusely as ever. We sometimes observe extreme hunger, and extreme thirst; but sometimes there is an absence of both hunger and thirst. The patient seems to have no desire for either food or drink. Costiveness is very common in the disease; and sometimes we observe great muscular strength; so that an exertion is made, far beyond what is possible in health. Sometimes insane people scarcely sleep at all. They will pass many days, perhaps weeks, with very little sleep; sometimes without any.

Preceding Signs of Insanity:—Insanity sometimes begins suddenly; and this is particularly the case where the hallucination relates to a propensity. Persons have sometimes been suddenly seized with an irresistible propensity; and *other* forms—where there is an absurd notion, or where there is

general delirium—may also begin suddenly. For the most part, however, insanity is ushered in by an oddity of manner and behaviour. There is a great degree of loquacity noticed. Persons talk much more than they are accustomed to do; and will burst into foolish fits of laughter. On the other hand, they are sometimes observed to be very taciturn. On other occasions persons, before the disease, are observed to be extremely passionate;—in a different state as to temper to what they are accustomed to be; and some, instead of being passionate, are sulky. Some are extremely civil. I have known such civility, as to be quite extravagant. They will beg us to stop to dine, when we have dined already: they will beg us to stop to supper; and then to take a bed. I have been astonished; and have afterwards learned, that these good people were in a madhouse. Frequently, too, there is a quickness of manner. There is no loquacity,—no civility; but a hurried way of doing every thing. Frequently there is observed a want of a proper attention to their affairs. They do not take the same interest in their affairs, that they did before. Again: this disturbance of feeling is frequently observed before the full formation of the disease. There is a want of affection to relations and friends; and, more or less, a change of general habits. These are the chief circumstances which precede the full establishment of the disease, when it does not come on suddenly.

Duration.—With regard to the continuance of the disease, it will vary from a few weeks, to the rest of the individual's life.

Madmen have lived to the age of eighty-seven. Mr. Tuke, in his account of the patients at the "Retreat"[a], says that there were eleven patients there, between sixty and seventy years of age; four, between seventy and eighty; and one had arrived at the age of eighty-seven: yet, upon the whole, there can be no doubt that insanity shortens life. If a person in insanity live to a great age, it is lucky (or unlucky) for him; but, in a great number of instances, such persons do *not* live to be very old;—just as is the case in connate idiocy. Persons who have congenital idiocy, generally die before they arrive at the middle period of life.

Rare in Childhood.—It very rarely, comparatively, occurs in children. The unsoundness of intellect in children is, in general, *idiocy*. Children have very weak passions. They are very little influenced by external circumstances, before mixing with the world, and forming connexions; and, of course, their passions are little liable to be unfavourably excited; and they have much less intellect than adults;—so that, altogether, they are much less subject to insanity. Still, however, children *may* be insane. Although their unsoundness is usually *idiocy*, in various degrees, yet occasionally they are *insane*. Dr. Haslam[b] gives cases of insanity in a child; and so does Mr. Greenwood. I think I have seen several instances of this; where it has been characterized by no delusion, but by very violent rage. Whether, when it begins in childhood, it continues for a long life, I do not know. I cannot say whether such individuals do, or do not, die prematurely.

Remissions and Intermissions.—But although insanity may continue during the rest of the patient's life, it sometimes has remissions, and even *inter*missions. People are not only much less mad at one time, than at another; but sometimes they are not mad at all. These intervals of sanity, are called "*lucid* intervals"; but, for the most part, a lucid interval is nothing more than the diminution of excitement. The patient is not less mad, but he is less violently excited than before; and therefore it is fancied

[a] See Page 605.
[b] See his "Observations on Madness and Melancholy." Chapter 4.

that he is sound; but, in a great number of these cases, we have only to touch the string, and the madness shews itself again;—the patient being only more tranquil,—less *evidently* mad than before. The greatest caution is required in believing that a person is in a lucid interval;—that is, in believing that a person is in an intermission of the disease.

Sometimes Periodical.—Occasionally the disease is not only intermittent, but periodical. I was once shewn, in a madhouse, an individual who was said to be deranged, for a certain time, every three years. I was applied to by a patient in 1814; and, as the case struck me, I made a particular note of it. He was forty-one years of age; and, five years before, a stone had struck him on the temple. The following and three subsequent years, in the month of March, he had paroxysms of laughing, yawning, stretching, and convulsions; the secretion of urine was sometimes copious, and sometimes scanty; there was great vivacity of spirits; he spoke and believed all sorts of absurdities; and his bowels became costive at that time, though at other times they were freely open. This was an instance of insanity. He was only mad in March;—the time at which *hares* are said to suffer derangement. The disease evidently arose from the blow inflicted on the temple, five years before.

Alternating with other Diseases.—The disease will sometimes intermit, alternately with other diseases. It has been observed to alternate with disease of the lungs. I was once, when a student, shewn a patient in Guy's Hospital, who died of phthisis. I understood that he had been previously deranged; and that as soon as derangement ceased, phthisis began; but he was previously considered phthisical. Whether he *was* in a state of phthisis, I cannot say. The stethoscope[a] was not used then, neither was the ear; but he was *considered* to be in a state of phthisis. He had pectoral symptoms; the insanity ceased; all the pectoral symptoms increased; and he died.

Usual Mode of Termination.—Insanity may exist for a long time, and then cease. Dr. Rush *speaks* of spontaneous cures after *eighteen* or *twenty* years; but, in one case, he *witnessed* recovery after *nine* years' duration. Very often, however, insanity terminates in fatuity[b]; and when it so ends, the fatuity is called "dementia."[c] Idiocy, fatuity, and dementia (I mentioned) were in reality the same thing; but if idiocy come on in after life, it is called "fatuity"; and if fatuity be the consequence of insanity, it is called "dementia." But it is to be remembered, that if madmen live to be old,—and some live to be *very* old, their mind, deranged as it is, must decline in the course of nature;—just as the minds of *sane* people decline;—just as *all* our minds will decline; and therefore one can hardly say that insanity has produced dementia; for the *insane* mind must fall into second childhood, exactly like the *sane* one. The disease, however, very frequently terminates, or is joined at last, by palsy; or perhaps by apoplexy; which proves fatal.

c. Morbid Appearances.

Lesions frequently Evade Detection.—When persons die of insanity, we (for the most part) find nothing sufficient to explain the symptoms. There is, perhaps, no appearance of disease in the head;—especially if the person

[a] From στηθος, *the chest*; nad σκοπεω, *to explore*.

[b] From "fatuus", *silly*.

[c] From "de", *without*; and "mens—mentis", mind.

die early, and be inspected very soon after death. But we should remember, that although frequently nothing is found to explain the symptoms, very few brains are dissected in a proper manner. Most persons run over an examination of the brain more quickly than any other part. It takes so much time to open the head, that the rest of the business, for the most part, is hurried over; and many who do examine the brain, are not qualified for such an examination. Notwithstanding all this, however, there can be no doubt that little or nothing is frequently found in the brain of insane persons; —just as is the case in the stomach, in dyspeptic people. The stomach of a dyspeptic person, when opened, could not, in the greater number of cases, be distinguished from that of other persons, who have died with an excellent digestive apparatus. After pure asthma, we cannot tell that the individual has been subject to the affection.

Insanity Corporeal, though not necessarily Structural.—The foregoing, therefore, is no argument against the disease being an affection of the brain. A disease may be *corporeal*, and yet not be *structural*;—no affection of any organ may take place. It does not follow, because we say insanity is *corporeal*, that it is not a disease of the *mind*. We know nothing about that, except as to this world; and it is with this world that medical men have to do. It is a *corporeal* disease; but that does not imply that it must be a change of *structure*. A change of *function* may be quite sufficient. In diabetes, which destroys life, I have frequently opened bodies; and have not seen any evidence of organic disease. It is easy to conceive that this must be the case, if we remember, that individuals who have been mad for years have, just before death, recovered completely. A lady of rank, in whose family there is insanity, told me, that her husband had been deranged for a great number of years; and at length he died; but just before death he recovered his senses. Dr. Marshall, who was formerly a teacher of anatomy in London, mentions a case where recovery from insanity occurred a few hours before death. Now if the disease had arisen from a *structural* affection of the brain,—if the brain had been so disorganized that it could not perform its functions, such an event could not have occurred.

Evidences of Cerebral Disease.—Insanity proves itself to be a cerebral affection, as much as dyspepsia proves itself to be a disease of the stomach. But we may have *anatomical* proof in these cases; for, when the disease has continued long, we generally find some mark of disease in the head. We do not find any thing to explain the insanity; but we find something that shews there has been suffering in the head. For example:—there is often fluid in excess in the brain, or *upon* the brain; or the membranes of the brain are thicker than usual; or they are opaque. The bones of the head are very frequently thickened likewise; the external table remains in its proper situation; but the diploe between the two is increased. A deposition takes place there, and the bones become thicker; and, not only so, but sometimes they acquire a degree of hardness equal to that of ivory. Insanity, it is true, is not situated in the bones of the head; but when there is such thickening of the bones, and the *membranes* are thickened, and effusion is found in the membranes, it shews that the head has been suffering.

Thick Skulls.—Gall mentions that, in many suicidists,—in fact, he says in *all*,—and frequently in great criminals, where there was no efficient reason for the action of which they had been guilty,—where they had been influenced by violent feelings only,—he found the bones dense and thick. Greeding mentions that, in two hundred and sixteen maniacs, he

found the bones of the cranium very thick in one hundred and sixty-seven. In one hundred *furious* maniacs, he found in sixty-eight that the bones of the cranium were very thick. Out of thirty imbecile individuals, he found the bones of the cranium very thick in twenty-two. Gall mentions another interesting fact; which is that, in the extreme old age of maniacs, the bones may grow thin again;—just as they do in sane individuals. It is well known that, in sane individuals, the bones become very thin in certain parts; and though in insanity we may have them thickened, yet they will become thin again.

Local Lesions of the Brain.—Besides these appearances, we may find various diseases in the brain itself; but we must not be surprised if, in cases which are not of long standing, we do not find any disease at all. If the case be of long standing, and the bones are diseased, we may also find disease of other parts. I had a case[a], which occurred in a woman who

[a] A female, aged thirty-one, was admitted [into St. Thomas's Hospital] on the fifteenth of February [1831]; saying that she had been ill two months. It was represented to me [Dr. Elliotson] as a nervous case. The symptoms were, a propensity to injure some part of herself; and she had "no ease and comfort" (these were her expressions) till she gave way to it. "The part that she desires to injure" (says the case-book) "does not continue to be the same for above an hour at a time; but, as soon as the desire to injure one part ceases, she desires to injure another. The mode in which she is anxious to injure herself, is simply by what she calls her own internal efforts. She does not desire to cut herself, or dash her head against the wall, or to poison herself; but to injure herself simply by muscular efforts, unaided by external objects;—so that she will hold her breath for the purpose of suffocating herself; she will twist her head to one side, in order to strain and break all the muscles and tendons on the other side of the neck; she will sometimes force her breath into her ears, so as to endeavour to burst them; and make all the efforts she can, to strain and force her eyes out of her head." She was quite sensible that this was a morbid state, and lamented it exceedingly. She wondered what was the matter with her; and said that, before this affection, she had always had a strong mind, and could restrain her feelings; but now she had no control over her inclinations. Her spirits were greatly depressed, on account of finding herself in this horrid state. I could discover no other morbid condition of the mind. Her judgment, on all points, was good; she was under no delusion of any kind; and yet she possessed this desire. There could be no condition of the case being feigned; for, while you were talking to her, and she to you, you saw her head twist on one side violently; and could discern that she was silently making an effort to rupture some part of the neck, or to overstrain it; and you would see her eyes close, from the efforts that she appeared to be making. Her head was thus constantly in motion; and I thought, at first, she had shaking palsy of the head, or partial chorea; but that was not the case, for she told me, that it arose from her own incessant efforts to strain her head and neck. This appearance of the head was continually going on.

But the proof that there was no deception in all this, was not merely that you saw these efforts going on too naturally and too intensely to be counterfeited, but there were a number of other symptoms. She was drowsy, had pain in her head, a sensation of pressure there, and (she said) a sensation of "opening and shutting" in her head from time to time; but this was chiefly felt at the sides of her head, immediately above the ears; and shot across the back of the head, in a straight line. This sensation was felt immediately above the ears, and extended backwards till the two sensations—the sensations of each side—met. Now she might have said that she had this pain when she had not; but it is a remarkable fact, that this was an alleged seat of the pain. Moreover, there were sensibly evident symptoms of disease; for her breath was excessively offensive; so that those who were much about her complained of it, and could not long hold their heads near her. Frequently it turned my stomach (which is a pretty strong one); and her tongue was excessively foul;—being coated with dirty, thick mucus. She was in a situation of life, too, which rendered it exceedingly improbable that there could be any deception; for she kept a school, and had (in addition) a little trade in the way of a peculiar kind of needle-work; and, by means of them both, she gained a very excellent livelihood. She was exceedingly respected, in her own neighbourhood, by medical men who knew her, and by every one else. This I learned from the medical gentleman who sent her here [St. Thomas's Hospital], to be under my care. She had

had a disposition to injure herself; and there was violent pain in each ear. She was deformed, and laboured under chronic bronchitis. She was placed near a window, caught cold, and died suddenly. After death, over each

hardly any sleep, when she first came to the hospital. Besides the pain running backwards from each ear, she complained of a strong pulsation in that part.

You will sometimes meet with a case, where the person has a sound judgment on every point,—is not at all insane in his intellectual faculties; but is wrong with respect to some one feeling. He finds it irresistibly violent; and, perhaps, it is vitiated at the same time. Now this was the case here. This woman was labouring under a propensity which is called, by Dr. Gall, "the propensity to *murder*", or (in the nomenclature of Dr. Spurzheim, disapproved of by Dr. Gall) "destructiveness";—a propensity, whatever name we give it, bestowed upon animals in general, for the purpose of destroying other animals for the sake of food, and for the purpose of rage; and which exists in us, it has been supposed, in such a form as to give the feelings of rage, anger, or indignation. In this woman there was a diseased manifestation of this propensity; only it was limited to hurting herself. She wished continually to commit suicide, or injure herself. But there was still a greater limitation of it, and a very striking peculiarity in the case; inasmuch as she had constantly a desire to effect the object (according to her own account, and as it appeared) only by internal exertion;—not by taking poison, not by cutting herself with an instrument, not even by using her nails for the purpose of lacerating her flesh; but simply by straining, forcing, twisting, stopping her breath, and endeavouring to force out her eyes and her ears. A peculiar circumstance was the pain which she felt, and the throbbing just over each ear, and extending partially around the head. Every gentleman in the habit of going round the hospital, must have heard her say, that the pain was exactly over each ear; and, though it extended, shot from that situation. This was no imagination of mine. I did not lead her to any such declaration. I merely asked if she had a pain in her head; and she said "yes." I then asked her where it was situated; and she pointed out the exact spot. She was repeatedly questioned, by myself and others, afterwards; and she always gave the same answer. This was a very striking phrenological fact.

This woman died;—not of this complaint; for of that she was cured, or nearly so. She was opened; but I was not present. The brain, however, was preserved; and, on examining it, I found nothing; and this was only what might have been expected. In diseases of various parts of the body, you continually open patients, and find nothing;—so many diseases are merely functional. In this case nothing was to be expected, because the woman was cured; but I understand that the "dura mater" adhered to the brain where the pain was felt; that is to say, at the sides, low down;—shewing that an inflammatory state had previously existed, and had left its common consequence,—adhesion. I should not omit mentioning, however, that the character of the insane person, even where disproportionate development has not been the predisposing cause, corresponds (in most instances) with the character of the head.

With respect to the treatment of this woman, I considered that an inflammatory affection of that part of the head, was the cause of the pain she experienced. I cupped her behind the ears, to twelve ounces; and gave her calomel (five grains twice a day), and put her on low diet. Leeches were again and again applied to that part. She was admitted on the eighteenth of January; and twenty leeches were applied to the seat of the pain every day, till the eighth of February. From the eighth of February, they were applied every other day, for a fortnight. Her mouth soon became tender; and, as that took place, her tongue became clean, and her breath ceased to be fetid. At last, it began to smell of mercury; but the odour was quite changed in character, and was supportable. She twisted her head less and less, and she slept more;—several hours in the night. The pain in the head left her; and she now felt relieved from the disposition to strain and injure herself. She was a deformed woman; and the lungs and heart had hardly any room to play. She was subject to more or less bronchitis; and was seized with an attack, from being placed near a window; and it was necessary, on account of this affection of the chest, to bleed her. She was bled to six ounces, recovered from the bronchitis, was now really well, and was to be dismissed on the following Thursday. On the Saturday, however,—being in the ward just as usual,—she was seized (I understand)—for I had left the hospital—with pain in the abdomen; and, in a few minutes died. The friends came for the body before the inspection could be completed. The head was examined, and also the chest; but nothing morbid was found in either, except the adhesion of the "dura mater" to the brain, above the "meatus auditorius externus." On account of the friends' waiting for the body,

ear, there were found strong adhesions to the "dura mater"; and the brain itself, just over the part, was in a state of vascularity. In insanity we may find different parts of the brain more or less inflamed; and we may find the appearances which inflammation more or less induces; such as thickening and softening, and various organic affections;—just such as would, *à priori*, be expected.

Increased Heat of certain Parts of the Head.—I may mention, in connexion with this remark, that over the parts which are particularly excited, we frequently find the temperature higher, than at other parts of the head. Nothing is more common than to find one part of the head hotter than another. If we have been studying for some hours, we feel the temperature of the forehead to be much hotter than it is either at the top, the back, or the sides of the head. So when persons' feelings are excited in insanity, a local increase of temperature is frequently induced. This remark has been made by those, who have more opportunity of observing the fact than myself.

Georget's Researches.—[M. Georget has summed up the morbid changes which he considers as authentically connected with madness; and his recapitulation may be looked upon as a tolerably complete statement of the result of anatomical researches into this subject, up to the time when his work on insanity, and the article contributed by him to the "Dictionnaire de Médecine", were published. The following are the principal points:—"Irregular conformation of the *cranium*, the prominences of which are developed irregularly;—those of the right side being generally larger than those of the left;—some skulls having the lateral diameter of equal extent with the antero-posterior, and the cavities of the base irregular in extent; some skulls (one in twenty) thickened partially or generally, more frequently the bones hard, white without diploë, resembling ivory; some very light. *Dura mater* rarely changed; sometimes adherent to the skull, thickened, containing deposits of bone. *Arachnoid* displaying in places additional laminæ of a red or grey colour; sometimes thickened, but smooth. *Pia mater* injected or thickened, and infiltrated with serum;—giving, at first, the appearance of gelatinous deposit. *Volume of the brain* sometimes less than the cavity of the cranium seems to require. Some brains very hard; cut with difficulty; the white substance glutinous, elastic, and suffering distension: more frequently the brain is soft;—the grey matter being pale and yellowish, and the white substance discoloured, of a dirty white, the colour and consistence of these portions almost confounded. The convolutions separated by serosity, and the *pia mater* thickened. Interior cavities of the brain appearing in some instances very large, in others small, often filled with a serous fluid, remarkably clear and limpid; *plexus choroides* exanguious, containing hydatiform vesicles. Partial softenings of the brain, erosions, ulcerations of the surface of the ventricles. *Cerebellum* generally softer than the cerebrum, sometimes partially softened. *Mesocephalon*, *medulla oblongata*, and *medulla spinalis*, rarely displaying morbid changes of structure."

More Recent Researches.—Considerable additions have been made to the morbid anatomy of the brain, in cases of insanity, since the time of M. Georget. These researches have been conducted chiefly by MM. Bayle,

the examination of the abdomen was not proceeded with; and, therefore, the cause of death is unknown. Whether she died from a rupture of any part within the abdomen, I do not know; nor have I any idea of the cause of her death; although I am quite satisfied it was in the abdomen.—"*London Medical Gazette*"; *Volume* 8; *Pages* 168 *to* 176. (*No.* 179; *May* 7, 1839.)

Calmiel, Lallemand, Foville, and Bouillaud. The two former have principally directed their attention to the history of general paralysis; and the pathological details given by them have reference to this disease, which may be termed an adventitious one; but which is so frequently connected with insanity, that its supervention cannot be looked upon as a matter of mere contingency. M. Calmiel's observations resolve themselves into the general conclusion, that unequivocal signs of chronic inflammation of the brain exist in almost every case of this disease complicated with insanity.

Some of the morbid appearances which M. Calmiel considered as proper to the disease, which he terms "paralysie des aliénés"[a], are connected by M. Foville with insanity; and are regarded by that writer as ultimate results of that disease in its protracted stage; when the brain—having long been disordered in function, and especially in the state of the vascular apparatus—passes into a degree of disorganization, no longer compatible with the continued preservation of even physical life.

The changes which the different parts of the encephalon undergo, according to M. Foville, resolve themselves into the signs of recent inflammatory action in acute cases, and the well-known results of long-continued inflammation in chronic and inveterate examples of the same disease. He has noted in the former the chief morbid signs in the grey substance of the brain; such are a red colour, uniform, and very intense; numerous mottled spots, varying from a bright to a violet red, bloody points; minute extravasations of blood; diminished consistence in the thickness of the cortical substance, coincident with a slight increase of consistence in its surface; dilatation of the vessels, and resistence of their parietes. In *acute* cases M. Foville has never observed adhesions of the membranes to the cortical substance. Such adhesions are very frequent in *chronic* cases; and hence, as he conjectures, may be explained the curable nature of *recent* maniacal affections, and the hopeless and incurable state of those patients who have *long* laboured under insanity.

Morbid Appearances in the Grey Matter.—The chronic changes of the cortical substance, are increased firmness and density of the superficial part; extending to no great depth, but uniform, and constituting a distinct lamina or layer of hardened consistence; which, torn off, leaves a red, soft, mammillated bed of softened cortical substance beneath. The volume of the convolutions remains natural, or is less than natural;—owing to a real atrophy, or to the existence of lacunæ, which are the results of a minute extravasation. This morbid change often extends to three or four convolutions on each side of the sagittal[b] suture;—a chasm, filled with serosity, often occupying the place of the absorbed cerebral substance. Coexistent with this state of the encephalon, is that species of atrophy of the cranium, in which the diploë disappears;—leaving a superficial depression on the head. Another morbid state of the cortical substance, is that of uniform and red ramollissement; which is a change very distinguishable from that above described.

Morbid Appearances in the White Matter.—The changes of the white substance, principally its preternatural hardness and unusual whiteness, resolve themselves, in M. Foville's opinion, into adhesions between the cerebral fibres and the deposition of additional matter;—the results of chronic inflammation. It is well known to those who have studied the works of late anatomists on the structure of the brain, that M. Foville has attempted

[a] "Paralysis of the insane."

[b] From "sagitta", *an arrow*.

to demonstrate in the organization of the cerebral mass the existence of distinct planes of medullary substance, superimposed one upon another, and connected in the healthy state by means of a very fine cellular tissue. These planes, thus easily separable in the healthy state, become closely adherent in long-continued cases of madness. M. Foville repeats the observation made by many writers;—that the brains of lunatics are so full of serous fluids, that an abundant serosity flows from the surface of incisions. He likewise observes the presence of small serous cavities, from the size of a millet-seed to that of a nut. This was first noted by M. Esquirol. It is the appearance which the late Dr. Sims has more recently described, as the spontaneous cure of ramollissement. The section of a brain thus perforated, is compared to that of a porous cheese. By M. Foville these cavities are supposed to be the relics of extravasation. Perhaps the opinion of Dr. Sims will be allowed to be the most probable:—that they are the results of softenings of the brain. It must be carefully noted, that these changes in the white substance do not belong to insanity, separately existing and uncomplicated with paralysis. In persons affected with the "paralysie des aliénés"[a], they are almost universal. They are likewise found in the brains of old men, whose voluntary movements have become uncertain and vacillating; but more in lunatics whose muscular powers had remained unimpaired.

The Membranes.—The changes in the membranes observed by M. Foville may be referred, in like manner, to the various results of meningitis: they are thickenings and adhesions of the *dura mater*, injections of the *pia mater*, and opacity and increased density of the *arachnoid*.

The pathological results deduced from these observations are, that morbid changes in the cortical substance are directly connected with intellectual derangement, and those of the white substance, with disorders of the motive powers. These opinions coincide generally with those of the most accurate morbid anatomists of recent times. It must be observed, that all such changes in the brain and the membranes resolve themselves into the well-known results of inflammation and increased vascular action.

Thoracic Lesions.—Diseases in the thorax are often traced in cases of mental derangement. Hypertrophy of the heart is a phenomenon of frequent occurrence. M. Georget declares, that in more than three-fourths of the bodies of insane persons examined by him, there had existed organic disease of the lungs; such as chronic pneumonia, or phthisical degenerations. He says, that phthisis is the cause of death in more than half of the maniacs who die in the Salpêtrière. Cavernous excavations are found in the lungs of numerous patients; who, during life (unless the fact has been ascertained by auscultation), are never known to labour under pulmonary disease.

Abdominal Lesions.—Of abdominal diseases in insane persons, the most frequent is gastro-enteric inflammation. This has been discovered in a considerable proportion of bodies of persons affected with mental derangement. One of the most remarkable changes in the necroscopy[b] of insane persons, is displacement of the transverse colon. This was observed, by M. Esquirol, in thirty-three out of one hundred and sixty-eight cases of melancholia. The change consisted in an altered position of the intestine; which, instead of traversing the abdomen, was turned into a perpendicular direction, and precipitated behind the pubes. A similar phenomenon has

[a] See Page 623.

[b] From *νεκρος, dead*; and *σκεπτω, to examine.*

been noticed by Bergmann, Nasse, and Guislain. Organic diseases of the liver are of very rare occurrence in connexion with insanity.[a]]

d. Causes of Insanity.

Hereditary Predisposition.—With regard to the causes of insanity, of course they are *predisposing* and *exciting*;—just as is the case with other diseases. Among the *predisposing* causes, the most remarkable is hereditary predisposition. I should think there is no disease to which the human frame is subject, which can be so hereditary as insanity. When I say "disease", I mean *disposition* to the disease; because if a person do not have a disease break out till he is thirty, forty, fifty, sixty, or even seventy years of age, yet if the disposition to it be given to him by his parents and ancestors, we say it is hereditary. That is the ordinary mode of speaking; but some people object to this word "*hereditary*." I should suppose, however, that if a man inherit an estate from his father, even if he do not come into its possession till he is ninety years of age, it is just as hereditary as if he receive it the day he is born. It is a mere quibble to limit the word "*hereditary*." But insanity, in a large number of cases, is hereditary; and I do not think it is so difficult to wear out the hereditary disposition to any other disease, as it is that to insanity. It seems to require more of dilution,—more crossing of the breed, than any other affection; for it comes on even in the third and fourth cousins; and although it may have disappeared in one generation, it so frequently returns, that there is the greatest danger of its arising in almost every other descendant. Scrofula, gout, and various other complaints, will cease from good management, and in favourable circumstances; but as to the disposition to insanity, it is certainly one of the most undilutable (if I may use the expression) that can be imagined.

Importance of Attending to this Cause.—The importance of attending to the existence of insanity in families, has been very much dwelt upon by some writers; and I must confess that, if I were going to be married, there is no disease that I should be more anxious to inquire whether the family was free from, than this. Dr. Spurzheim, among others, has written on the subject; but it is just as well dwelt upon by Burton in his "Anatomy of Melancholy", in his usual facetious and singular manner. He enumerates hereditary disposition among the causes of melancholia; and says:—

"*Parents a Cause by Propagation.*—That other inward inbred cause of melancholia, is our temperature, in whole or part, which we receive from our parents. Such as the temperature of the father is, such is the son's; and look what disease the father had when he begot him, such his son will have after him, and is as well inheritor of his infirmities as of his lands." He then enumerates a number of hereditary diseases, and proceeds to remark—"Some other causes are given, which properly pertain to, and proceed from the mother. If she be over-dull, heavy, angry, peevish, discontented, and melancholy,—not only at the time of conception, but even all the while she carries the child in her womb,—her son will be so likewise affected, and worse. If she grieve over much, be disquieted, or by any casualty be affrighted and terrified by some fearful object heard or seen, she endangers her child, and spoils the temperature of it, for the strange imagination of a woman works effectually

[a] "Library of Medicine"; Volume 2; Pages 126 to 128.

upon her infant." He concludes thus:—"So many several ways are we plagued and punished for our fathers' defaults; insomuch that, as Fernelius truly saith,—'It is the greatest part of our felicity to be well-born; and it were happy for human kind, if only such parents [persons] as are sound of body and mind, should be suffered to marry.' An husbandman will sow none but the best and choicest seed upon his land; he will not rear a bull or an horse, except he be right-shapen in all parts; or permit him to cover a mare, except he be well assured of his breed. We make choice of the best rams for our sheep; rear the neatest kine; and keep the best dogs. 'Quanto id diligentius in procreandis liberis observandum!' ('And how careful, then, should we be in begetting of our children!') In former times, some countries have been so chary in this behalf,—so stern, that if a child were crooked or deformed in body or mind, they made him away. So did the Indians of old (by the relation of Curtius); and many other well-governed commonwealths, according to the discipline of those times. 'Heretofore, in Scotland,' saith Boethius [a], 'if any were visited with the falling-sickness, madness, gout, leprosie, or any other such dangerous disease, which was likely to be propagated from the father to the son, he was instantly gelded; a woman kept from all company of men; and if by chance, having some such disease, she were found to be with child, she with her brood were buried alive.' And this was done for the common good; lest the whole nation should be injured or corrupted. 'A severe doom', you will say, 'and not to be used among Christians'; yet more to be looked into than it is. For now, by our too much facility in this kind, in giving way for all to marry that will,—too much liberty and indulgence in tolerating all sorts, there is a vast confusion of hereditary diseases;—no family secure;—no man, almost, free from some grievous infirmity or other; when no choice is had, but still the eldest must marry, as so many stallions of the race. Or, if rich,—be they fools or dizzards [b], lame or maimed, unable, intemperate, dissolute, exhaust through riot,—as was said, 'jure hereditario sapere jubentur';—'they must be wise and able by inheritance.' It comes to pass that our generation is corrupt; we have many weak persons, both in body and mind; many feral [c] diseases raging amongst us; crazed families;—*parentes*, *peremptores* [d]; our fathers bad, and we are like to be worse." [e]

Now this is good advice; for though it is not to be carried to the unwarrantable pitch of gelding unfortunate people, yet undoubtedly this matter ought to be attended to much more than it is. I think it sinful to marry a person in whose family there are many instances of insanity; and it is appalling to read the accounts of "deaf and dumb" charities, and "blind" charities; where it is stated that individuals have produced child after child deaf and dumb, or blind. I think, when one or two children have been produced blind or deaf, that it is wickedness for procreation to be continued. Sometimes as many as six children are born deaf or blind in the same family. I should think it would be desirable, in such circumstances, to ascertain (if possible) from which of the family the disease arose; and that divorce would then be very allowable;—so that only one should be deprived of marriage-rites.

As an illustration of the hereditary nature of insanity, Dr. Burrows says,

[a] In his "Scotorum Historia."
[b] Blockheads.
[c] Funeral.
[d] "Parents being murderers."
[e] "The Anatomy of Melancholy; by Democritus, Junior." Part 1; Section 2; Member 1; Subsection 6.

that six cases out of seven, in his private practice, were of that class.[a] In the Salpétrière, there were three hundred and twenty female lunatics; one hundred and five of whom had the disease hereditarily. Out of two hundred and sixty-four cases treated by Esquirol in his private practice, one hundred and fifty were hereditary. Where insanity is hereditary, it is very common to see other members of the family, not deranged, but afflicted with some nervous disease or other. I know one family, where two or three are deranged. The father is not deranged; but he speaks badly, and has twitches of the face. Two other children of the family are sane; but have twitches of the face. Where one is insane, another is frequently a little odd in his manner, or odd in his thoughts; but not sufficiently so to be called "deranged." Where there is insanity in a family, some individuals have very strong feelings; but not so strong as to overbalance the mind, and produce insanity.

Moral Causes.—Among the frequent causes of insanity, are what are termed "*moral* causes";—consisting in violent excitement of the feelings; but these, for the most part, are innocuous, unless there be hereditary predisposition. A person will, in general, bear the most violent excitement from external circumstances, unless there be a predisposition to the disease. We every day see persons suffer the greatest reverses,—the most dreadful privations,—the severest bereavements of those who are dearest to them; so that they are overwhelmed for a time; but they are not ruined in mind for ever. There must be a certain weakness of mind, or a bad constitution of mind, or an ill-regulated state of mind, or a disposition to insanity in general, for these causes to take effect. At any rate, the mind may be so strong, and the faculties so well formed, and so well balanced, that the strongest moral causes will not upset the man. With regard to these causes, it is said that joy has excited insanity, even more frequently than grief. Human nature seems doomed to suffer. Most of us, every day of our lives, suffer something or other,—little or much; and human nature seems more capable of enduring grief than of bearing joy.

Partial Development of the Brain.—There can be no doubt, I think, that one predisposing cause to insanity, is a partial development of the brain. In many people who are deranged through the feelings, (which is the case with the greater part of deranged persons,) certain parts of the brain are more developed than others;—so as to be more than a match for the rest of the head; and they have suffered so strong an excitement, as to have overbalanced the powers of the mind. This occurs in a great number of cases. Where there is mental delusion, I believe, in most cases, it arises from some strong passion. When a man fancies himself an emperor, it is on account of the excessive development of the organ of "self-esteem." When a person fancies himself to be the Deity[b], it is generally from the same circumstance. The delusion generally springs from excess of pride. When a person is convinced that a conspiracy is formed against him,—that attempts are made against his life every day, or that attempts are *meditated*;—when he believes things which have no reality, and sees demons[c] coming to injure or to destroy him,—it is generally from an over-excitement of the depressing passions. That is to say, his fear has got the better of his pride; and, being under the influence of fear, he afterwards becomes the subject of delusion.

Exciting Causes: Intense Application to One Point.—With respect to

[a] See his "Commentaries on the Causes, Symptoms, and Treatment of Insanity."

[b] See Pages 615 and 640.

[c] See Page 640.

exciting causes, there can be no doubt that long application to one particular point, is occasionally the cause of insanity. It was evidently intended by Providence, that we should employ all the faculties with which we are blessed;—not merely that we should use *one* arm, but *both*; not merely one *leg*, but both; not one *faculty of the mind*, but all in their turn; so as to strengthen the whole, and enjoy every feeling of the mind, as well as every intellectual faculty. If, then, a person dwell intensely upon one idea,—so as not to employ the faculties of his mind at large, and employ all the feelings; if one only be engaged to the exclusion of the rest; so that ideas of *one* kind are not counterbalanced by ideas of *another*;—the person may at last persuade himself of any thing, and become mad. We cannot have a better illustration of this, than in Johnson's "Rasselas"; where, from a philosopher studying astronomy;—not hearing discourses on other subjects; not having his mind drawn to other topics; not enjoying one of the greatest delights in life,—conversation with his fellow-men; but shutting himself up, being abstracted on one point (namely, the motion of the heavenly bodies);—he at last became deranged, and fancied that he had the command of them. He was cured by being taken into society again.[a]

[a] I [Imlac] have just left the observatory of one of the most learned astronomers in the world; who has spent forty years in unwearied attention to the motions and appearances of the celestial bodies, and has drawn out his soul in endless calculations. I was introduced as a man of knowledge, worthy of his notice. I visited him with more and more frequency; and was, every time, more enamoured of his conversation.

I had quickly reason to imagine, that some painful sentiment pressed on his mind. He often looked up earnestly towards the sun, and let his voice fall in the midst of his discourse. He would sometimes, when we were alone, gaze upon me in silence, with the air of a man who longed to speak what he was yet resolved to suppress. He would often send for me with vehement injunctions of haste; though, when I came to him, he had nothing extraordinary to say: and sometimes, when I was leaving him, would call me back, pause a few moments, and then dismiss me.

At last, the time came when the secret burst his reserve. We were sitting together, last night, in the turret of his house;—watching the emersion of a satellite of Jupiter. A sudden tempest clouded the sky, and disappointed our observation. We sat awhile silent in the dark; and then he addressed himself to me in these words:—"Imlac, I have long considered thy friendship as the greatest blessing of my life. Integrity without knowledge is weak and useless; and knowledge without integrity is dangerous and dreadful. I have found in thee all the qualities requisite for trust, benevolence, experience, and fortitude. I have long discharged an office which I must soon quit at the call of nature; and shall rejoice, in the hour of imbecility and pain, to devolve it upon thee."

I thought myself honoured by this testimony; and protested, that whatever could conduce to his happiness, would add likewise to mine.

"Hear, Imlac, what thou wilt not without difficulty credit. I have possessed for five years the regulation of the weather, and the distribution of the seasons. The sun has listened to my dictates; and passed from tropic to tropic by my direction; the clouds at my call have poured their waters, and the Nile has overflowed at my command; I have restrained the rage of the dog-star, and mitigated the fervours of the crab. The winds alone, of all the elemental powers, have refused my authority; and multitudes have perished by equinoctial tempests, which I have found myself unable to prohibit or restrain. I have administered this great office with exact justice, and made to the different nations of the earth an impartial dividend of rain and sunshine. What must have been the misery of half the globe, if I had limited the clouds to particular regions, or confined the sun to either side of the equator?"

I suppose he discovered in me, through the obscurity of the room, some tokens of amazement and doubt; for, after a short pause, he proceeded thus:—

"Not to be easily credited will neither surprise nor offend me; for I am, probably, the first of human beings to whom this trust has been imparted. Nor do I know whether to deem this distinction a reward or punishment. Since I have possessed it, I have been far less happy than before; and nothing but the consciousness of good intention, could have enabled me to support the weariness of unremitted vigilance."

"How long, sir," said I, "has this great office been in your hands?"

"About ten years ago," said he, "my

Fever, and Injuries of the Head.—Insanity has frequently been excited by fever, and common inflammation of the brain. It has been excited by heat applied to the body at large; but particularly to the head; what is

daily observations of the changes of the sky, led me to consider whether, if I had the power of the seasons, I could confer greater plenty upon the inhabitants of the earth. This contemplation fastened upon my mind; and I sat days and nights in imaginary dominion, pouring upon this country and that the showers of fertility, and seconding every fall of rain with a due proportion of sunshine. I had yet only the *will* to do good; and did not imagine that I should ever have the *power*. One day, as I was looking on the fields withering with heat, I felt in my mind a sudden wish, that I could send rain on the southern mountains, and raise the Nile to an inundation. In the hurry of my imagination, I commanded rain to fall; and, by comparing the time of my command with that of the inundation, I found that the clouds had listened to my lips."

"Might not some other cause", said I, "have produced this concurrence? The Nile does not often rise on the same day."

"Do not believe", said he, with impatience, "that such objections could escape me. I reasoned long against my own conviction, and laboured against truth with the utmost obstinacy. I sometimes suspected myself of madness; and should not have dared to impart this secret but to a man like you;—capable of distinguishing the wonderful from the impossible, and the incredible from the false."

"Why, sir," said I, "do you call that incredible, which you know, or think you know, to be true?"

"Because", said he, "I cannot prove it by any external evidence; and I know too well the laws of demonstration, to think that my conviction ought to influence another, who cannot (like me) be conscious of its force. I therefore shall not attempt credit by disputation. It is sufficient that I feel this power;—that I have long possessed, and every day exerted it. But the life of man is short. The infirmities of age increase upon me; and the time will soon come, when the regulator of the year must mingle with the dust. The care of appointing a successor, has long disturbed me. The night and the day have been spent in comparisons of all the characters which have come to my knowledge; and I have yet found none so worthy as thyself. Hear, therefore, what I shall impart, with attention such as the welfare of a world requires. If the task of a king be considered as difficult,—who has the care only of a few millions, to whom he cannot do much good or harm,—what mus be the anxiety of him, on whom depends the action of the elements, and the great gifts of light and heat! Hear me, therefore, with attention.

"I have diligently considered the position of the earth and sun; and formed innumerable schemes, in which I changed their situation. I have sometimes turned aside the axis of the earth, and sometimes varied the ecliptic of the sun; but I have found it impossible to make a disposition by which the world may be advantaged. What one region gains another loses, by any imaginable alteration;—even without considering the distant parts of the solar system, with which we are unacquainted. Do not, therefore, in thy administration of the year, indulge thy pride by innovation. Do not please thyself with thinking, that thou canst make thyself renowned to all future ages by disordering the seasons. The memory of mischief is no desirable fame. Much less will it become thee to let kindness or interest prevail. Never rob other countries of rain, to pour it upon thine own. For us [Egyptians] the Nile is sufficient."

I promised that, when I possessed the power, I would use it with inflexible integrity; and he dismissed me,—pressing my hand. "My heart", said he, "will be now at rest; and my benevolence will no more destroy my quiet. I have found a man of wisdom and virtue, to whom I can cheerfully bequeath the inheritance of the sun." . . . . .

The sage confessed to Imlac, that since he had mingled in the gay tumults of life, and divided his hours by a succession of amusements, he found the conviction of his authority over the skies fade gradually from his mind; and began to trust less to an opinion that he never could prove to others, and which he now found subject to variation, from causes in which reason had no part. "If I am accidentally left alone, for a few hours," said he, "my inveterate persuasion rushes upon my soul, and my thoughts are chained down by some irresistible violence; but they are soon disentangled by the prince's conversation, and instantaneously released at the entrance of Pekuah. I am like a man habitually afraid of spectres; who is set at ease by a lamp, and wonders at the dread which harassed him in the dark; yet, if his lamp be extinguished, feels again the terrors which he knows that when it is light he shall feel no more. But I am sometimes afraid, lest I indulge my quiet by criminal negligence; and voluntarily forget the great charge with which I am entrusted." . . . . .

called "*insolation*" has frequently made men mad. Mechanical injury (as may readily be imagined) has produced the same thing. An instance is mentioned of a foreign surgeon having trephined a man, for a large wound of the temporal bone; and, when the wound was healed, the man could not refrain from stealing. He was an honest man before; but after the wound he had an irresistible desire to steal. The surgeon was something of a philosopher. The people could not imagine how stealing was a disease; but the gentleman who had performed the operation, was convinced that it was; and, by representing the case scientifically to others, he procured the liberation of the individual.

The Puerperal State.—The puerperal state is, no doubt, one cause of insanity. During labour, women are subject to such an irritation of the head, and probably of the spinal marrow, as to fall into insensibility and convulsions; and, in like manner, puerperal women frequently become insane. They become so, in general, from the third or fourth day after delivery, up to the fourteenth or fifteenth; and, now and then, they will become insane during suckling. Dr. Gall says, that he knew four women who, in pregnancy only, had a desire to steal. They had a *local* or *partial* insanity; and not, as we usually see in the puerperal state,—a *general* insanity.

Old Age.—I think old age has a tendency to produce insanity; and there it is, in general, insanity of *feeling*. The intellectual faculties decline when we grow old; and the feelings frequently fall into a state of excitement. I have frequently seen old men, whose intellectual faculties have become much decayed, become exceedingly passionate, suspicious, and at last delirious;—totally unlike any thing they were before, and in such a state as I considered to be madness.

Excesses of all Kinds.—Excess of all kinds will induce this disease. Sexual indulgence is always enumerated among the causes of insanity; but very frequently, I have no doubt, excessive sexual indulgence, as well as *improper* indulgence, is the result of a morbid state of the brain itself. I have no doubt that a great many who indulge in sexual pleasures, beyond what is intended, (thinking of nothing else,—running riot every day,) do so through a morbid excitement of the head;—a diseased state. They live in indolence; and, not having any thing else to do, they select this as a good occupation. I have no doubt that many persons indulge in this way, till they go mad; but I am quite satisfied that this is not always the case; but that the state which ends in insanity, has originally produced a violent excitement in that particular direction.

Cessation of Discharges.—The cessation of discharges will have the same effect. Persons have gone mad from the drying up of an ulcer or an issue; and the disease has sometimes arisen in the way of metastasis. When a disease to which a person has been long accustomed disappears, sometimes insanity will occur. I have seen it come on after gastrodynia; and it is said to have occurred, sometimes, after itch, and other diseases. It is

"My reason", said the astronomer, "has been so long subjugated by an uncontrollable and overwhelming idea, that it durst not confide in its own decisions. I now see how fatally I betrayed my quiet, by suffering chimeras to prey upon me in secret: but melancholy shrinks from communication; and I never before found a man to whom I could have imparted my troubles, though I had been certain of relief. I rejoice to find my own sentiments confirmed by yours;—who are not easily deceived, and can have no motive or purpose to deceive. I hope that time and variety will dissipate the gloom that has so long surrounded me; and that the latter part of my days will be spent in peace."—"*History of Rasselas, Prince of Abyssinia. By Samuel Johnson, LL.D.*" *Chapters* 40, 41, 42, 43, 46, *and* 47.

merely a disease of the brain; and therefore persons afflicted with it are subject to all other affections. Diseases of the liver and intestines will sometimes produce a sympathetic excitement of the head; so as to occasion insanity. Disease of other parts, on the other hand, will sometimes *impede* this disease.

Agency of the Devil.—I need not say that the devil has nothing to do with this disease, any more than any other; but some physicians say, that the disease is caused by the devil, or demons. The devil is a particular individual; but demons are supposed to be the spirits of departed persons. Even sound writers give an account of insanity being produced by the devil. Sauvages, the first writer on nosology, says that he really cannot agree with those German physicians who, one and all, say that persons possessed by the devil do wonders. Hoffman and Sauvages state, that signs are produced by demoniacal agency. One of these authors says, in the first place, that when a person is mad through demons, he has a demoniacal manner. He has not only heard them vociferate unusually loud, and make most unusual gestures, but perform wonderful and unusual motions of the body. In the second place, he says that these motions of the body (convulsions) came on suddenly, without any preceding disease. Thirdly, that such patients are very blasphemous; and look very much like the devil. Fourthly, that they have a knowledge of men; and reveal secret and particular objects faithfully. Fifthly, that they have a knowledge of unknown tongues;—not *foreign* tongues. To be conversant with *unknown* tongues, is much more clever than knowing *foreign* tongues. We should all be desirous to know the latter in this way; because it would save us the trouble of learning them. Sixthly, he says, that they have unusual strength; and, seventhly, that they vomit singular things;—such as hairs, pieces of flint, pins and needles, and things of that description; and that they not only discharge them from the stomach, but even sometimes from the eyes. When this occurs, we may be quite sure a person is possessed of the devil. Physicians have now driven demons from the nosology; and Voltaire says, that the devil is always much mistaken when he addresses himself to doctors;—that we are the men who drive him out.

e. Diagnosis and Prognosis.

Phrenitis.—As to the general *diagnosis* of insanity, we have to distinguish it from phrenitis, from fever, and from delirium tremens. There can be no doubt that, in insanity, there frequently are signs of inflammation;—that there is pain and heat of the head; quickness of pulse; thirst; a dry and foul tongue; high-coloured urine; and a throbbing of the temples;—just as in delirium from inflammation. But, in the first place, insanity is a *chronic* disease; whereas phrenitis and fever are not; and, in the next place, although there are these symptoms of inflammation of the brain in insanity, when it *first begins*, (so that we may be in doubt as to whether it is phrenitis—common inflammation—or not,) yet we have this criterion;—the insanity is out of all proportion to the signs of inflammation. I know of no other mode of discerning the true nature of the case, when signs of inflammation are present, than this. But in insanity, we may have no signs of inflammation at all; so that there can be no doubt as to its not being a case of inflammation of the brain. The state of the brain may be much the same, and there may be something of quibbling in it; but the distinction is important: because, if there be decided inflammation of the brain, we may set to work according to the strength of the

patient; and, by antiphlogistic measures, do great good; whereas, if the signs of insanity be out of all proportion to the signs of inflammation, and it be taken for a mere case of phrenitis, we shall in general do great harm. Antiphlogistic measures are, generally, very useful in the *beginning* of insanity, when there are more or less signs of inflammation; but if the signs of aberration of mind, be out of proportion to the signs of inflammation, they will do serious mischief. Indeed, if we go boldly to work, and think that it is a case of inflammation, antiphlogistic measures will frequently cause the patient to sink; or they will perpetuate the disease. It is of importance to consider, whether the signs of inflammation, and the signs of insanity, are in proportion to each other. If the latter be only in proportion to the former, the case may be treated as inflammation. Our diagnosis will be also assisted, by knowing whether the individual has ever been insane before, and whether there is insanity in his family; because, if these circumstances do exist, and if we think that disturbance and inflammation are coexistent, and not one dependent upon the other, then we must not have recourse to antiphlogistic measures.

Fever.—As to the delirium of fever, it is easily known (in general) by the peculiar hollowness of the eyes, the vomiting, the extreme loss of appetite, the pain of the loins, and so on. One cannot easily mistake a case of this description; and when delirium afterwards comes on, if it be violent, it is in proportion to the signs of inflammation; and if it be not violent,—if it be *muttering* delirium, then it is in proportion to the sinking of the patient, the fluttering state of the pulse, and the typhoid symptoms.

Feigned Madness.—It is of importance to know whether the disease is real or feigned. If it be feigned madness, the impostor cannot keep himself awake; as madmen frequently do. Madmen frequently sleep regularly; but frequently they can do without sleep for a long time; but, where the disease is feigned, persons cannot hold out. Neither can they desist from eating and drinking, as madmen frequently can; and the pulse is frequently not affected;—at least if they are confined, so that they cannot gain access to stimuli. Madmen will rave for days and weeks, without stopping; whereas a person who is feigning madness, generally thinks it necessary to rage violently, because he considers it an important feature of insanity; and the consequence is, he cannot continue it. Supposing, however, that the patient does not affect *mania* (that is to say, *general* insanity, derangement on *all* points), but *monomania*[a], he generally overdoes it. It is impossible to convey, by words, an accurate idea of what we mean; but generally there is some over-acting, or some sort of inconsistency. He does not support the character well. He is not aware of all which he ought to do; and he does more than he should.

Concealed Madness.—There is no difficulty, therefore, in establishing the diagnosis;—as to whether it is phrenitis, or fever, or insanity; or whether it is a case of feigned insanity or not. The difficulty is to ascertain whether a patient is *really* mad, when he pretends *not* to be so. The difficulty is not to prove cases of "morbi *simulati*"[b]; but cases of "morbi *dissimulati*"[c];—not where the disease is pretended; but where the patient pretends not to have it. I formerly alluded to some cases, which shewed how cunning madmen were[d];—how necessary it is to take them by surprise;—to ask circuitous questions; so that they may be led to the main question, without being aware of it.

[a] See Page 602.
[b] "Pretended diseases."
[c] "Concealed diseases."
[d] See Pages 606 and 615.

Prognosis.—If there be hereditary tendency to the disease, or if there ave been an injury of the head, or if there be a peculiar organization of the ead, or if there have been previous attacks of the disease,—recovery is ot the less probable, but relapse is the more probable. Such persons do ot less easily recover than others; but when they *have* recovered, they ay easily fall into the disease again. I believe that the prognosis is ren- ered more favourable by the individual, in whom the disease occurs, being either very young, nor in an advanced life; but in the middle period of fe. The more violent the exciting cause, the more favourable will be our rognosis; because, if the exciting cause be very slight,—if a small spark ave excited a great flame, it may be supposed that the person is strongly isposed to insanity; whereas, if the exciting cause be very violent, there as probably but little disposition to the disease; but the violence of the ause was every thing.

Mania,—general excitement of the brain,—general delirium,—general iolence of feeling, affords a more favourable prognosis than *mono*mania. Iania is a general disturbance of the whole head; and it is more capable f correction than a fixed disturbance on one point. It appears to be more f the nature of an inflammatory state of the brain; and inflammation is ore easily recovered from, than any thing locally fixed,—where the pa- ent dwells upon some one particular point. Dementia, or that weakness f intellect which follows insanity, affords the least favourable prognosis; r the brain is generally in such a state of inexcitability, that it seldom covers its power. If a person have epilepsy, or other diseases of the rvous system, recovery is rare. The longer the disease has existed, the ss chance is there of recovery; the more acute the disease, the more ansient (in general) is it. With regard to those cases which occur in a erperal state [a], recovery is more frequent than otherwise. The prognosis ay generally be given favourably, when the patient has fallen into the sease after delivery, or during suckling.

f. Treatment of Insanity.

The *treatment*, like the *causes* of insanity, is generally divided into two nds,—*moral* and *physical*; and the physical, again, are divided into two nds;—first, *antiphlogistic* measures; and, in the next place, *soothing* mea- ures.

1. *Physical Treatment.*

Antiphlogistic Measures.—When the case is recent, and there are phre- tic symptoms, the remedies for inflammation within the head are to be lopted, with more or less vigour; or when the case is *not* recent, but we ve similar symptoms during any period of the disease, the same measures e to be more or less adopted. Generally speaking, however, antiphlogis- measures are not very admissible. When blood is taken away, it is und, in the greater number of cases, that it is neither buffy nor cupped; d the majority of cases treated actively, as phrenitis, do not turn out so ell, as those in which such treatment is not adopted; or in which such eatment is adopted with very great moderation.

I have before mentioned [b] that, in insanity, there may be no signs of renitis at all; or that if there be, still the mental aberration, and the mental

[a] See Page 630. [b] See Page 631.

excitement, are out of all proportion to the signs of inflammation which exist. I stated[a] that the disease is not inflammation of the brain; for, though there may be more or less of an inflammatory state, yet that does not explain the disease. It is a morbid state, not necessarily of an inflammatory nature; and that morbid state, although frequently *connected* with inflammation, is unquestionably not *founded* upon it.

Blood-letting.—In the beginning of the disease, however, very frequently a certain extent of blood-letting is proper; together with a certain degree of purging and ptyalism. For example:—the exhibition of tartar emetic, in large doses,—so as to produce a state of nausea, and depression of the system,—may be serviceable. But we must be guided, in the employment of these measures, by the state of the patient; by the recency of the occurrence; by the state of the constitution at large; and by the strength and character of the pulse. We must remember that, whatever signs of inflammation there may be, the disease is not necessarily of an inflammatory character; and that it is much better to adopt moderate antiphlogistic measures, such as will not greatly depress afterwards.

Cold to the Head.—Among these, the application of cold to the head is one of the best. The application of ice is often much more effective than bleeding; and it is not attended by such subsequent depressive effects as bleeding. I can lay down no rule for the adoption of antiphlogistic measures, except this;—that we must be very much on our guard, and not trust too much to bleeding. When the disease has existed for any considerable time, if a fit of violence come on, it is very rarely to be treated by blood-letting; but cold must be applied; and we must remove, as much as possible, all stimuli.

Stimulants and Narcotics.—However, we have sometimes a very different state from that of inflammation. Frequently there is great aberration of mind; but, while the mind is in a state of high excitement, the pulse is of a weak character,—perhaps very rapid; and it is clear, from the whole state of the patient, that we must not adopt depressing measures; but that, on the other hand, stimulants and narcotics are the most useful. Frequently, in this disease, there is a weakness of pulse; which easily proves, to an experienced person, that the case is one, not of inflammation, but of irritation. This is to be treated by cold;—in the form of ice, or cold water, or a shower-bath; and frequently by good nourishment and narcotics. Cold lessens the morbid irritability of every part of the body.

Both Plans Conjoined.—Now and then, both plans may be very moderately conjoined;—just as in the treatment of inflammation. But frequently maniacal patients are in such a state of excitement, that they will not bear more than the application of ice to the head, and moderate purging; and we may find benefit by the administration of a certain portion of wine; or (what generally answers still better) a certain portion of porter, or good strong malt-liquor of some other kind; together with nutritious food. As to narcotics, morphia has been found of late to answer much better, in a great number of cases, than opium. I have seen persons soon sent to sleep, in this state, by a large dose of camphor;—a scruple of camphor given every three or four hours.

It is necessary, not only at the *beginning* of the disease, but at its *crisis*, to prevent the patient from falling into an inflammatory state of the head; and, on the other hand, it is necessary to keep up the strength;—not to

[a] See Page 631.

llow him to sink into a state of debility and irritation. Moderate anti-hlogistic measures are the only ones to fulfil the former indication; and utritious food, or even the moderate administration of stimuli, together ith narcotics, are very serviceable for the latter.

Attend to other Diseases, if present.—I need not say it is necessary, in ll cases, to remedy any other disease that may be present. If there is ostiveness, vomiting, chronic hepatitis, or any other disease, get rid of it possible; for, in most instances, it will only exhaust the patient so much e sooner; and in fact, irritation in *one* organ, frequently keeps up irrita-on in *another*. Now and then cases occur, in which mania is suspended y the production of another disease; but these instances are comparatively re. If the new disease were but slight, (supposing, for example, it were nly the itch,) it might be well to let it run its course; but if there were y serious disease, I should consider it our duty to cure it;—at any rate, lessen it as much as possible; because the insanity itself could not do ore mischief than it will.

Support the General Health.—Not only is it necessary to remedy any iseased state that may exist,—unless it be clearly beneficial to the mind, d at the same time clearly not injurious to the body,—but it is also ne-ssary to support the health as much as possible;—to have the patient, as uch as possible, in the fresh air; to observe the most perfect cleanliness; d to take care that all his food shall be of the best quality.

Warm and Cold Baths.—Warm and cold baths are found very useful; t it is in melancholia that warm baths answer best. The cold-bath, in most ses of insanity, when patients glow after it, is an exceedingly useful mea-re; and in violent paroxysms, a cold shower-bath, continued till the pa-ent is pretty nearly overpowered, has often a beneficial influence. As a eans of remedy in chronic cases, also, the shower-bath is one of the best ings that can be employed.

A hot and a cold bath have been sometimes had recourse to toge-er. If the patient be placed in a hot bath, and after a short time a ream of water be allowed to play on the head,—descending for about ree feet, till the head be thoroughly cold,—it is said to be very beneficial. hese are all various modes of effecting the same purpose.

Means for subduing the Violence of the Paroxysms.—Speaking of the medies for the purpose of subduing great violence, I may mention that e most violent fits of insanity,—the greatest paroxysms of rage will, in neral, cease for a time spontaneously. It was the custom of Pinel, the lebrated French physician, to let patients exhaust themselves;—to let em rave away; being certain that, after a time, they would be quiet ain. Nature is exhausted after great excitement; for the latter cannot carried on for a long time. But, for the purpose of suppressing this olence, when it is too long continued, some practitioners have recom-ended a rotary machine; in which the patient is set upright, and spun und as fast as possible;—till he is sick and giddy, and reduced to quiet-ss. In that way a maniac, like any body else, will be rendered pretty lm. It has been recommended to lay the patient horizontally, with his ad at the centre, and to spin him round in that position; so that the ood might be driven from the head to the centre of the body, by the ntrifugal force. I have seen it put in practice in lunatic-asylums abroad; here the patients spun round as fast as a tetotum; and, it is said, with e effect of quieting them.

2. *Moral Management.*

With regard to *moral* management, very great good may be effected. The *medical* treatment is, for the most part, adopted for the purpose of lessening any urgent symptoms at the time; and for the purpose of preventing mischief; but with regard to curing the disease, I believe physical treatment, in the greater number of cases, is not very efficacious. We may do great good by means of it;—we may prevent an inflammatory state of the head; we may support the constitution; we may do great good by cooling the patient, procuring sleep, maintaining the general health, removing diseases in other parts of the body, re-exciting a suppressed discharge, preventing additional mischief, and lessening urgent symptoms. The *moral* treatment, however, is of the very highest importance.

Cultivate the Healthy Faculties.—In the first place, it is right to cultivate any faculties that are still sound. If patients be not *universally* insane, but have any mental faculties left in a state fit for occupation, it is exceedingly serviceable to employ them. If a patient have a taste for drawing, for music, for mechanical contrivances, or for any other employment, that faculty should be cultivated. He should be allowed to make the best exertion he can with his intellect. A pleasurable occupation of this description, is exceedingly advantageous;—not only as contributing to the happiness and the comfort of the patient, but as withdrawing him from insane ideas. By this means persons have frequently had their insanity very easily subdued.

Moderate Exercise.—It is also found, almost universally, of great service to enjoin moderate exercise. A large number of maniacs, who have no intellect left for any pleasurable mental occupation; and many who, even while in their senses, knew not what intellectual delight was,—may still derive great pleasure, as well as great improvement of health, from bodily exercise. Nothing is found more useful, in the treatment of lunatics, than to give them things to do; and, more especially, to make them work in gardens; and occupy themselves continually, in the open air, with bodily exercise.

Interest the Feelings.—It has also been found of great use, not only to maintain activity of body, and cultivate those faculties of the mind which are still entire;—to make the most of what is left; but also to interest the feelings. This has been found particularly the case with females. We should give them animals to take care of; for the tender feelings are excited, and a constant interest is kept up by having animals under their care. This has been found, in many instances, of very great use. Whatever their station in life may be, by giving them bodily exercise, we maintain the general health; we withdraw their attention from madness to reason; and, in some degree, create a pleasant state of mind. This may be done by mental occupation, as well as by bodily exercise. One great point is, to produce a pleasurable state of excitement; and, in conformity with this, it is necessary to make them as happy, in all respects, as possible;—to treat them with the utmost kindness;—never to have recourse to severity, except in urgent cases; and never to have recourse to harsh punishments, or to any thing which can border on cruelty.

Impropriety of Harsh Treatment.—Nothing should be done which is calculated to irritate their mental or bodily feelings;—to inflict corporeal pain, or produce vexation of mind; unless the latter be absolutely necessary. No stripes, or corporeal punishment, ought ever to be adopted. For-

merly, straps and bars were had recourse to, as a proper mode of treatment. Till modern times, the chief treatment of insanity consisted in cruelty. Celsus gives direction for the employment of the greatest severity towards unatics.[a] Meibomius (after whom the tarsal glands are named) says that Rhazes, an Arabian physician, orders that when a person labours under 'love-madness", and nothing else will do, he must be tied up, and hen soundly thrashed, and beat well with the fists; and this again and gain. "One swallow does not make a summer"; and therefore, if one hrashing does not do, give the patient another. Another writer agrees vith him; and says—"If the patient be a young man, let his posteriors be vell flogged; and, if he be not quiet then, put him into the bottom of a ower, with some bread and water, till he begs pardon for being mad, and ecomes sane." Such were the ideas entertained, formerly, of the treatment f insanity.[b]

Restraint, when Necessary, should be Mild.—There should be the mildest estraint possible. Restraint is sometimes very necessary; because some atients are mischievous; and they will not only tear things to pieces, and o all the mischief they can; but they will murder themselves or others. ut restraint, when necessary, should always be effected in the gentlest anner. At those lunatic-asylums where the greatest attention is employed, here (I believe) the greatest gentleness is found admissible; for the more ruelly we behave to lunatics, the worse they are. It is in mismanaged natic-asylums, that we have shouting and howling; and that every kind f trouble is experienced. Where the keepers of lunatic-asylums are be-evolent,—use no more restraint than is necessary; and especially use re-raint in the least offensive manner; and where they take every admissible pportunity of being kind to the patients;—there we find the patients early all quiet; and a very small number indeed require corporeal re-raint.

If punishment be necessary for having done amiss, patients ought not to flogged, but confined for a day;—as a child would be; and should be ld that that is the punishment for having done amiss. It is certainly right be firm in all this;—never to threaten punishment, and then not put in execution. A maniac would soon find out this mistaken lenity; and ke advantage of it. Whatever is threatened, should be put into execu-on;—provided we threaten nothing but what is right; so that maniacs ay depend upon punishment, as a certain consequence of misconduct. t the utmost that is required in the way of punishment, is to deprive

[a] Celsus, however, is by no means an qualified advocate of harshness; for (in ok 3, Chapter 18) he says—"Sæpius nen assentiendum, quam repugnandum ; paulatimque, et non evidenter, ab his e stultè dicentur, ad meliora mens addu-da. Interdum etiam elicienda ipsius in-tio; ut fit in hominibus studiosis littera-n, quibus liber legitur, aut rectè, si delec-tur, aut perperam, si id ipsum eos offen-; emendando enim convertere animum ipiunt. Quin etiam recitare, si qua me-nerunt, cogendi sunt. Adcibum quoque sdam non desiderantes reduxerunt hi, inter epulantes eos collocarunt."—"Yet are oftener to agree with their opinions, n to oppose them; and by this means the nd is (by degrees, and insensibly) to be led from a foolish to a better mode of discernment. Sometimes, also, an effort of the mind is to be elicited;—a plan which is adopted with literary men; to whom a book is read, correctly if it please them, or incorrectly if such improper reading displeases them: for they then turn their attention to correcting it. Moreover, they should be urged to recapitulate whatever they may remember. Some, who had before no desire for it, have been induced to partake of food, by being seated with those engaged in eating."

[b] This "love-madness" (observes Dr. Elliotson) is certainly the only case in which such treatment should be adopted;—if adopted at all.

them, for a little time, of any pleasure which they are accustomed to have, or to employ a little more restraint than usual.

Removal of Knives, &c.—In the next place, it is very necessary that there should be nothing dangerous allowed to be in the patient's reach;—knives, or any instrument of which the patient might make a bad use. There are various degrees of insanity; and many patients may be trusted with things that might do harm; but, as a general rule, every thing with which he could do mischief, should be removed from a patient's reach. The windows should be well secured; and the patient should have no opportunity whatever of doing mischief; for lunatics are very sly. Bars, however, should be so placed before the window, as to look ornamental, rather than otherwise; and so as not to give the idea of a prison-house.

Separation from Friends.—There should be nothing about the individual, to remind him of the circumstances connected with his insanity. Hence, in most cases, it is found useful (as a general rule) that the patient should be removed from his friends; for the circumstances connected with his insanity will (of course) present themselves, if the patient see his friends frequently, or remain in his own house. It is, for the most part, advantageous to take the patient away from his friends, and his own premises; in order that all associations connected with his insanity may be removed.

Interviews with Friends.—Still, although it is necessary to remove patients from their friends, yet when reason is returning, it has sometimes been found useful to gratify them with a sight of those they love the most. I know that exceptions to the rule of not allowing them to see their friends, are rare; but now and then that rule may be broken through, and great advantage be derived from such a breach of it. Dr. Gooch, in the "Transactions of the College of Physicians"[a], and likewise in one of his posthumous volumes[b], gives an account of a lady with puerperal insanity; in whom the gratification of seeing her husband, was apparently productive of good effects. It was an experiment; but Dr. Gooch satisfied himself that it was likely to be productive of benefit. It is a good general rule, not to be broken through without care; but the result, in Dr. Gooch's case, was very satisfactory.[c]

A similar case occurred to me, some years ago, in a gentleman who had

[a] Volume 6; Page 294.

[b] "Account of some of the Most Important Diseases peculiar to Women."

[c] A lady, twenty-eight years of age, of good constitution, but susceptible mind, became affected with melancholia, a few months after her second lying-in. Toward the end of her pregnancy, a frightful incident had occurred to a near relation; and affected her so deeply, that she often spent the night sleepless, sitting up in bed, thinking of her misfortune, and dreading that she should lose her reason after her confinement. Having nursed her child without feeding it for three or four months, with much unnecessary anxiety and exertion, she grew thin and weak; complained of sinking at the stomach, and aching in the legs; and experienced so much confusion of mind, that she could not arrange her domestic accounts. She became low spirited;—she knew not why. She was advised to wean her child, took some light tonic and gentle laxative, and went down to the sea-side; but, at the end of a month, she returned home;—having derived little benefit from her absence. Her spirits became gradually more depressed; and it was impossible to persuade her that she had not some fatal disease. One day it was a cancer; another inflammation of the bowels; and to such a height did her apprehensions rise, that her husband was often brought home, by some alarming message, and found her with a solemn air; and, in a low whisper, giving direction to her servants whom she had assembled around her, what to say if she should expire before her master arrived. She now grew much worse; and there was no longer any doubt about the nature of her complaint. She was seen by a physician of extensive experience in these diseases, and sent into the country. Many weeks passed; sometimes she was better, sometimes worse

been deranged from moral causes. From great anxiety of mind, he was perfectly deranged; but his insanity subsided, and he told me that he should like to see his wife; for that it was very hard to be kept from seeing his wife and family. I found him still deranged; but I stopped with him two hours, and satisfied myself that it would do him good. He wished to leave his bed-room, and see different parts of the house. I took off his jacket,

—now accusing herself of the deepest depravity, and meditating schemes of self-destruction; then, again, convinced of the absurdity of her notions, and struggling against the load which for a short time every day weighed on her heart. In this way many weeks passed. At length, the disease came upon her with more violence than ever; and, in her self-examination and condemnation, she became quite ferocious.

She was now put under the care of an experienced attendant; separated entirely from her husband, children, and friends; placed in a neat cottage, surrounded by an agreeable country (it was the finest season of the year); and visited regularly by her physician.

For several weeks she manifested no improvement. Sometimes she was occupied with one notion, sometimes with another; but they were always of the most gloomy description. At length it became her firm belief, that she was to be executed for her crimes, in the most public and disgraceful way. Every noise she heard, was that of the workmen erecting the scaffold; every carriage, the officers of justice assembling at the execution; but what affected her most deeply was, that her infamy had occasioned the disgrace and death of her children and husband, whose spirit haunted her. As soon as the evening closed, she would station herself at a window at the back of the cottage, and fix her eyes on a white post that could be seen through the dusk. This was the ghost of her husband; who, day and night, was whistling in her ears.

Several weeks passed in this way. The daily reports varied; but announced nothing happy. At length her husband became impatient; and begged to have an interview with her;—thinking that the best way to convince her he was not dead, was to shew himself. This was objected to. He was told the general fact, that patients are more likely to recover when completely separated from their friends; and that if she saw him, she would say it was not himself, but his ghost: but the husband was obstinate; and the interview was consented to. When he arrived at the cottage, he was told that she had had a tolerable night, and was rather more tranquil; but that there was no abatement of her gloomy notions. "As soon as I entered the drawing room, where she usually spent the day", (I [Dr. Gooch] copy his own statement, and which he wrote down at the time of the occurrence,) "she ran into a corner, hid her face in her handkerchief, then turned round, and looked me in the face;—one moment appeared delighted at the thought I was alive; but immediately afterwards assumed a hideous expression of countenance, and screamed out that I was dead, and come to haunt her. This was exactly what Dr. Gooch had anticipated; and for some minutes, I thought all was lost.

"Finding that persuasion and argument only irritated and confirmed her in her belief, I desisted; and tried to draw off her attention to other subjects. It was some time since she had seen me or her children. I put her arm under mine, took her into the garden, and began to relate what had occurred to me and them since we parted. This excited her attention: she soon became interested; and I entered, with the utmost minuteness and circumstantiality, into the affairs of the nursery, her home, and her friends. I now felt that I was gaining ground; and, when I thought I had complete possession of her mind, I ventured to ask her, in a joking manner, whether I was not very communicative for a ghost. She laughed; I immediately drew her from the subject; and again engaged her attention with her children and friends. The plan succeeded beyond my hope. I dined; spent the evening with her; and left her, at night, perfectly herself again."

He went the next morning, in a state of intense anxiety, to know whether his success had been permanent; but her appearance at the window, with a cheerful countenance, soon relieved his apprehensions. While he was there, Dr. Gooch came in. He went up stairs, without knowing the effect of the interview; and came down, saying—"It looks like magic!" With a view of confirming her recovery, she was ordered to the sea-side to bathe. As soon as the day of her departure was fixed, she began to droop again; the evening before it, she was very low; and, on the morning of her setting-off, was as bad as ever. This state continued for several weeks, in spite of sea-air and bathing; and ceased as suddenly as it had done before;—apparently in consequence of interviews with friends, calculated to remove the apprehensions by which her mind was haunted. She has since then continued perfectly well; and has had another child, without the slightest threatening of her former malady.—*Gooch, on the Diseases peculiar to Women; Chapter* 21. *(Second Edition; Pages* 163 *to* 168.*)*

and led him down stairs; and gratified him by letting him see, first one part of the house, and then another. I watched the effects, and found it did not disturb him in the least. On the contrary, he seemed to gain intellect, and power over himself, as we proceeded. There were many little gratifications which he wished for, and which I let him have. One curious thing was to kill a *bantam-cock*, which he saw from a window; and which appeared to him as a spectre, or a fiend. The colours, he said, had been terrific to him; and he should not be happy till it was killed. I gratified him with it; and he was exceedingly thankful. He killed it himself. I watched him carefully, for some time after this; and at last I satisfied myself, that the sight of his wife would not be dangerous. I might have been wrong; but it turned out that I was right. I brought her from a neighbour's house; and the interview was most affecting. From that moment he was perfectly in his senses; except for a few days when he was violently excited, and then he was found to ramble. This rule of separating a patient from his friends, therefore, although a very proper one, may be now and then transgressed; but it should not be broken without extreme caution. For the most part, when patients are insane, if their friends be about them, it increases the general excitement; and there is no chance of doing any good, till they are withdrawn.

The absence of all corporeal punishment,—of all cruelty or severity,—of every thing which is calculated to irritate the patient, and the adoption of every thing that is mild, and gentle, and soothing, and calculated to excite their best feelings, and all their feelings in a pleasurable and satisfactory manner;—this will lead, very frequently, to the removal of the disease. But beyond this gradual operation on the disease, moral treatment cannot be expected to go. We cannot expect, by moral treatment, to cure a madman at once.

Immediate Recovery by Moral Means.—A story, however, is related, of a person being cured in France, all at once, by moral means. A madman maintained the possibility of the miracle of St. Denis. The miracle was, that the saint kissed his own head. A madman was maintaining that this was a fact; and said it was possible, because he had done so himself. Another madman inquired how he did it; and whether he kissed it with his heel;—and then he laughed at him. From that moment the man never spoke of it again. Now it is quite clear that the man must have been almost in his senses, to have seen the validity of any such reasoning.

Another is said to have believed himself the Holy Ghost; and he had a neighbour in the madhouse, who also believed that he was the Holy Ghost; and, as they were not far separated, they were brought to each other. The one inquired—"Can there be two Holy Ghosts? You say *you* are the Holy Ghost; and *I* am the Holy Ghost;—can there be two?" The man got up and said—"There cannot be two Holy Ghosts;—I must be wrong!"—and he never again called himself the Holy Ghost. But when such an effect as this is produced, the person must be almost well.

There was another man who fancied himself dead [a], and implored to be buried. He assured his attendants that he was quite dead; and he abstained from food, as a dead man ought to do; and was laid out, as dead men are. He was conveyed towards the church;—not enclosed in a coffin, but carried in a bed. His friends took care that some merry fellows should meet the funeral, at a certain part of the road. They asked who it was that was going to be buried; and the men who carried him replied, that it was a very

[a] See Page 604.

bad fellow;—that the world had happily got rid of him. This so provoked the man, that he sat upright; and became so savage, that he jumped down to thrash them all. He was then taken home; sat down; ate a good dinner; and recovered from that time. This is another instance of a man who was all but well at the moment. It is not for such purposes as these, that moral treatment is to be adopted. We *may* do good in such cases as these; but, in general, such a result is not to be expected.

Stratagem sometimes Necessary.—It is very necessary to have recourse to stratagem in many cases. There was another instance of a man[a] who fancied himself dead, and would not eat; and, as there was a fear that he would die of starvation, the following stratagem was adopted. Some people[b] dressed themselves in shrouds, like corpses; and went into his room, which had been previously darkened. These people carried food with them, and ate of it freely; saying that they were dead, and the dead always ate well; and, as he wished to do every thing that became a gentleman who was dead, he thought he would eat too. It is said that he then fell asleep; and that when he awoke his fancy was gone.[c] Another person would eat, but he would not be *seen* eating; and this is very common. Some madmen will not eat in the presence of any body; nor will they eat if they think any one will discover that they have been eating. A madman who had such a whim, had food given him; with a request that he would feed the cat with it. He was extremely hungry, and ate it very readily; and afterwards declared that he had given it to the cat, who swallowed it down all at once.

Regularity in the Performance of Daily Functions.—One point is very necessary to be attended to. If we make insane people do every thing with regularity, there is far less trouble with them, in the way of eating and drinking, sitting up, and going to stool. A certain hour should be fixed for

[a] Henri-Jules de Bourbon; the first prince of the house of Condé.

[b] His valets, Girard and Richard.

[c] During the last twenty years of his life, he was frequently subject to fits of hypochondriasis. In these fits, he would utter the strangest things imaginable; and act, in every respect, like an insane person. In his last journey to Burgundy (of which he was governor), for instance, he fancied himself a hare; and ordered the bells not to be rung;—lest they should frighten him, and compel him to take refuge in the woods. He once fancied himself a plant; and, as such, ordered himself to be watered. For this purpose, he placed himself in the garden of the Hotel Condé; and insisted on being watered by M. de Plainville, one of his pages. This page, however, was unwilling to perform so strange an office; and, leaving the two watering-pots full of water, that he had brought, made his escape, and hid himself. His royal highness was filled with indignation at the page's disobedience; and threatened worlds of mischief in retaliation. The threats, however, died away, as the fancy lost hold of his imagination. One of the most frequently recurring of his mental delusions, was the belief that he was a bat; and he actually caused a room to be hung with stuff, and wadded;—for fear he should fly against the boards in the day-time, and do himself some injury. An hour before his dissolution, he ordered a couple of stout sticks to be brought to him. At a loss to imagine what he could want sticks for at such an awful hour, they were tremblingly brought to him; when, having caused them to be placed on either side of him on the bed, he called for the princess, and Mademoiselle de Langeron. These ladies being apprized of his royal highness's wish to see them, (not, however, without being first warned to beware of the sticks,) with doubtful feelings made their appearance. When the prince saw them, he said that, considering the shameful way in which he had treated them during his lifetime, he deserved that they should retaliate upon him; and begged they would make him die under the blows they would minister to him with the two sticks. The poor prince, however, was saved such a death; for he died before he could persuade his wife to take one of the cudgels.—*Extracted from the "Memoires du Comte de Maurepas"; in the "Mirror of Literature", Volume* 33, *Pages* 314 *and* 315. (*No.* 949; *May* 18, 1839.)

all these purposes. Nothing is found more useful, in the treatment of insane persons, than to establish habits for every thing which we wish them to do. If a certain hour be established for going to the water-closet, they will go as a matter of course, without ever thinking of staying away, and retaining the contents of their bowels; whereas, if there be no fixed time for it, we may have the greatest difficulty. So with respect to food, and every thing else.

CHAPTER VII.

AFFECTIONS OF THE SPINAL CORD.

Having, in preceding chapters, considered those affections, which are ated solely in the brain, and are characterized by a disturbance of the nctions of sensation, judgment, and volition [a], we will now proceed to nother class of affections; mainly distinguished by the presence of spasm convulsion on the one hand, or paralysis on the other. Recent investi-tions into the physiology of the spinal cord, have shown that these fections consist in the derangement of functions belonging, exclusively, to system of which the *true spinal cord* constitutes the centre. It is de-rable, therefore, to point out the distinguishing features of the two sys-ms.

"The functions of the cerebral system,—sensation, perception, judgment, olition, and voluntary motion,—are gradually developed from infancy to dult age. It is the ψυχη,—the 'animus',—the 'soul', enthroned on organization, which gradually becomes more and more perfect. These nctions are *psychical*. How different from those of the true spinal or mere cito-motory system! By the former we *feel* external impressions, *perceive* xternal objects, judge of their properties, *wish* and *will* to approach and void them, and actually *move* (by a *voluntary effort*) to or from them. By e latter, when an external object induces an appropriate action in certain uscles, its ingestion into the animal frame is effected or prevented, without y cognizance of our mind or will; although sometimes with such con-rrence shown by additional voluntary acts. Thus, the atmospheric air is spired, while carbonic acid is excluded, without any voluntary, cerebral, psychical act; the sphincters still act, when the organ through which e soul manifests its faculties is removed.

"Cerebral diseases affect primarily the cerebral functions, and the true inal functions consecutively. The diseases of the true spinal system in-ce changes in the excito-motory phenomena in the first place, and in the rebral functions in the second. Cerebral diseases are generally more in-lious in their progress, than the true spinal; because slight aberrations of e cerebral functions are less observable than similar affections of the true inal system;—pain, vertigo, watchfulness, &c., being less striking than the ghtest degree of convulsive movement or paralytic affection. It is on is account that the *first* symptom *observed* in cerebral disease, is frequently ie belonging to the true spinal system; especially *vomiting*, perhaps *abismus*.

"The true spinal diseases, especially those of eccentric origin, affect in a markable manner the functions belonging to this system;—those of the e and eyelid; those of the larynx and pharynx; the respiration; the

[a] Phrenitis (Page 524); Hydrocephalus (Page 547); Apoplexy (Page 560); ental Shock (Page 581); Delirium Tremens (Page 581); Tumours in the Brain (Page 588); Affections of the Intellect (Page 590).

action of the expulsors and sphincters; and that state of the muscles designated by the term '*tone*.' We must revolve in our minds the symptoms of epilepsy, of hysteria, of tetanus, and of hydrophobia; the causes and phenomena of vomiting, of asthma, of abortion, of tenesmus, and of strangury; and we shall be forcibly struck with the justice of this remark.

"In many diseases the influence of the excito-motory power, and of the passions, over acts of volition, is most obvious; as is also that of volition over the excito-motory power. Let the patient in chorea be directed to move his hand in a given manner; we shall immediately observe the distorted movements produced by the disordered agency of the excito-motory power. Let the patient be agitated, and his chorea is tenfold worse than before. The disordered actions of chorea, are also aggravated by every act of the will; they subside, on the contrary, during sleep. On the other hand, every convulsive effort affects the brain with congestion and its consequences; of which a fatal coma, or effusion, is not the least frequent."[a]

We shall now proceed to consider the various affections of the cord itself; commencing with "Spinal Irritation."[a]]

SECTION I.—SPINAL IRRITATION.

Definition.—[This term has been used to designate an affection usually characterized by pain in the back; either induced or increased by pressure of the spinous processes of the vertebræ, accompanied by neuralgic and hysteric symptoms, of a nature so variable as to simulate almost every form of disease to which the body is liable. Spinal irritation ought to be considered rather as an effect of disease, than as a malady *sui generis*; but, as the subject is of the highest practical importance, it is proper to direct attention to it, by giving a detail of its phenomena in this place.

Symptoms.—The phenomena this affection presents, differ according to the extent, seat, and intensity of this irritation; and are so greatly diversified as to prevent the possibility of giving a description that would be applicable even to the majority of cases. The only means we can think of for conveying a general idea of this disorder, is by referring to the different forms of hysteria, neuralgia, and chronic rheumatism. A combination of the symptoms occasionally presented by all three, constitutes spinal irritation.

The only constant symptom, is more or less pain on pressing the spinous processes of the vertebræ. It may be confined to one spot, or be more or less diffused over the spinal column;—pointing out the extent of the spinal irritation. In many cases the patient is unconscious of any thing wrong in the back, often denies the existence of pain in that situation, and refers all the uneasiness to the ultimate distribution of the nerves arising from the part. Sometimes there is a dull constant pain; which is overlooked, and thought to be wholly unconnected with the local complaint. When pressure is made on the affected part, however, the pain in the back is increased; and not unfrequently the patient starts as if an electric shock had been received, or falls into a state of syncope. The seat of pain generally corresponds with the origin of the nerves ramifying on the organs, or portion of the surface complained of; although in some instances, as stated by Griffin, the morbid changes in the cord appear somewhat more extensive than the external tenderness. The local pain is often produced or increased

[a] "Diseases and Derangements of the Nervous System. By Marshall Hall, M.D. Chapter VI.

y lifting heavy weights, or twisting the body; and has often been excited y jerks or slight concussions when walking.

In conjunction with the spinal tenderness, there may be neuralgic pains more or less diffuse) over different parts of the surface, diminished sensiility, convulsions, or paralysis; and, as the functions of the different iscera and organs of the body are often impaired, various diseases are siulated. Thus women suffer neuralgic pains sometimes in the right, but iore commonly on the left side, beneath the mamma; sometimes, again, ie breast itself is more especially affected;—constituting the "irritable iamma" of Sir A. Cooper. In other cases there is a feeling of numbness, -as pointed out by Dr. Brown of Glasgow; or of constriction round the iorax;—as if a walnut, or other hard substance, were pressed within a ght belt. Occasionally the affection commences with pain in the occiput, nd rheumatic sensations in the neck and shoulders; several cases of which re given by Mr. Teale of Leeds. At other times, instead of neuralgic ains, there is a sense of numbness in the hands or feet; extending more r less over the extremities. We have seen a case where the only symptom as excessive coldness in the hands and fingers, that often amounted to ctual pain; and prevented the individual from sewing, and carrying on her sual employments. If the spinal irritation be more severe, the internal rgans participate; and the symptoms produced vary according to the ortion of the cord that is affected.

When the spinal tenderness is confined to the cervical portion, there may e headach; loss of voice; neuralgic pains in the face and gums; trismus; arious disorders of vision (as ocular spectra, muscæ volantes, night-blindess, &c.); more or less deafness, or confused sounds in the ears; diminished r perverted sensation of taste and smell; dysphagia; paralysis of the ngue; sickness; vomiting; loss of appetite; inordinate hunger or thirst; ain at the stomach; pyrosis; difficult breathing; cough; irregularity of the ulse; palpitations; disposition to syncope; paralysis of one or both arms sometimes confined to the fingers, hands, arms, or shoulders); increased nsibility or numbness in those situations; pricking, formication, &c. lthough these symptoms may have coincided at different times with cerical tenderness, it is evident that many of them—more particularly such affect the special senses—arise from irritation of the cranial portion of ie cord. When vertigo or delirium is present in such cases, it is probable iat the brain itself is more or less affected. When the irritation is in the orsal region, the dyspnœa and palpitations of the heart are more marked; iere is sometimes dry cough; pleurodynia[a]; pain under the clavicles, in ie shoulders, and in the superior extremities; sense of constriction in the iorax (often like a tight band); neuralgic pains in the side; diminished nsibility in the breast and epigastrium; more or less derangement in the igestive organs; &c. When it is situated in the lumbar portion, the ymptoms are,—pain in the parietes of the abdomen, hypogastrium, loins, nd genito-urinary apparatus; symptoms resembling gravel in the kidneys, reters, or bladder; irritable uterus; cramps and increased sensibility, or alsy (more or less complete) in the inferior extremities.

When the spinal irritation is more diffused, there is an admixture or ombination of the above symptoms. Hence the occasional difficulty experienced in tracing the various undefined symptoms to their true source. ases of angina pectoris, asthma, different forms of neuralgia and hysteria,

[a] From πλευρον, *the side*; and ὀδυνη, *pain*.

spasmodic croup, convulsions, hydrophobia, epilepsy, tetanus, chorea, paralysis, spasmodic colic, diarrhœa, cholera, irritable bladder, &c., are recorded by Griffin; all of which have been connected with the spinal irritation, and disappeared on its departure. It often happens, that the spinal tenderness shifts its position; when the other symptoms change also. Griffin details a remarkable case of a young lady, in whom the symptoms successively assumed the appearances of organic lesion of the lungs, heart, and abdominal viscera; together with an endless variety of other complaints of a neuralgic, asthmatic, epileptic, cataleptic, and paralytic nature. Indeed, the singular changes the disease undergoes, render it impossible to obtain a perfect knowledge of its numerous forms, without studying in detail the extraordinary cases which have been recorded of it.

Causes.—Women are much more predisposed to this complaint than men; and young girls more than married women. Of one hundred and forty-eight cases given by Griffin, twenty-six were males, forty-nine married women, and seventy-three girls. In a table of one hundred and fifty-four cases (given in the same work), we have determined that one occurred at the age of four years, that there were seven between the age of ten and fifteen; eighteen between fifteen and twenty; thirty-one between twenty and twenty-five; fifteen between twenty-five and thirty; seventeen between thirty and thirty-five; eighteen between thirty-five and forty; fourteen between forty and forty-five; twelve between forty-five and fifty; seven between fifty and fifty-five; three between fifty-five and sixty; five between sixty and sixty-five; and six whose ages are not recorded.

This disorder, therefore, is most frequent between the ages of fifteen and fifty;—the menstrual period of women. Spinal irritation has been observed in every habit and constitution;—in the full and plethoric, as well as in those who are spare and delicate. In almost all who have been affected, however, somewhat of the nervous temperament has been remarked, or at all events a peculiar excitability of the system. The most common *exciting* causes are uterine disorder; exposure to cold and moisture; dyspepsia, worms, and other sources of irritation in the alimentary canal; affections of the liver, mental emotions; erysipelatous, rheumatic, and eruptive fevers; local injuries, &c.

Nature.—As spinal irritation, uncomplicated with other disease, rarely terminates fatally, the exact anatomical characters of this affection are unknown. There can be little doubt, however, that in the majority of cases the symptoms are referrible to a state of congestion of the spinal cord or its investing membranes. Ludwig and J. P. Frank have alluded to the effects of spinal congestion, and the anatomical circumstances which favour its occurrence. The latter, in particular, has pointed out the absence of valves in the spinal vessels; together with their peculiar distribution on the surface of the cord. Their anatomical structure and arrangement render them peculiarly liable to congestion; as the venous blood must ascend in opposition to gravity. They are also equally pressed on by the cerebro-spinal fluid in a state of health; and any cause which tends to increase or diminish its normal quantity, may readily be conceived to produce venous congestion. Hence, derangements in the menstrual function, and the various causes which have just been mentioned, frequently occasion dorsal and lumbar pains; with other symptoms of spinal irritation. The vessels, being principally superficial, unless very much dilated, occasion only partial pressure; and consequently increased action, followed by the principal phenomena of this affection; namely, neuralgic pains. That motion

s not so commonly increased or diminished, may be attributed to the re-
ation of the cord with the osseous walls which surround it,—as pointed
ut by Ollivier; for the *anterior* columns are almost immediately applied
o the bone, while the *posterior* are five or six lines distant from it. In-
lependently of any positive evidence, therefore, it may be said that the
heory of congestion is fully capable of explaining the phenomena, and is
he morbid condition which of all others we should expect to follow the
nown causes of the disorder. On the other hand we cannot, with some
uthors, suppose it to be chronic inflammation; for the changeable na-
ure of the affection, and its sudden appearance and disappearance, are
pposed to such an opinion. With regard to the spinal tenderness, it has
een well pointed out by Mr. Locock, ("Edinburgh Medical and Surgical
Journal", No. 136,) that "an inspection of the vertebral column, in an
natomical subject, will shew at once how impossible it is to press the cord
r the nerves going from it, in the slightest degree." We cannot think
vith him, however, that "tenderness of the spinal marrow is a sign of
ittle value"; as numerous cases prove, that there is a connexion between
he situation of the local tenderness and other symptoms; while local treat-
nent has dissipated the disorder, when remedies directed to the removal
f its more remote effects have failed. No doubt the spinal irritation is in
tself only a symptom, although one which indicates with tolerable certainty
he origin of the malady; and, as our pathological knowledge improves,
here is every reason to suppose that this view of its pathology will be ge-
nerally admitted.

Diagnosis.—It is remarked, by the Messrs. Griffin, that there does not
ppear to be any complaint to which the human frame is liable,—whe-
her inflammatory or otherwise,—which may not occasionally be imitated
n disturbed states of the cord; and hence it is a prolific source of those
complaints called "hysterical" or "nervous." The same authors have
given the following diagnostic symptoms, by which it may be distin-
guished from organic disease:—1. The pain or disorder of any particu-
ar organ being altogether out of proportion to the constitutional disturb-
nce. 2. The complaints, whatever they may be, usually relieved by the
ecumbent position; always increased by lifting weights, bending, stoop-
ng, or twisting the spine; and, among the poorer classes, often conse-
quent to the labour of carrying heavy loads; as in drawing water, manure,
&c. 3. The existence of tenderness at that part of the spine which cor-
esponds with the suffering organ. 4. The disposition to a sudden trans-
erence of the diseased action from one organ or part to another, or the
ccurrence of hysterical symptoms in affections apparently acute. At-
ention to the four circumstances above enumerated, will generally enable
he practitioner to identify this disorder. It may readily be mistaken for
lisease of the vertebral bones; as there is not unfrequently an apparent
prominence of the vertebræ, where the tenderness is felt. As such an
error may lead to very distressing consequences, it will be well to enume-
rate the circumstances which distinguish the one from the other. In
vertebral disease, the prominence is angular, and depends on displacement
of the bones, or curvature; in spinal irritation it is round, and is occa-
sioned by slight swelling of the ligaments or coverings of the spine; in dis-
eased vertebra there are seldom hysterical symptoms in young females,
whereas they are common in spinal irritation. Disease of the vertebra is
most common in young persons of a strumous constitution; whereas spinal
irritation is most frequent in adults. Lastly: complete paralysis is common

in vertebral disease, but rare in spinal irritation; and, in the latter, the general health is not so much affected.

Prognosis.—The prognosis in spinal irritation is always favourable; as there is every reason to believe, that the mere state of irritation uncomplicated with a more serious morbid lesion, has never proved fatal. When there is any other coexisting disease, the prognosis (of course) is the same as that of the particular affection with which the spinal irritation is complicated.

Duration.—The duration of the symptoms is very variable;—from a single day, to three or four years. A case is given by Griffin, where it continued four years and a half. According to his experience, a quick and irritable pulse, and furred tongue, are indications of an obstinate and troublesome attack.

Treatment.—The various and often contradictory symptoms, induced by spinal irritation, render its diagnosis and treatment difficult and uncertain. Numerous facts, indeed, attest that individuals have long laboured under rheumatic, neuralgic, and hysterical complaints; during which they have suffered the greatest tortures; although they have been relieved in a few days, by treatment directed locally to the spine. Whatever difficulties, therefore, may exist in drawing a line of demarcation between the effects of spinal irritation and numerous other disorders, and notwithstanding the obscurity that rests on the precise nature of the morbid change which produces it, the great practical utility to be derived from its study is unquestioned. So fully are we impressed with its importance, that we consider that, in all cases of neuralgia, rheumatism, and hysteria, the spine should be examined; while, perhaps, there is scarcely a functional disorder to which the young female is liable, which may not occasionally be found connected with spinal irritation. We have often had an opportunity of observing the manner in which numerous disorders have been traced to this source; and feel assured that if practitioners in general would pay greater attention to this complication, many of the extraordinary and anomalous cases which are at present the cause of great embarrassment in practice, might terminate in the speedy relief of the patient, and increased credit of the physician.

It must not be supposed, however, that the difficulty terminates, even when the disease is found to be connected with spinal irritation; for experience has demonstrated, that this is in itself not unfrequently a secondary effect;—produced by the disordered functions of other organs. The first object of the medical attendant, therefore, should be to determine whether the affection is idiopathic or sympathetic, acute or chronic.

When the disorder is idiopathic, our attention must be directed to the restoration of the general health of the patient; and an antiphlogistic or tonic line of treatment must be determined on, according to the circumstances of the case. Accordingly, the application of leeches, or cupping over the spine where there is tenderness, or stimulants and counter-irritants, should be employed;—according to the general strength of the patient, and the acute or chronic nature of the disease. In many cases, the loss of blood by leeches has been sufficient to remove the symptoms; in others counter-irritation, as by blistering or the tartar-emetic-ointment, has succeeded. The tartar is particularly recommended by Mr. Tate; and may be used with every hope of benefit. But when the affection is sympathetic (as is generally the case), in addition to the above means the origin of the malady is to be anxiously sought after; and remedies calcu-

lated to remove it are to be administered. By far the most common cause in females, is derangement in the menstrual discharge; and, in such circumstances, the endeavours of the medical attendant should be directed to promote the due performance of this function. If there be irritation in, or improper action of, the digestive or biliary organs, the disordered state should be combated by appropriate remedies. Every medicine employed should have reference to the state of the system, and constitutional powers of the individual; and a low or a nourishing diet prescribed accordingly. In persons of an irritable temperament, change of air, exercise, congenial society, and all methods of distraction, should be recommended. In chronic cases, the disease is often very intractable; but if it have been previously treated in an injudicious manner, much may be effected by the above means. If there be much pain or watchfulness, anodynes are useful; hyosciamus and belladonna should be preferred;—opium often increasing the irritability. In other respects the treatment should be conducted on the principles laid down under Hysteria and Neuralgia; with which disorders spinal irritation is almost inseparably connected.[a]]

SECTION II.—INFLAMMATION WITHIN THE SPINE.

[This, like *encephalitis*, may be distinguished into:—1. Inflammation of the *membranes*, or spinal *meningitis*. 2. Inflammation of the *substance*, or spinal *myelitis*. The latter may be again distinguished into:—1. Inflammation of the cerebral, or sentient and voluntary tracts. 2. Inflammation of the true medulla. 3. Inflammation of the principal divisions of the medulla.

Causes.—The causes of inflammation within the spine are (principally) blows or falls, violent muscular efforts, and exposure to damp or cold. One patient became affected with acute spinal myelitis, from being long exposed to the rain and cold in an open boat. This affection has frequently occurred from the pernicious custom of lying upon damp grass. Rheumatism seems occasionally to have led to this disease. The observations of M. Louis have distinctly shown the connexion between caries of the vertebræ and spinal myelitis.

Symptoms.—It is rare that meningitis of the spine exists without meningitis within the cranium. It is equally rare for the membranes to be inflamed, or one of the cerebral tracts, without affection of the substance, or of the other portions of the spinal marrow. The distinctions between these affections, therefore, are not easily defined. Happily they are not essential to the treatment. Those symptoms which point to such distinctions will be noticed, however, as we proceed. A much more interesting distinction arises from the various locality of the inflammation;—according as it affects the "medulla oblongata", or the cervical, dorsal, lumbar, and sacral portions of the spinal marrow. A knowledge of the anatomy and physiology of the part, frequently enables us to define the region of the spinal marrow which is the seat of the disease; and guides us at once in our prognosis, and in the local application of remedies;—the most important part of the treatment.

Symptoms of Spinal Meningitis.—In general, the symptoms of meningitis are *more* those of *irritation* of the spinal marrow, or *spasm*; those of *myelitis*, *more* those of *destruction* of the organ, or *paralysis*. Both kinds of symptoms may exist, however, or follow each other, in both diseases.

[a] "Library of Medicine"; Volume 2; Pages 184 to 189.

Diseases, especially those of the nervous system, are usually more complicated in individual patients, than as they are described in books. Hence a difficulty in the commencement of practice. We are led to expect impossibilities;—diseases well defined in their simple forms. It will be well for us, in reference to our present subject especially, to become well acquainted with the anatomy and physiology of the parts; and we shall then be able justly to interpret each symptom as it appears.

Among the first symptoms of spinal *meningitis*, is local *pain* in some part of the spinal column; augmented by the movements of the patient, and by percussion; but rarely, if ever, by pressure along the spine. This pain sometimes extends along the back and limbs, in which there is then tenderness on pressure;—a symptom which may serve to distinguish meningitis from myelitis, in which there is usually loss of sensibility.

The next important symptom is spasm, or various kinds of muscular contraction. The head, the neck, or the trunk is bent backwards; or there is trismus [a], torticollis [b], partial or complete opisthotonos [c], or contraction of the limbs;—constant, or recurrent, or exacerbated, in paroxysms, on moving, on being moved, &c.; with extreme pain. Sometimes there are convulsions. The respiration is sometimes difficult. There is sometimes retention of urine and constipation.

The symptoms will vary according as the meningitis exists principally at the base of the brain; or at the upper, or the lower, part of the spine.

Symptoms of Spinal Myelitis.—The symptoms of spinal *myelitis*, are those of paralysis of sensation and voluntary motion. A sense of numbness (impaired sensibility), and a sense of feebleness (impaired muscular power), are first observed, singly or combined, in one or both of the inferior or superior extremities. In some cases, probably of complication with meningitis, there is augmented sensibility. In other cases there are spasmodic or convulsive affections. If the disease proceeds, the paralysis of sensation and voluntary motion gradually augments. Generally the paralysis affects first the inferior, and afterwards the superior extremities; far more rarely it pursues a contrary course: occasionally the motions alone, and very rarely the sensations alone, are paralyzed. If the disease occupy the *upper* parts of the spinal marrow, the respiration, and even the action of the larynx and pharynx, become impaired; and we have difficulty or choking in swallowing, or asphyxia. There is sometimes the sensation of a cord-like tightness across the epigastrium. If the *lower* part of the spine be affected, the bladder, the rectum, and their sphincters, are variously paralyzed; and there may be retention of urine and constipation, or involuntary evacuations; or retention and involuntary flow of urine may be combined. The condition of the bladder and the condition of the rectum should be ascertained, by proper examinations, *in every case.* In some instances there is perfect impotence, or inertia of the uterus: in others the patient has become a father, or the uterus has been excited to expel the fœtus. These differences, doubtless, admit of explanation by a reference to the *kind* of affection,—irritation, or destruction, and its *locality*,—in the cervical, dorsal, or lumbar portions of the spinal marrow.

Morbid Appearances.—The morbid anatomy is, in every respect, similar to that of cerebral meningitis and myelitis.[d] It is rare, indeed, that spinal meningitis occurs without a similar affection of the membranes of the brain.

[a] From τριζω, *to gnash.*

[b] From "torqueo", *to twist*; and "collum", *the neck.*

[c] From οπισθιν, *backward*; and τεινω, *to draw.*

[d] See Page 529.

We have injection of the "pia mater", and of the spinal vessels in general; effusion of serum, lymph, pus, and blood, under the arachnoid, diffused or in portions; and perhaps softening of the adjacent medulla. The arachnoid itself is free from blood-vessels; the morbid changes supposed to take place in this membrane, have their seat in the subjacent cellular membrane, or in the "pia mater." In *chronic* meningitis, there are sometimes membranous adhesions and effusion, of a cartilaginous hardness.

The principal morbid change in myelitis, is softening; which may occupy the whole, or any portion, either side, or the anterior or posterior part of the spinal marrow; it most frequently affects the cervical or lumbar portions. There is, as in the same affection of the brain, a degree of tumefaction. Induration is the frequent result of *chronic* myelitis.

Treatment.—The most efficacious treatment of inflammation within the spine, consists (I believe) in the application of cupping in *acute* cases, and of issues and setons in the *chronic*. Cupping may be applied so as to involve the two principles of local depletion and counter-irritation. For this purpose, the scarification should be deep, and crossed; and little blood should be drawn;—the operation being repeated, according to the violence of the disease and the powers of the patient. In reference to the use of issues, M. Louis makes a very apposite remark:—"Experience has demonstrated the utility of issues in Pott's disease; when that affection is of long standing, and voluntary movement more or less injured. A necessary consequence of the foregoing is, that the same means ought to be employed in the simple or primitive softening of the spinal marrow." The administration of mercury in the acute cases, and in the chronic cases when these are uncomplicated with a tuberculous diathesis, is an important measure.

The most moderate diet should be enjoined; the bowels should be kept free; and the recumbent posture, with the utmost quiet, should be preserved.

SECTION III.—SPINAL APOPLEXY.

Little, I believe, can be said of this form of spinal disease. If it can ever be suspected during life, it can only be from the suddenness of the accession or attack of the symptoms; and the treatment must be the same as in acute inflammation within the spine.

In a very interesting case, (for which I am indebted to Mr. Kiernan,) the "medulla oblongata" being *suddenly* compressed, the respiration ceased, and the patient expired instantly. An organic change, which would have produced irritation rather than pressure, would have induced a very different effect.[a]]

SECTION IV.—SPINA BIFIDA.

Definition.—There is sometimes a collection of water low down in the spine; and a tumour is formed externally. From the bone being generally deficient and the spine gaping, the disease is called "spina bifida." This, like the accumulation within the head, is sometimes congenital,—born with

[a] "Diseases and Derangements of the Nervous System. By Marshall Hall, M.D." Chapter 7; Pages 315 to 319.

the child; and sometimes it is not. Sometimes a collection of water will exist with a sound spine; and sometimes the spine is bifid.

Appearances of the Parts.—A tumour is produced,—sometimes more than one; and generally the tumour is situated at the lower part of the spine;—in the loins. The higher the tumour is situated, the more rare is the case. These tumours are of all sizes;—from merely a little elevation of the skin, to the size of a child's head. Sometimes the tumour is diffused; sometimes it is very prominent; and sometimes it is both diffused and prominent. It is also of all shades. The skin externally is seen in all conditions. Sometimes it is healthy; sometimes it is very thick; sometimes it is inflamed; sometimes it is gangrenous, ulcerated, and fistulous; and sometimes I have seen it very hairy. The subjacent membranes are likewise found in all sorts of states. Sometimes the membranes are diseased, while the skin remains healthy.

Characters and Seat of the Fluid.—The fluid which is contained in these tumours, is exactly like the fluid of hydrocephalus;—for the most part, exceedingly limpid, like rock-water; and its quantity varies, from a few ounces, to six or seven pounds. It will exist sometimes in the arachnoid, sometimes between the arachnoid and "dura mater", and sometimes between the arachnoid and the "pia mater";—that is to say, it will exist in the arachnoid on either side; and it will be found between the "dura mater" and the bones. It has even been found in the canal which runs along the "medulla spinalis."

When there is a deficiency of bone, there is sometimes a fissure all the way through;—from the cervical vertebræ, down to the os coccygis. That, however, is very rare. Sometimes it runs from the last cervical vertebra, down to the beginning of the sacrum; or it exists only in the loins. The latter is a common occurrence. The deficiency is sometimes a mere slit; sometimes there is an imperfect evolution of the lateral arches of the bones; and sometimes there is even separation of the body of the vertebræ also.

Varieties in the Position of the Cord.—Besides this variety as to the state of the integuments, as to the state of the membranes, as to the situation of the water, and as to the condition of the bones, there is a great variety also as to the situation of the spinal marrow. Sometimes it is precisely in its natural place; sometimes it runs outside the tumour; sometimes it is distributed upon the sac; and sometimes it has been seen deficient in the affected part.

Frequent Coexistence of Club-Foot.—It has been noticed by some, that club-foot frequently coexists with this affection. It is well known, that when there is a species of monstrosity in one part of the body, it is very common to find a defect in another: if an important part (such as the heart or brain) be deficient, it is very common for other parts to be malformed. In this disease, then, club-feet often coexist; but very frequently they do not; because they are only minor deviations from the natural structure of the body. I recollect an instance of a child having this disease, where the tumour was situated on the loins, and was surrounded by a considerable quantity of hair; and there were club-feet; but the tumour ceased spontaneously. No measures were resorted to, for the best part of a twelvemonth; although, when the child was first born, there was the appearance of ulceration, and even gangrene. The disease, however, entirely disappeared; the surface became flat; hydrocephalus commenced; and ultimately destroyed the child.

Treatment.—With regard to the treatment of spina-bifida, I need not make any remarks. Medicine is of no avail; but cases have been much relieved, if not cured, by puncturing, and by the careful application of a bandage;—exactly the same treatment that has succeeded in hydrocephalus.[a] The part is frequently in a state of gangrene, and then no treatment can be borne; but when the employment of remedial measures is admissible, they are entirely mechanical, and therefore devolve on the surgeon.

[a] See Page 558.

CHAPTER VIII.

CONVULSIONS.

Definition.—[By the term "*convulsion*", is meant a diseased state of the muscular tissues; characterized by violent involuntary contractions, with alternate relaxations. This diseased action is common to the muscles both of voluntary and involuntary motion; but occurs much more frequently in the former. The term "*spasm*" has been applied, by some, to the inordinate action of the *involuntary* muscles;—the term "*convulsion*" being more particularly reserved to designate the irregular contraction of the *voluntary* muscles. When the contractions have been of some duration, and are not quickly succeeded by alternate relaxations, they have been called "*tonic* convulsions";—exemplified in tetanus; whilst involuntary alternate motions of contraction and relaxation have been termed "*clonic* convulsion"; of which hysteria affords an example. The term "*convulsion*" has sometimes been exclusively appropriated to *clonic* convulsion; but as the principal difference between *clonic* and *tonic* convulsions consists in degree, and they both originate in the same causes, it is more convenient for practical purposes to include them under the same head. Very slight and quick alternations of contraction and relaxation, constitute what is called "tremor."[a]

Convulsions manifest themselves in various degrees, and under various forms. They occur as a symptom in the course of many diseases; and they sometimes assume such regular and well defined characters, as to constitute distinct and separate diseases; as, for instance, in the case of tetanus and hysteria. There are, however, attacks of simple convulsion, partial and general, that cannot be referred to hysteria, epilepsy, or any of the well defined convulsive affections which have received generic names.[b]]

In Infants.—Children are very liable to epileptic fits and regular convulsions; from irritation of the bowels, teething, and other circumstances. These will sometimes depend upon the mere circumstance of teething; and cease if the gums be lanced. Sometimes they arise from the intestines, and are cured by purging; so that other antiphlogistic measures are not required; but sometimes they depend on, and are connected with an inflammatory state of the head; and after death we find the same appearance as in hydrocephalus[c];—at least, the lining membrane of the ventricles is as red as a piece of scarlet cloth.

Treatment.—The treatment of convulsions (if we cannot discover in the gums or intestines an exciting cause, which it is in our power to remove) should be, if the pulse will justify it, the same as for hydrocephalus.[d] We

[a] "Spasm" is morbidly *increased* action; "paralysis" is morbidly *diminished* action; "convulsion" is *irregular* action. "Tremor" is a loss of balance from *diminished* action,—approaching to *palsy*; "convulsion" is a loss of balance from *increased* action,—approaching to *spasm*. A "*clonic* spasm" is a convulsion. Palpitation of the heart is an example.—*Dr. Fletcher.*

[b] "Cyclopædia of Practical Medicine"; Volume 1; Page 466.

[c] See Page 551.

[d] See Page 553.

must take blood away freely, give mercury, and put ice on the head. But it is necessary here to make the same diagnosis that we do in hydrocephalus.[a] These convulsions may be connected with debility, with a weak pulse, with paleness of the face, or with only a transient flushing of it; and, in such cases as these, assafœtida, or a small quantity of laudanum, or ammonia, may answer a good purpose.[b] In these cases of convulsions, cold affusion has frequently been attended with very good effect. In the work of Dr. Currie on Cold Affusion[c],—a sort of classical work in medicine, and well worth reading,—he mentions several cases of convulsions in children, where they ceased immediately on the sudden application of cold water. Now if these convulsions had arisen from an inflammatory state, the effect would not have been of this kind. We cannot cure inflammation by merely throwing cold water on a patient. It is clear that the convulsions of children may frequently arise from irritation, not within the head, but connected with a distant part; but if there be an over-fulness of the head in particular, or of the system at large, without marks of inflammation, or still more *with* marks of inflammation, it is not right to trust to any thing but the common antiphlogistic remedies vigorously applied.

Chronic Convulsions.—The *chronic* convulsions of children are allied to epilepsy; and must be treated in the same way.

[a] See Page 578. [b] See Page 579. [c] See Note to Page 365.

CHAPTER IX.

EPILEPSY.

Synonymes.—The disease next to be spoken of is epilepsy. The name of the disease is given to it from the suddenness of the seizure;—from ἐπιλαμβανω, *to seize upon*. It is also called, in Latin, "morbus *comitialis*"; because if a person in the "comitia", or popular assemblies, of the Romans was seized with the disease, it was considered a bad omen, and the comitia were dissolved. It is also called "morbus *sputa*",—"the *spitting* disease";—from the custom of spitting into the bosom, to avert the unfavourable omen. The Romans were remarkably superstitious; and fancied it was a sign of ill luck to be seized with a fit; and therefore they spit into their bosoms, to save themselves from something pernicious, or to do good to the patient. In common language it is called "the *falling* sickness"; and, now that the lower orders have got hold of fine names, they call it by various appellations. The Jews ascribed it to the influence of demons; it is also indicated in the New Testament; where persons are said to have been suddenly seized by an evil spirit, and to have fallen into the water or fire[a]; because a patient who is liable to the disease may be near fire or water, and he will fall into the one or the other.

SECTION I.—PROGRESS AND VARIETIES.

Definition.—In epilepsy, there is a sudden loss of sense, with convulsions of the voluntary muscles; and the loss of sense continues after the convulsions have ceased;—so that a person is said to "go to sleep" after the fit.

Symptoms of the Attack.—In the fit, the countenance is ghastly and pale or perhaps of a bluish red; it is sometimes sallow. The lips are livid; the neck and the cheeks are much swollen; and, perhaps, the whole body is bedewed with sweat; but especially the head and cheeks. There is foaming at the mouth; and generally the tongue is bitten. There are universal violent convulsions, horrid grimaces, a rolling of the eyes, and dilatation of the pupils. Sometimes it happens that the urine and fæces are discharged involuntarily;—the urine most frequently; and occasionally there is a discharge even of semen, with or without an erection;—I do not know which. The hands are generally clenched, in the fit; and the heart palpitates strongly. The pulse is quick; and the respiration is short, deep, and irregular.

Not attended by Suffering.—When the patient wakes from the state of

[a] "There came to Him a certain man, kneeling down to Him, and saying—'Lord, have mercy on my son; for he is lunatic and sore vexed! For ofttimes he falleth into the fire, and oft into the water.' And Jesus rebuked the devil; and he departed out of him; and the child was cured from that very hour."—"*The Gospel according to Matthew*"; *Chapter* 17; *Verse* 15.

sopor, he has generally no recollection of what has passed; and perhaps, herefore, there is no suffering. The want of *recollection* of suffering, how-ever, is no proof that there has been *no* suffering; for we have all suffered enough in cutting our teeth, and yet we know nothing of it now. So it may happen respecting more recent events. The fit *may* be attended with more or less suffering; but I should think there was none, for persons do not suffer, in general, when they are hung;—although they may struggle, and hang so long as to be insensible, and almost dead. There is an account, n Lord Bacon's works, of a person who was hung, and all but killed; and et he did not suffer. From a short account written by Cowper, the poet, t appears that he three times attempted to commit suicide; and one of these ttempts was by suspension. The account was written by himself; and was ound among his manuscripts. It is very scarce;—on account of its having een bought up. He there mentions, that he suspended himself over his hamber-door, in the Temple; and became perfectly insensible. He only ecollected a flash of light appearing before his eyes. His weight at last aused him to drop on the floor, where he was found; and, after a time, he ecovered.[a] He says that, although he was thus in the jaws of death,

[a] One evening in November, 1763, as oon as it was dark,—affecting as cheerful nd unconcerned an air as possible,—I Cowper] went into an apothecary's shop, nd asked for a half-ounce-phial of lauda-um. The man seemed to observe me nar-owly; but if he did, I managed my voice nd countenance, so as to deceive him. The ay that required my attendance at the bar f the House [of Commons] being not yet ome, and about a week distant, I kept my ottle close in my side-pocket;—resolved to se it when I should be convinced there was o other way of escaping.—Not knowing here to poison myself,—for I was liable to ontinual interruption in my chambers [in e Temple] from my laundress and her usband,—I laid aside that intention, and re-lved upon drowning. For that purpose, immediately took a coach; and ordered e man to drive to Tower-Wharf;—in-nding to throw myself into the river from e Custom-House-Quay. I left the coach on the Tower-Wharf;—intending never return to it: but, upon coming to the ay, I found the water low, and a porter ated upon some goods there;—as if on rpose to prevent me. This passage to e bottomless pit being mercifully shut gainst me, I returned to the coach, and dered it to the Temple. I drew up the utters [of the coach], and once more had course to the laudanum, and determined drink it off directly; but God had other-se ordained. A conflict, that shook me pieces, suddenly took place; not properly trembling; but a convulsive agitation, hich deprived me (in a manner) of the use my limbs; and my mind was as much aken as my body. Distracted between e desire of death, and the dread of it, enty times I had the phial to my mouth, d as often received an irresistible check; and, even at the time, it seemed to me that an invisible hand swayed the bottle down-wards, as often as I set it against my lips. I well remember, that I took notice of this circumstance with some surprise;—though it effected no change in my purpose. Pant-ing for breath, and in horrible agony, I flung myself back into the corner of the coach. A few drops of laudanum which had touched my lips, besides the fumes of it, began to have a stupifying effect upon me. Regretting the loss of so fair an op-portunity, yet utterly unable to avail myself of it, I determined not to live; and, already half-dead with anguish, I once more re-turned to the Temple. Instantly I repaired to my rooms; and, having shut both the outer and inner door, prepared myself for the last scene of the tragedy. I poured the laudanum into a small basin, set it on a chair by the bed-side, half undressed my-self, and laid down between the blankets;—shuddering with horror at what I was about to perpetrate. I reproached myself bitterly with folly and rank cowardice, for having suffered the fear of death to influence me, as it had done; and was filled with disdain at my own pitiful timidity: but still some-thing seemed to overrule me, and to say—"Think what you are doing! Consider, and live!" At length, however, with the most confirmed resolution, I reached forth my hand towards the basin; when the fingers of both hands were as closely contracted as if bound with a cord, and became entirely useless. Still, indeed, I could have made shift with both hands,—dead and lifeless as they were,—to raise the basin to my mouth; for my arms were not at all af-fected: but this new difficulty struck me with wonder;—it had the air of a divine in-terposition. I lay down in bed again, to muse upon it; and, while thus employed,

and had become perfectly insensible, yet he had no previous suffering; and therefore, as there was no suffering in that state, it is probable that there is no suffering in epilepsy;—that there is such a state of insensibility that

heard the key turn in the outer door, and my laundress's husband came in [to the outer room]. By this time, the use of my fingers was restored to me. I started up hastily; dressed myself; hid the basin; and, affecting as composed an air as I could, walked out into the dining-room. In a few minutes I was left alone; and now, unless God had evidently interposed for my preservation, I should certainly have done execution upon myself;—having a whole afternoon before me. Both the man and his wife having gone out, outward obstructions were no sooner removed, than new ones arose within. The man had just shut the door behind him, when the convincing spirit came upon me, and a total alteration in my sentiments took place. The horror of the crime was immediately exhibited to me in so strong a light, that—being seized with a kind of furious indignation — I snatched up the basin, poured away the laudanum into a vessel of foul water, and—not content with that—flung the phial out of the window. This impulse, having served the present purpose, was withdrawn. I spent the rest of the day in a kind of stupid insensibility;—undetermined as to the manner of dying, but still bent on self-murder, as the only possible deliverance.

I went to bed, to take (as I thought) my last sleep in this world. The next morning was to place me at the bar of the House; and I determined not to see it. I slept as usual, and awoke about three o'clock. Immediately I arose, and (by the help of a rush-light) found my penknife, took it into bed with me, and lay with it (for some hours) directly pointed against my heart. Twice or thrice I placed it upright under my left breast;—leaning all my weight upon it; but the point was broken off square, and it would not penetrate. In this manner the time passed, till the day began to break. I heard the clock strike seven; and instantly it occurred to me, that there was no time to be lost: the chambers would soon be opened; and my friend would call upon me, to take me with him to Westminster. "Now is the time!"—thought I. "This is the crisis! No more dallying with the love of life!" I arose; and, as I thought, bolted the inner door of my chambers; but was mistaken: my touch deceived me, and I left it as I found it. My preservation, indeed, as it will appear, did not depend upon that incident; but I mention it, to shew that the good providence of God watched over me, to keep open every way of deliverance;—that nothing might be left to hazard.

Not one hesitating thought now remained: I fell greedily to the execution of my purpose. My garter was made of a broad piece of scarlet binding, with a sliding buckle;—being sewn together at the ends. By the help of the buckle, I formed a noose, and fixed it about my neck; straining it so tight, that I hardly left a passage for my breath or for the blood to circulate: the tongue of the buckle held it fast. At each corner of the bed, was placed a wreath of carved work; fastened by an iron pin, which passed up through the midst of it; the other part of the garter, which made a loop, I slipped over one of these; and hung by it some seconds;—drawing up my feet under me, that they might not touch the floor. But the iron bent; and the carved work slipped off, and the garter with it. I then fastened it to the frame of the tester;—winding it round, and tying it in a strong knot. The frame broke short, and let me down again. The third effort was more likely to succeed. I set open the door, which reached within a foot of the ceiling. By the help of a chair, I could command the top of it; and the loop, being large enough to admit a large angle of the door, was easily fixed so as not to slip off again. I pushed away the chair with my feet, and hung at my whole length. While I hung there, I distinctly heard a voice say, three times,—"'Tis over!" Though I am sure of the fact, and was so at the time, yet it did not at all alarm me, or affect my resolution.

I hung so long that I lost all sense,—all consciousness of existence. When I came to myself again, I thought myself in hell. The sound of my own dreadful groans was all that I heard; and a feeling like that produced by a flash of lightning just beginning to seize upon me, passed over my whole body. In a few seconds, I found myself fallen on my face to the floor. In about half a minute, I recovered my feet; and reeling and staggering, stumbled into bed again. By the blessed providence of God the garter which had held me till the bitterness of *temporal* death was passed, broke just before *eternal* death had taken place upon me. The stagnation of the blood under one eye (in a broad crimson spot) and a red circle round my neck, showed plainly that I had been on the brink of eternity. Soon after I got into bed, I was surprised to hear a noise in the dining-room where the laundress was lighting a fire. She had found the door unbolted, notwithstanding my design to fasten it; and must have passed the bed-chamber-door, while I was hanging on it; and yet never perceived me. She heard me fall, and presently came t

)thing is experienced. I should suppose that, in drowning, there is no ffering, if it occur at once. Shakspere's expression is—

"Oh Lord! methought what pain it was to drown!" [a]

it there is no reason to suppose there is pain, if the individual go down d do not come up again; but if he come out of the water, the suffering dreadful.

Duration of the Attack.—The convulsions of epilepsy may last from a oment, to fifteen minutes or more; and sometimes they recur after they ve ceased, before the sopor is over. The sopor, or coma, is generally mplete, both during the convulsions, and for some time subsequently; it not always. This, therefore, is the character of epilepsy;—a sudden tack of convulsions of the voluntary muscles, together with insensibility; the insensibility continuing after the convulsions have ceased.[b]

Most frequently attacks One Side.—Frequently, like all diseases of the rvous system, it occurs more on one side than on the other. Paralysis equently does so; St. Vitus's dance affects one side more than the other; steria does the same; and we find that epilepsy likewise has the same ndency.

Occurs most frequently during Sleep.—The fits of the disease most fre- ently occur during sleep, or in the state intermediate between sleeping d waking; when we all experience a little delirium. If we fall asleep a *moment* from a waking state, there is no delirium; but if we *fall* leep *gradually*, the mind wanders. If we wake *suddenly* there is nothing the kind; but if we wake very *slowly*, then again a little delirium is ex- rienced. We are more accustomed, however, to *go to sleep* gradually, an to *wake* so; and therefore the delirium is observed far more commonly going to sleep, than in waking. Now it is at the instant when a person neither in full action nor at complete rest, that epilepsy particularly at- cks him. A great number of persons have a fit, just when they are going sleep, or when they awake;—many have it when they are asleep; and, ain, some only have it either when they are going to sleep, or when they e about to awake.

Warning of its Occurrence.—Occasionally the patient has no warning atever; and has no knowledge of the fit. I have seen many persons io are not at all aware that they have fits. These have been persons in e decline of life, who are in the habit of sitting in the house;—not going out so as to run the chance of being injured; and who have been watched the rest of the family. I have known them have fits for years; and t they have not been aware of it;—at least they *pretended* they were not. ie individual has been seized in a moment; and has afterwards wondered iat has been the matter. But some persons have good warning. Some, eviously to the attack, have vertigo and headach, sufficient to shew that ey are going to have it. Sometimes there is just vertigo enough, and no

me if I was well;—adding, that she red I had been in a fit. I sent her to a end, to whom I related the whole affair; I despatched him to my kinsman, at the fee-house. As soon as the latter arrived, ointed to the broken garter, which lay in middle of the room; and apprised him, o, of the attempt I had been making. s words were:—"My dear Mr. Cowper, u terrify me! To be sure you cannot hold the office at this rate. Where is the deputation?" I gave him the key of the drawer where it was deposited; and, his business requiring his immediate attendance, he took it away with him; and thus ended all my connexion with the parliament-office. —*Cowper's Works; edited by Dr. Southey; Volume* 1; *Chapter* 5; *Pages* 122 *to* 131.

[a] "Richard the Third"; Act 1; Scene 4.

[b] See Page 656.

more, to enable them to escape from danger. Some have headach, a day or two before the vertigo; but some have vertigo only just in sufficient time to make them get out of the dangerous situation in which they are placed. Occasionally, a spectre has been seen at the moment of the fit;—an image has passed before the mind, before the fit took place. I recollect that Dr. Gregory[a] used to mention, in his lectures, that he knew a patient who, before the fit, saw a little old woman come out of the corner with a stick; and when she approached and struck him, down he fell in a paroxysm. It is a mental delusion of the moment, produced by an excitement of the brain. The fact is mentioned by Sir Walter Scott, in his "Letters on Demonology and Witchcraft";—certainly not one of his best books.[b]

Sometimes, before the fit, the patient utters a loud scream. He is not aware of any suffering that occasions him to do it; but only says that he cannot help screaming. Sometimes the patient has a warning during the *first* fits; but when he has been long subject to the disease, *no* warning takes place. Sometimes, after a fit, not only will a patient forget it, but no symptom remains; on the other hand, people will occasionally be subject, for some day, to headach and sleepiness. Sometimes these symptoms only remain a few hours; but in other cases they will remain a few days.

Aura Epileptica.—Sometimes, before the fit, there is a warning; occasioned by a sensation of tickling, or crawling, along the surface of the body. There is a sensation as if fluid were creeping from the fingers, or from the thighs, towards the trunk; and sometimes as though a spider or flea were creeping over the skin. When it appears like fluid, it is generally like *cold* fluid. This has been ascribed to a sort of rush of air or wind, and has been called "aura"; and, being connected with the epilepsy, it is called "aura

[a] See Note to Page 270.

[b] A patient of Dr. Gregory, a person (it is understood) of some rank, having requested the doctor's advice, made the following extraordinary statement of his complaint:—"I am in the habit of dining at five; and, exactly as the hour of six arrives, I am subject to the following painful visitation. The door of the room, even when I have been weak enough to bolt it (which I have sometimes done), flies wide open; an old hag, like one of those who haunted the heath of Forres [alluding to the witches in "Macbeth"], enters with a frowning and incensed countenance, comes up to me with every demonstration of spite and indignation which could characterize her who haunted the merchant Abudah in the Oriental tale; she rushes upon me, says something, but so hastily that I cannot discover the purport; and then strikes me a severe blow with her staff. I fall from my chair in a swoon; which is of longer or shorter endurance. To the recurrence of this apparition I am daily subjected;—such is my new and singular complaint." The doctor immediately asked, whether his patient had invited any one to sit with him, when he expected such a visitation. He was answered in the negative. The nature of the complaint, he said, was so singular, it was so likely to be imputed to fancy, or even to mental derangement, that he had shrunk from communicating the circumstance to any one. "Then", said the doctor, "I will dine with you to day, tête-à-tête; and we will see if your malignant old woman will venture to join our company." The patient accepted the proposal, with hope and gratitude; for he had expected ridicule rather than sympathy. They met at dinner; and Dr. Gregory, who suspected some nervous disorder, exerted his powers of conversation, (well known to be of the most varied and most brilliant character,) to keep the attention of his host engaged, and prevent him from thinking on the approach of the fated hour, to which he was accustomed to look forward with so much terror. He succeeded in his purpose better than he had expected. The hour of six came almost unnoticed; and, it was hoped, might pass away without any evil consequence; but it was scarce a moment struck, when the owner of the house exclaimed, in an alarmed voice,—"The hag comes again"!—and dropped back in his chair in a swoon;—in the way he had himself described. The physician caused him to be let blood; and satisfied himself that the periodical shocks of which his patient complained, arose from a tendency to apoplexy. —"*Letters on Demonology and Witchcraft. By Sir Walter Scott.*" *Letter* 1; *Pages* 23 *to* 25.

pileptica." It does not follow the course of particular nerves. It appears o reside in the skin; and there is certainly no connexion whatever between t and the neurilema of the part. I have seen several instances of this ffection; and I made a note of one case, in 1826. A boy had a sensation f two auræ; which ran along the dorsum of the foot, up the front of the egs and thighs. Each stream ran up the trunk, and they met at the epi- astrium; and then it seemed as if there were five streams, running from ie two up the trunk. As soon as the auræ got to the epigastrium, down e fell. He compared the sensation, which was very rapid, to that of the reeping of a spider. I had another case of the same kind, in May, 1826.

Frequency of the Fits.—Occasionally, the fits are very numerous at first; ut gradually become less so. While, however, they become less numerous, iey generally become more severe, and last longer. I think, in the ma- ority of cases, the fits are most frequent at first; so that a person will have dozen or twenty in a day; but as they become fewer, I have generally bserved them last longer, and the severity is greater. Occasionally I know ie reverse takes place;—they are not so numerous at first. Some have ut one fit for many years;—an interval of many years occurring before nother takes place; and, so far as I know, some have but one fit during fe. It has proceeded from some temporary cause; and the disease has ever recurred.

The Mind becomes Impaired.—If the disease have continued long, and ie fits have not been very infrequent, the mind generally becomes im- ired; but if the disease have continued long, and yet the fits have not curred except at long intervals, then the mind is not impaired. The ason is simply this;—the disease of the brain, which gives rise to these s, at last disturbs other functions. It is not the *epilepsy* that causes it; it the *cause* of the epilepsy impresses other parts of the brain. That the sease, however, does not necessarily impair the mind, is shewn by the ample of Julius Cæsar, and Napoleon; both of whom, we are told, were bject to it.[a]

Complicated with other Diseases.—It is very common for one, two, or ore diseases of the nervous system to be united; and we find, in illustra- n of this observation, that epilepsy frequently occurs in chorea, in hys- ria, in insanity, in idiotism [b], and not unfrequently in palsy;—that is to say, e pathological state of the brain or spinal marrow, or both, will produce metimes one symptom, and sometimes another. The disease may be ch, as to extend from one portion to another, and to affect various parts. is union of different diseases of the nervous system, is almost always en. In St. Vitus's dance, there is a peculiar constitution of the mind,— little fatuity. Apoplexy and palsy we see united every day; and apoplexy the common termination of many diseases of the nervous system;—of sanity, for example. These different nervous diseases may coexist or cceed each other.

Variety of Epilepsy.—There is a great variety in epilepsy. That which

[a] *Cassius.* Did Cæsar swoon?

Casca. He fell down in the market- ce, and foamed at the mouth, and was echless.

Brutus. 'Tis very like! He hath the alling sickness."

"*Julius Cæsar*"; *Act* 1; *Scene* 2.

It is reported that afterwards, he [Cæsar] puted it [his conduct to the senate] to his ease;—saying that their wits are not perfect which have this disease of the "fall- ing evil"; when, standing on their feet, they speak to the common people; but are soon troubled with a trembling of their body, and a sudden dimness and giddiness.—"*Pictorial Edition of Shakspere*"; *Part* 35 ("*Julius Cæsar*"); *Tragedies, Volume* 2; *Page* 236. (*Quoted from North's Translation of* "*Plutarch's Lives.*")

[b] See Page 595.

I have just described is the most common form; but there are very great varieties;—so that persons may quarrel about the definition, if they choose; and say that such and such forms are not epilepsy. If we define epilepsy to be "a *complete* loss of sense, with *general* convulsions", then an *incomplete* loss of sense, or *partial* convulsions, is not to be considered epilepsy. But it is not wise to quarrel about terms, in this way, so long as we understand what is meant by them.

It will sometimes happen that there is decided insensibility *before* the convulsions take place; and that *during* the convulsions, the person becomes more or less sensible. This is one form in which the disease appears. Occasionally patients have no convulsions at all;—they will simply fall down in a state of insensibility, and rise up again without knowing what is the matter with them. Occasionally, instead of these convulsions occurring throughout the body, they are confined to one side; and sometimes they are still more partial;—being confined to one extremity. Sometimes, instead of convulsions, there is mere tremor of the body; or a part of the body will shake violently. Occasionally, during the fit, there is delirium. The person shews that he is not insensible; but, instead of being insensible, he is in a state of violent delirium;—apparently in an alarming condition; although in general, I believe, there is no danger at all. Sometimes patients have this delirium on recovering from a comatose state. Occasionally the disease assumes the form of partial tetanus; one-half of the body being in a state of the most intense spasmodic rigidity. I have seen two cases, where the person was seized, at the moment of the convulsions, with a spasm of one-half of the body, attended with the most excruciating pain. One arm and one leg have been drawn up; yet there has been no danger; and the nature of the case has been shewn very plainly, by the next paroxysm being epileptic.

Ecstasis.—Sometimes there is a variety in what occurs in this respect;—a person is insensible to all around him; and yet has, before the fit, no *internal* unconsciousness. I have seen several instances where, before the fit, the patient became unconscious of external objects;—that is to say, the comatose state came on before the convulsions; but, in that apparently comatose state (a state of sopor in which there was no perception of any thing around) the patient was internally in a state of activity; and that condition is called "ecstasis"[a];—whether it be united with epilepsy or not. In this state, people sometimes walk, dress themselves, and even compose poetry; and yet they have no knowledge of it. If they be awakened in this condition, they are alarmed; or, at least, they are surprised at the situation in which they are placed. Sometimes they recollect it all;—just as we recollect a dream. Sometimes we may remember a dream, but sometimes we have no knowledge of it; while those near us see that we have been dreaming. So it is in this state of ecstasy, which consists in the mind being internally active. Sometimes the paroxysms are not quite complete; so that a person is half aware of what is going on about him. If the patients be in a situation where they have frequently been before, and have become habituated to it, they have been known to walk over difficult places, where there was the greatest danger, with impunity. These places, however, were well known to them; so that habit influenced their motions. Sometimes, however, the activity of the mind is so imperfect, that they know where the window is, and how to open it, yet they forget that there is the street beyond the window; and they step out, and are

[a] From ἐξίστημαι, *to be mentally deranged.*

dashed to pieces. This all arises from an imperfect activity of mind. This state of ecstasis is nothing more than active dreaming. In dreaming, we are often active, reason correctly, and even compose poetry; but in this state of ecstasis, more than that is done;—persons will compose to a great extent, reason accurately, and perform voluntary motion,—so as to go from one place to another, and do many things; and yet, for the most part, they will be ignorant of it. A patient of mine had this ecstasis before the paroxysm of epilepsy. She was a girl, and subject to epilepsy; and, before she fell down, she was insensible to all around her; but in the state of insensibility she used to hum "Robin Adair", and "Home, sweet home", so correctly, that none could find fault with her; but she was quite unconscious of it. After this, the activity of the mind ceased; she became unconscious internally as well as externally; and the convulsions then came on. I had another patient, more religiously and devoutly disposed; and she always sung *hymns*, and in good time.

Dr. Darwin considered this somnambulism, or "walking in the sleep"[a], (which is only an imperfect degree of sleep,) to be an epileptic disease. Whether it is *true* epilepsy or not, is another thing; but he considered it to belong to the family of epileptic affections. Dr. Prichard, of Bristol, (whose work on nervous diseases[b] is well worth reading,) considers walking in the sleep and ecstasis to be both of an epileptic character. If a person be *asleep*, and be seized with a partial consciousness, and partial voluntary power, it is called "somnambulism"; but if he be seized in a *waking* state, then it is called "ecstasis." It is the same state; only it may begin when we are *asleep*, by a degree of *activity*; or when we are *awake*, by a degree of *insensibility*. They come exactly to the same thing. They frequently occur without epilepsy; but they are frequently united with it.

Night-Mare.—The night-mare is considered by some as allied to epilepsy. In the night-mare, which is technically called "incubus"[c], there is a degree of sense, but a deceptive feeling;—generally some unpleasant dreams, and more or less loss of volition. There is a strong, but ineffectual desire to make a muscular effort. It is only a variety of somnambulism; and when the paroxysm ceases, we can make a voluntary effort: whence it is imagined, we get rid of the night-mare by making the effort; whereas the effort is made because the diseased state ceases. I think it is a slight degree of epileptic affection. There can be no doubt that it is a cerebral affection; and it may arise from eating suppers, and from other causes. It is singular that there is one house in the country, where I always have the night-mare; and in my own case the spectre has taken the shape of a devil, with a colour like that of oil-skin. The house is that of a friend of mine. I repeatedly changed my bed-room; and at last I did not go to bed at all, but slept in the drawing-room. Still, however, I had the night-mare. I do not know the reason. Possibly it was going from London, partaking of a late dinner, eating more than I should, being cheerful from seeing my friends, and then going to bed. Certain it is that in that house, for four or five years, I regularly had the night-mare.

Coma without Convulsions.—The state of ecstasis I have described, precedes the commencement of the fit; and I believe it sometimes takes place *after* the fit; but other varieties take place in the fit itself. I mentioned that, sometimes, the coma ceases when the convulsions come on[d]; and

[a] From "somnus", *sleep*; and "ambulo", *to walk*.

[b] "Treatise on Diseases of the Nervous System; by J. C. Prichard, M.D."

[c] From "incubo", *to sit upon*.

[d] See Page 662.

some people have coma without convulsions at all[a]; and that is a kind of epilepsy which is frequently mistaken for apoplexy. Many persons are said to have twenty fits of apoplexy, when they have never had one. Old people will fall down senseless; and will get up again, just as if nothing had happened; and if a practitioner be near, he bleeds them; and a cure of apoplexy is thought to be effected; but there is no reason to suppose that it is any such thing. It appears to be only imperfect epilepsy,—epilepsy without convulsions; for there is no stertorous breathing; no harm arises from it; and such persons very frequently, sooner or later, have regular epilepsy. A slight degree of this is sometimes seen;—so that persons will not lose themselves entirely. They feel that they are going; they catch hold of something; and they are right again. It is, no doubt, an imperfect form of epilepsy. The coma is not fully formed; lasting only a few moments. I have known this occur; and then the coma to last longer, and be more perfect; till, after some years, the coma has been joined with convulsions: so that I have no doubt elderly persons (and sometimes it happens to young ones) fall down senseless, and come to, without suffering any consequences whatever; and have frequent attacks of it. Occasionally, mere faintness is produced;—not enough to make the person take hold of any thing.

Partial Convulsion.—The convulsions, I mentioned[a], are sometimes very local. Sometimes it is only an arm or a leg that is convulsed. I had a case occurring in a boy, in 1828, whose muscles at the back of his head were affected; and likewise the muscles of his eyes. He was frequently seized with a fit; which made him hold up his head, and begin winking his eyes. During this state of partial convulsions, his head was drawn back, and he was perfectly insensible; but he never dropped down. His father once fired a pistol close to his ear; but the boy took not the least notice of it. He would heave a deep sigh, stir about, and be himself again. I have seen him, repeatedly, in a paroxysm of this description. He would have thirty fits in a day; stand still all the time; and be perfectly unconscious of them. There was a boy in St. Thomas's Hospital, who was nearly in the same state. When he was attacked he held his forehead, and said he was unconscious. I never saw *him* in a fit; but I have frequently seen the other boy in one. So imperfect is the fit, that if the patient be eating his dinner at the time, he continues to masticate as though the fit were not on him; but he is quite unaware of what he is doing. I had another patient, in whom the head was drawn down; and, when sitting at a table, down his head would come upon it; till his nose was beat flat, like a kidney. Before he had epilepsy, his mother said, he sat "nod, nodding", till his nose was almost as flat as the rest of his face. I have seen cases affecting one part of the body only. I had under my care an old lady who had had hemiplegia of one side; and this side became subject to epilepsy, and was convulsed from time to time. It is useful to know these things; because we might think that a patient, in these anomalous forms of epilepsy, was suffering under some structural disease that might prove dangerous. If it be merely epilepsy, we may give a much more favourable prognosis, so far as life and death are concerned; though the prognosis in epilepsy is generally unfavourable, because it is rarely curable.

Most frequent in Youth.—This is a disease, which is very common in infants and young children; and it will sometimes continue till puberty, and then cease; but it will sometimes occur again, after the sexual period of

[a] See Page 662.

life is over. I had a patient (an old lady) who informed me that she had epilepsy, when a child, every few weeks; and that the fits gradually grew rarer, till puberty. During the menstruating period they ceased, and she had no fit for thirty years; but when menstruation ceased, then she had a fit every year or two;—sometimes not so often. She had pain in the occiput, for five years, before the disease returned; and, one day, she suddenly fell down dead. Here was an instance, within my own knowledge, of a person having the disease when a child; of its ceasing at puberty, and during the menstruating period; and of its beginning again, when she relapsed into her former state. Generally, when the disease lasts through life, it begins just before puberty, or about that time. Dr. Heberden not only observed this, but also states that there was no mitigation from puberty, so far as he could judge from his experience.[a] It is generally imagined, that puberty mitigates the disease or destroys it altogether; but I believe that the hopes of parents, on that point, are usually false; and that puberty does not influence it. Either so many young persons die of the disease, and do not grow old, or it ends in other nervous diseases,—particularly insanity; so that, at last, the individual is put in the class of insane persons. Whatever may be the reason, we certainly see it more frequently in *young*, than in *old* people; and I suppose it arises from a variety of causes. Persons become fatuous; and then the epilepsy is considered only a secondary matter; and now and then it ceases altogether. Old people are most subject to that form of epilepsy, which is characterized by coma without convulsions[b]; and which, I stated [c], is often mistaken for apoplexy.

Most Frequent in Males.—Males are more subject to the disease, than females; except when it occurs in young children and infants. In infants, the proportion is just the same; because there is not the individual difference of constitution; but as the period of puberty arrives, and there is the distinction between the sexes, then it is more common among males than females. I once made a calculation of the number of patients I had had with this disease. In 1829, I found that I had had in the hospital thirty-seven patients; twenty-seven of whom were males, and only ten females. They were nearly all boys and girls; so that it is much more commonly seen in *young* persons, than in *old* ones.

SECTION II.—CAUSES.

Hereditary Predisposition.—With regard to the causes of the disease, we may first mention a certain hereditary predisposition. This is shewn, perhaps,—not by brothers and sisters, and predecessors (uncles and aunts, fathers and mothers, grandfathers and grandmothers) having had *this* disease,—but by their having had other affections of the nervous system. The same state of the nervous system, will frequently not produce the same disease;—one may have epilepsy, and another some other nervous affection. When, however, these things occur in different generations, we may class them together, and consider them as the development of an hereditary predisposition. We continually see, in females, something wrong in the nervous system; but it does not produce the same effect in all. Some will have one disease, and some another.

The Form of the Head.—Epilepsy is frequently conjoined with a curious form of the head: it is very often united with a deficiency of brain; and

[a] See his "Commentaries"; Chapter 3. (First Edition; Page 163.)

[b] See Page 662.

[c] See Page 664.

(of course) with fatuity, or idiocy. Epilepsy is frequently united with that form of idiocy which depends, not upon *disease* of the brain, but upon a *deficiency* of brain. Many people have a narrow forehead;—a low forehead, sloping back; and they have epilepsy. This is not universal, nor indeed *general*; for any derangement of the nervous system may produce epilepsy. Many persons are idiots, not from there being a deficiency of brain, but from the brain being of bad quality; but there is one kind which depends entirely upon a deficiency of the anterior part of the brain; that no one now can deny. Where such is the case, it is common for epilepsy to be united with it. It is very common to find a sugar-loaf form of the head in epileptic patients. Epilepsy is sometimes united with a large head. I mentioned that the hydrocephalic man[a], who had ten pints of water in his head, was epileptic.[b] Sometimes it arises from a preternaturally thick skull; and, on the other hand, epilepsy may accompany the most beautifully formed head;—simply from some accidental disease in the head. However, one circumstance connected with the predisposition to epilepsy, is an idiotic form of the head;—a shallowness of brain. Not that I conceive the shape of the head has any thing to do with the production of the disease; but where the brain is more or less deficient in development, very frequently the patient is likewise epileptic.

Cerebral Disease.—Epilepsy sometimes exists in chronic hydrocephalus, and various other diseases of the head; but we frequently see it in the best-formed head. There is a predisposition to it, indeed, from any cerebral disease whatever. Whatever disease may exist in the brain, the person so affected is very liable to have epilepsy. The same state which produces one disease of the brain, may (either by its intensity, or by extending to other parts) produce epilepsy. Very often, however, the predisposition to this disease is inexplicable. A person is seized with an epileptic fit, from some circumstance which will not produce it in another; and yet we may be able to discover no difference between the two individuals. It is the same with all other diseases. We see a predisposition, or an indisposition, to them, unconnected with external circumstances. We cannot tell why, for example, one person will take a contagious disease, or become affected the moment he is exposed to it, while another equally exposed escapes; and so it is, frequently, with regard to epilepsy.

Exciting Causes.—If the predisposition be very strong indeed, then the slightest exciting cause will produce it;—such as will scarcely more than quicken the pulse in another person. It has followed tremor;—we find many cases of epilepsy, evidently ascribable to extreme dread. Injuries of the head (not in *one* part merely, but *any* part) will produce it. The suppression of habitual discharges, whether natural or artificial, has the same effect; and so also has the suppression of irritation. It will arise in females from a suppression of the menses; and, in males, from the suppression of an hæmorrhoidal discharge which has become habitual. It arises from the cessation of a mere irritation;—for example, from the cessation of an accustomed cutaneous disease without discharge. The cessation of gout will produce it; and also tumours, especially if situated on the head. These causes, I mentioned, will sometimes give rise to phrenitis.[c] The presence of the tumour produces inflammation of some particular part, so that epilepsy occurs; or the removal of the tumour causes a greater quantity of blood to be thrown on the brain; and thus the disease is induced. It occa-

[a] Cardinal.
[b] See Pages 556 and 557.
[c] See Pages 536 and 537.

sionally takes place in violent fever. In fever, the brain is frequently in a state of great excitement; and epilepsy occurs. Sometimes, among other causes, it has been excited by worms in the intestines or stomach, by teething, and even by a stone in the bladder. Irritation of any part of the body whatever, if it amount to a certain point, and the person be predisposed to the disease, may produce epilepsy. In the "Edinburgh Medical Essays", there is mentioned an instance of the disease being produced by a small hard body in a nerve, at the lower end of the "gastrocnemius externus" muscle. The disease had existed twelve years; but on this body being removed, it entirely ceased.[a] It is also produced by inflammation of the membranes of the brain: when speaking of arachnitis, or the acute hydrocephalus of children, I mentioned that convulsions were very common.[b] Poison will produce it; mineral poisons (lead, for example), and all the tribe of vegetable narcotic poisons, will give rise to it.[c] Small-pox will also produce it: it is common for children, at the period of the eruption of small-pox, to have epileptic fits. Dangerous hæmorrhages may produce it. When a person is almost expiring from hæmorrhage, the collapsed state of the brain, from the want of blood, excites convulsions. In some persons, sexual intercourse will produce it. It is said that Napoleon had epileptic fits on such occasions;—not on *every* occasion of the kind; but at periods of particular excitement. Imitation will produce it, especially in females. If they see it in others, they are prone to fall into the same state.

SECTION III.—MORBID APPEARANCES.

Thus we have just seen, that any violent irritation, whether mental or corporeal, in whatever part of the body it is situated, may produce this disease. Mere inflammation of the brain, or injury of any part of the head, may cause it, when there has been no disposition to the disease before; and it may entirely cease on the cessation of inflammation within the

[a] In July, 1720, a woman about thirty-eight years of age, was brought to me [Dr. Short]. She had laboured twelve years under an epilepsy; which, from one fit a month, was come to four or five violent ones every day (each continuing an hour, or an hour and a half); by which she was rendered mopish and silly, and incapable to take care of her house and family. Her husband was reduced in his circumstances, from his affection and care for her;—having got and followed all the advice he could. Evacuations of all kinds had been tried; the epileptic and cephalic tribes of medicines had been ransacked; and many other medicines had been used in vain;—the disease growing more severe. Her fit always began in her leg, toward the lower end of the gastrocnemii muscles; and (in a moment) reached her head, and threw her down;—foaming at the mouth; with terrible distortions of the mouth, neck, and joints. While I talked with her, she fell down in a fit. I examined the leg; and found no swelling, hardness, laxness, or redness, different in that place from what was in the other leg; but—suspecting (from her fit beginning always at that part) that the cause of her disease lay there—I immediately plunged a scalpel about two inches into it; where I found a small indurated body, which I separated from the muscles, and then took up with a forceps. It proved to be a hard cartilaginous substance or ganglion, about the size of a very large pea, seated on a nerve; which I cut asunder, and took out the tumour. She instantly came out of the fit, cried out she was well, and never after had a fit; but recovered her former vigour, both of body and mind.—"*Medical Essays and Observations. Published by a Society in Edinburgh.*" *Volume* 4 (1735); *Article* 27. (*Fifth Edition*; *Pages* 334 *and* 335.)

[b] See Page 549.

[c] The most complete table we have seen of these poisons, and of all others (whether animal, vegetable, or mineral), and of the diseases which they produce, is that constructed by the late Dr. Fletcher. It is published, as a Chart, by Butler, Medical Bookseller, St. Thomas's Street, Southwark.

head, or the cessation of any cause of excitement there. On this account, we may frequently expect to find no morbid appearance in the head. As any irritation of any part of the body may produce it, it is not reasonable to suppose that we must in all cases find disease in the head. It may, however, arise from inflammation and irritation of various kinds in the head itself; and, in such circumstances, we may expect to find disease in that part. Now this is just what really occurs. Sometimes, on opening epileptic persons, we find nothing wrong in the brain; even when there has been no evident exciting cause at a distance. When there is an exciting cause at a distance, we cannot expect to find any thing morbid in the brain; but where we can discover *no* exciting cause at a distance,—no stone in the bladder,—no tumour,—no worms in the intestines; but where the cause has been supposed to exist solely in the head,—even in this case the disease has sometimes, and not unfrequently, disclosed nothing after death. It has appeared to be a disease of mere function; and has not produced any structural change. It is always to be taken into account, however, that a great number of persons who open heads, are not qualified to do so; —that is, although qualified to perform the mechanical operation, they are not able to say that every part is perfectly sound. It requires a man to be a good morbid anatomist, and to take great pains, before he examines the head, and declares that there is nothing morbid in it.

But after this disease we find, occasionally, an abscess in the brain, softening of the brain, induration of the brain, or tumours in and upon it. We also find exostosis [a], thickening, and effusion;—not that the thickening and effusion have been the cause of the disease; but the irritation which produced the epilepsy, likewise produced effusion and thickening. Every disease that is found in the brain, we may find in persons who have been epileptic; because any organic affection of the part may produce the disease. Dr. Prichard (to whose work on Nervous Diseases I referred [b], as being an excellent production) says that he witnessed two dissections, where nothing wrong was seen in the brain. There was a man in St. Thomas's Hospital, who had been there from a boy (having been engaged as surgery boy); and who used to tumble about. I have heard that he was tipsy; but I do not wish to discredit his reputation. When he died, his brain was examined; and, although he was idiotic as well as epileptic, it was said that nothing morbid was discovered. Wenzel, a German anatomist, and others, formed a society for the investigation of cases of this disease, —so far as regarded the *post-mortem* appearances; and they say, that in fifteen cases out of twenty the cerebrum was sound; but the pineal [c] gland was diseased, and also the cerebellum; which was altered in consistence, colour, and size; but I have opened persons who have died of epilepsy, and no morbid appearance has been found in the cerebellum, or anywhere else; and, again, the cerebellum is often found diseased, without epilepsy. I believe the truth is, that any irritation whatever will produce this disease; which is nothing more than a great excitement of those parts of the brain connected with the voluntary muscles. It is stated in Dr. Carter's account of a lunatic-hospital in France, that one of the physicians there, among the number of lunatics under his care, examined about thirty adult persons, who had been labouring under the disease; and he found no disease of the brain, but only of the "medulla spinalis." These

[a] From ἐξ, *out of*; and ὀστεον, *a bone*.
[b] See Page 663.
[c] From πινα, *a pine-apple*;—alluding to its shape.

observations were too limited. If sixty had been examined instead of thirty, I have no doubt that the inference would have been different.

Seat of the Disease.—Although this disease so frequently arises from a mere functional affection, or a temporary source of irritation, yet it is an infinitely more permanent disease than St. Vitus's Dance, or hysteria; and much more frequently does it arise from organic causes. It arises *less* frequently from structural change than palsy does, but *more* frequently from that source than does either chorea or hysteria. Whatever spot in the whole body is the source of irritation,—whatever spot even of the brain itself (the cerebrum or the cerebellum), it is probably the "medulla oblongata" which is the chief seat of excitement. My reason for arriving at this conclusion is, that pressure on the "medulla oblongata" always causes sleep. This has been ascertained experimentally, in individuals where no other part of the brain existed than the "medulla oblongata";—the cerebrum and the cerebellum having been deficient. It is said that, in the case of certain fœtuses, if the "medulla oblongata" be *slightly* compressed, we have *convulsions*; but if it be *more* compressed, we have *sleep*; and it is also ascertained, that if a sharp instrument be passed into the brain, there is no sensation felt; but as soon as it reaches the "medulla oblongata", or the *origin* of the nerves (as people sometimes say), we have epilepsy. I think these circumstances make it probable that, whatever the cause of irritation may be, it acts there. However, this is only a probability. It may be the chief seat of chorea, tetanus, and hysteria, as well as of epilepsy.[a]

SECTION IV.—DIAGNOSIS AND PROGNOSIS.

Feigned Epilepsy.—We have first to ascertain whether the disease is really in existence, or whether it is only feigned. This necessity arises from the fact, that impostors frequently pretend to labour under this complaint; because it looks so frightful, and so much excites the attention of bystanders. In the *feigned* disease, the pupils are not dilated; the nails and the face are not livid; and if the hands be forced open, they are instantly clenched again. In *real* epilepsy, if we force open the hands, they remain so; but if a person be feigning the disease, and we open them, he will close them;—to shew that it is real! Some imitate the foaming of the mouth, by putting a little soap under the tongue. Again: in the feigned disease, there cannot be such palpitation and rapidity of the pulse, as in the genuine affection. The impostor, by tossing about, may quicken the pulse; but he will not produce that thumping of the heart against the ribs, which occurs in the real fit; and in the feigned disease, he does not very well bear putting the edge of our thumb-nail under his, so as to

[a] This opinion is confirmed, in a remarkable degree, by the researches of Dr. Marshall Hall and others, as to the functions of the true spinal cord. These authors have shewn, that the closure of the larynx, the distorted vision, and general convulsions, are really a disturbance of the "true spinal" functions; while the coma, and other cerebral symptoms, are really effects consequent upon this disturbance of the spinal functions. Dr. Marshall Hall has divided epilepsy into two principal varieties: the first, arising from direct irritation of the cord itself, he has named "*centric* epilepsy"; the second, arising from irritation of remote organs acting through the medium of the "excitor" nerves, has on that account received the name of "*eccentric*, or *centripetal*" epilepsy. A knowledge of these distinctions enables us to reconcile the contradictory results of different observers, as to its morbid pathology; and to form a more accurate prognosis in each case.

make an attempt to tear the cutis from the nail. A very horrid sensation is produced by this method;—perhaps as sharp an agony as the human body can experience. It is borne in real epilepsy; but in the feigned disease it is found very unpleasant; and impostors take the hand away, or strike the person attempting it. In the feigned disease, they generally take pains to fall down in a comfortable place; they do not fall against the fire or hot bars, or against the edge of a table; and so run the chance of getting a black eye, or lacerating their face. They generally fall down in some convenient place; and, like a cow, lie down steadily and quietly. One other mode of ascertaining the deception, is to propose, in the hearing of the person, some terrible means; such as the actual cautery. If he hears that, and especially if we bring a red-hot poker, he will get up instantly. Many have been detected by talking of some severe means; for the pulse, in consequence of the emotion, will then become quickened, in spite of their efforts to be tranquil.

Hysteria.—We may distinguish epilepsy from hysteria, by there being, in most cases, a complete loss of sense; by the absence of globus hystericus, laughing, crying, sobbing, or shaking, during the convulsions; and the absence of delirium. Occasionally, hysteria is combined with epilepsy, and then globus hystericus is present; but if it do exist, it is only in a slight degree; and if it exist in no more than a slight degree, we are justified in considering it a case of hysteria, rather than epilepsy. If there be globus hystericus, all the other symptoms of hysteria will be present as well;—laughing, crying, sobbing, and perhaps a copious discharge of very limpid urine. The best mode of making the distinction, is not to depend upon one symptom, but to take a general survey;—to remember that, in epilepsy, there is usually a *complete* loss of sense; and that, in hysteria, there is only an *incomplete* loss of sense; and, above all, that the fits do not come on regularly before convulsions. Patients will become sensible; and then, in the midst of their sensibility, the disease begins again; whereas epilepsy generally goes on in a pretty regular manner.

Prognosis.—If the cause be evident, and is of a temporary and removeable nature, our prognosis would be favourable; but if we cannot discover a cause for it, but see (at the same time) that the cause is not of a temporary nature, or within our power to remove it, then our prognosis should be unfavourable. If we discover the cause, and find it cannot be removed, still of course our prognosis must be bad. The disease, altogether, is one of the most intractable we can have to treat. It is a disease which, in the large majority of cases, cannot be cured; though, in most cases, we may lessen it.

SECTION V.—TREATMENT.

Treatment of the Attack.—If there be aura epileptica, we may frequently stop the disease by putting a ligature between the part from whence it arises, and the centre of the body. In a case of this nature, to which I have already alluded, where there were two auræ[a], a ligature was placed on each side; and when the patient complained of the sensation, some one tightened them. At last the fits ceased so long, that he went out of the hospital[b]; but I heard, after a still further lapse of time, that they had returned. In the fit itself, there is nothing to do but to place the patient's

[a] See Page 661.

[b] St. Thomas's.

head high; to put him out of danger, so that he may not knock himself; to loosen his neckerchief; and put a cork or piece of wood into his mouth, to prevent his biting himself. If there be any danger of apoplexy, of course we may bleed; but this is not usually the case. I stated that, in the convulsions of infants, cold affusion had been found to do good[a]; and I do not know that it would do harm. Some persons say they have recovered patients from these fits, by putting salt into the mouth. I know that we may frequently recover hysterical women by this means. I have seen them shake their heads, splutter, and open their mouths; but epilepsy is not so soon got rid of. Still, however, it may do some good.

Removal of the Exciting Causes.—To speak, however, of the treatment at large, and not of the particular fit. If the exciting cause be evident, we must remove it, if possible. If it be ascertained that there are worms, it is impossible to say whether they are the exciting cause; but it is right to remove them. If there be a stone in the bladder, the operation of lithotomy[b] should be performed. There was a case (rather a celebrated one, I believe) of a man, many years ago, who had received an injury of the head, and in whom epilepsy ensued. A surgeon, at St. Thomas's Hospital, imagined that the removal of the piece of bone might cure the disease;—that a spicula of bone was most probably proceeding from the inner table. A circular piece of bone was removed, by means of the trephine; and there, luckily, was the spicula; and he never had a fit afterwards. The spicula is preserved in the museum at St. Thomas's. I should imagine that a large number of people who are epileptic, have received an injury of the head; but we might employ the trephine many times, without such a fortunate result. Mr. Wardrop cured a case of epilepsy, beginning with aura in one finger, by amputating the small joint of the finger. Of course, if any other organ than the brain or spinal marrow, be diseased, we should remove it if possible.

When produced by Imitation.—The disease frequently arises from mental causes; and there physic can be of no use. We must administer to the state of mind[c], if it be in our power to do so. The disease once pervaded a whole school, in Holland, in consequence of imitation. One of the boys had epilepsy; and the whole school became epileptic. It was cured there by making an impression on the mind. The boys were all arranged round the room; and were told that the first boy who fell in a fit, should be flogged. This put a stop to the disease. I have no doubt that, many times, we might cure *ague* in the same way.

When Succeeding another Disease.—If the disease have appeared on the cessation of another, we should (if possible) re-excite the original disease. If it occurred after gout and rheumatism, we should apply strong mustard-poultices to the joints; but we should also endeavour to lessen an inflammatory state of the head;—notwithstanding we are endeavouring to re-excite the disease at a distance.

Antiphlogistics.—Supposing there is no exciting cause to be found, then we may almost always do good, by adopting antiphlogistic treatment. In the first place, it is (generally) useful to insist upon complete abstinence from distilled and fermented liquors;—wine, spirits, and beer of all kinds; and gradually from meat. Persons cannot bear an abstinence from meat well, at first. If any one make the experiment to abstain from it *all at*

[a] See Page 655.

[b] Or lithotripsy.

[c] Canst thou not minister to a mind diseased?—"*Macbeth;*" *Act* 5; *Scene* 3.

once, he will find himself grow weak; but if he abstain from it *gradually*, no inconvenience is felt; and a great number of persons can live very well without it. We should also persevere in keeping an open state of the bowels. There should not only be one motion a day, but two. The head should be kept constantly cold, by the use of a shower-bath, and frequent washing of the head. In addition to all this, if the patient be plethoric, venesection, bleeding, and leeches, will be found very useful. Of course, the degree in which all this is done, must be varied in different people; and some persons are too weak to admit of any thing of the kind; but if their state of body will admit of some part of this antiphlogistic treatment, and more especially if it will admit of a great deal, we shall find great alleviation. I know that most persons who go to St. Thomas's Hospital, are *relieved*; but I believe none are *cured*; and I have little doubt that the benefit they derive there, is simply from antiphlogistic treatment. Many are better, before there is time for medicine to have any effect; because they are instantly put on milk-diet, or gruel, or slops. It is to be remembered, however, that this is not to be borne in every case;—that there may be debility; and that a patient may be made worse by a plan of this kind; and even where such treatment is proper, we may make the patient worse by carrying it too far. I have seen many cases, where patients were better to a certain point; and beyond that, by lowering them, they became worse; and then, by going back to that point, they were better again. But even if patients be weak, and we cannot push antiphlogistic regimen to any extent, it is still necessary to avoid stimulants, and those things which cause a flow of blood to the head, and great excitement of that organ.

Setons, &c.—Setons, issues, and moxæ, are sometimes useful; but occasionally I have found them useless. The application of tartar-emetic ointment at the back of the head and scalp, is a very severe mode of treatment; and I have not found much benefit from it; but by antiphlogistic treatment, and keeping the bowels open, I have almost always seen great benefit produced.

Iodine and Mercury.—There can be no harm in trying mercury and iodine; because there may be some organic disease in the head, which these will remove. There may be irritation; there may be mere chronic inflammation; there may be something to be absorbed; and mercury may do good in such cases. Iodine may likewise do good, as a part of the treatment; but I should not advise one to try it very far. As a part (I may say) of antiphlogistic regimen, mercury and iodine are serviceable. They act by causing absorption; but I am not aware that they do good, except in removing the effects of chronic inflammation.

Specific Remedies.—But besides all these things, which may be deemed *rational* treatment, there are certain *specific* remedies in this disease, which we employ *empirically*;—that is to say, remedies which are found to do good without our knowing why. They will not cure the disease, once in many times; but when they do act beneficially, we know not their mode of operation.

Nitrate of Silver.—The nitrate of silver is one of these; and no doubt it has done great good. We may begin with the eighth, or the sixth of a grain for a child; but to an adult we may give a quarter, or half of a grain, and increase it to six or seven grains. I think Dr. Fowler says (in a case published in the "Transactions of the College of Physicians") that he once gave fourteen grains, every six hours. I know that when we get to a few grains, it frequently purges too much;—so that we cannot push it

farther. It is a remedy which has a tendency to excite gastritis. The salt, or muriatic acid, that may be in the stomach, is decomposed by it; and that is the reason why some people bear a great deal. It has a tendency to act on the mucous membrane of the stomach; and therefore, during its exhibition, we should press on the stomach, to see if there be tenderness. There is no rule for the dose; some will have unpleasant effects from one or two grains, and some will bear five or six with impunity.

Discoloration of the Skin.—But, besides these immediate effects, there is another, of a chronic nature. It has a tendency, if it be given for a length of time, to make the skin blue. The decomposed salt is deposited on the surface of the cutis; more and more decomposition takes place; and the cutis becomes black at last;—as though a lead pencil had been rubbed on the surface. We see some persons almost as dark as mulberries; and may fancy that they are going to fall down, from congestion of the head; but they are merely stained by this medicine. It will cause the sclerotica to be blue; but not to the same intensity as the cutis. I have frequently seen the sclerotica nearly of the colour of "preservers" (as they are called), which some people wear to preserve their eyes. The nitrate will also blacken the tongue or fauces. It is to be remembered, that a large dose is not required, in order to induce this effect; but that a small dose, if it be continued for some time, will lead to the same unpleasant results. If administered even in minute doses, for so short a time as three months, I believe there is a chance of the skin being blue. It does not so much depend on the *quantity*, as on the *time* that the medicine is given; and, on this account, I think we should be cautious of giving it, in private practice, longer than a month; and, as I do not think a month sufficient to produce any beneficial effects, I seldom use it. If it be *not* given for a long time, it will do no good; and if it *be* given for a long time, we run the chance of blackening the patient. In the case of young ladies, it should never be given.[a]

Cupri Ammonio-Sulphas.—The preparations of copper, (cupri ammonio-sulphas, and sulphate of copper,) will be found, I think, more useful than the nitrate of silver;—little use as any of them are. I have seen benefit result from them. Respecting the dose of these, it is best to give one fraction of a grain; and to increase it gradually. In cases where a large quantity is borne, it may exceed one, two, or three grains a day; and very frequently by no means so much. An over-dose occasions sickness and gastrodynia.[b]

Iron.—Iron has been proposed in this disease; but I cannot say that I ever saw it do good. I have no doubt, when a person has been lowered improperly, that it will do a certain amount of good as a tonic; but as to a specific power in the disease, I believe it has none. I had under my care a patient, who had been bled and starved; who had had issues, setons, moxæ, and every other remedy that could be imagined; and who was, in consequence, much debilitated. He then went to some gentleman, who gave him iron; and he told me that it cured him. I

[a] To obviate this inconvenience, attendant on the use of nitrate of silver, Mr. Lane has recently proposed the substitution of *chloride* of silver; under the belief that discoloration of the skin will not follow its use. For fuller information on this subject, the reader is referred to the "Medico-Chirurgical Review", for July, 1840 (Volume 33, Page 289); or to Braithwaite's "Retrospect", Volume 1, Page 224.

[b] The usual dose is half-a-grain, in a pill, night and morning.—*Dr. Fletcher.*

have no doubt that he had been reduced too low; and that iron did him good as a tonic; but, six months afterwards, he applied to me again, as bad as ever.

Acetate of Lead.—Dr. Rush, of America, states that acetate of lead has very great power over the disease. It is a fact that, in large quantities, it will sometimes *cause* the disease. Where persons have been poisoned by lead, from taking a large quantity into the stomach, or have been much exposed to its exhalations, epilepsy has been produced. Of course that is no argument against its moderate use; but I cannot say that I ever saw any good arise from it.

Zinc, Arsenic, &c.—The sulphate of zinc has been much praised, as well as the oxide.[a] I have given it in St. Vitus's dance. It may be exhibited in large quantities;—sometimes twenty or twenty-four grains; but I never saw it do good in epilepsy. The oxide of tin has been much praised; and so has arsenic; but I have seen persons from taking the latter, *become* epileptic. I do not believe these things are to be depended upon. Narcotics have been praised;—especially stramonium[b]; but I am not aware that they deserve any great recommendation.

Cold Affusion.—Cold affusion is certainly of use as a tonic; because it does not *excite* the patient. There are many tonics which excite the patient, at the same time that they increase his strength; but cold affusion does not. A cold shower-bath is useful in the disease; for it strengthens the constitution, without excitement; and it may knock down excitement by its antiphlogistic effects. It "braces" the body.

Oil of Turpentine.—The oil of turpentine is occasionally useful; but far less so than in hysteria. In hysteria, it is an excellent remedy; and if there be worms, in epilepsy, we cannot use a better medicine than oil of turpentine. Dr. Prichard thinks, that if the intestinal canal be diseased, it may do good. In amenorrhœa it may be serviceable; not by exciting the menses, but by removing the state which induces the affection; and so in the case of worms. If it remove intestinal affection, then we cannot say that it is good in epilepsy in general; but it removes the cause in those particular cases. Some contend that it is useful in epilepsy combined with insanity. I believe it has a particular effect on the nervous system; and where it has been said to be beneficial in epilepsy, I should suppose it was where there was some other disease. It has been given in two ways;—in small and repeated doses; and in large and less repeated doses. Twenty drops have been given, two or three times a day; or an ounce every two or three days. Some have given a drachm, once or twice a day; but I do not think that, in general, much good is to be expected from it.

Conditions Favouring the Action of these Remedies.—All the remedies just mentioned may fail, entirely through our not attending to antiphlogistic regimen. It is possible that cases happen, now and then, that would yield to some of these remedies; but we neglect to lower the patient. I am quite sure that remedies are frequently prevented from doing good, because we do not remove a plethoric state of the system. In some local inflammations, and in many cases of various diseases, it is necessary to lower the system to a certain point; and then remedies, which would not otherwise be useful, become so. The reason that the disease is so gene-

[a] The dose of the sulphate is two grains; that of the oxide, ten.—*Dr. Fletcher.*

[b] From "stramen", *straw*;—alluding to its fibrous roots.

rally intractable,—that so many remedies are so uncertain, and so unsatisfactory,—is very evident. This is a disease which arises from every kind of irritation, in every part of the body; and the irritation may be *structural*,—may be slow inflammation, or something we cannot remove. If it always arose from one cause, it would be a different thing; but it will arise from any cause whatever;—physical or mental, organic or inorganic; and situated in any part of the body. Not only, therefore, must it usually be an incurable disease, but there can be no one remedy for it. As to any one medicine being a remedy for epilepsy, I should think a little reflection would shew, that it is quite impossible.[a]

[a] Epilepsy is attended by clonic spasms; takes place chiefly in boys; and generally before puberty. The puerperal form of it is the worst; the lightest is that which occurs in small-pox. It begins with "aura epileptica"; the patient falls into convulsions; the hands are clenched; the urine and fæces discharged; the tongue is apt to be bitten, and there is froth from the mouth. These symptoms are followed by sopor. The pulse is not affected till the end of it; and is then accelerated from the violent motions of the patient. In a pretended fit, if you close the eye and open it suddenly, the pupil contracts; and if ammonia be put to the nostrils, it is felt. When called to a person in a real fit, lay him where he cannot hurt himself or others; bleed if you can get an intermission sufficient; dash cold water on him; loosen all the bandages; put cork between the teeth; inject assafœtida into the rectum; put ammonia to the nostrils; and fill the mouth with salt. Cullen thinks it arises from plethora and debility; therefore, after a fit, diminish plethora, and increase the strength. Give mineral tonics, &c. It sometimes ceases at puberty; before that period, therefore, the prognosis is favourable. It is incurable if it arise from a spicula of bone or a tumour pressing on the brain. It is worse if accompanied by aura. A paroxysm is often kept off by fear. Hence horrible remedies were used;—such as drinking blood hot from gladiators.—*Dr. Fletcher.*

CHAPTER X.

HYSTERIA.

Definition.—In this disease there are fits of general convulsions and insensibility, like epilepsy; but not a continuance of the insensibility after the convulsions are over.[a] For the most part, the convulsions are renewed in the midst of the insensibility. There are also sobbing, crying, laughing, and shrieking in the fit; but particularly before and after it. Sometimes, though not always, there is a mixture of sobbing, crying, laughing, and shrieking, in the midst of the convulsions. The insensibility is, generally, incomplete; the patient having some knowledge of what is going on around, if not all the time, yet during more or less of it. There is also experienced a sense of choking;—as if there were a ball in the throat, which could neither be got down nor brought up; together with irregular breathing; so that there is panting, and the chest heaves up and down. Frequently there is hiccup. Sometimes there is a rumbling noise in the abdomen; and a sensation is experienced as if a ball were rolling to and fro; till at last it comes to the epigastrium, and thence rises to the throat, where it sticks; and then the convulsions begin, and the patient falls down. The abdomen seems to swell; and no doubt it does so. In a few minutes, sometimes, the abdomen will be distended with flatus. There is frequently, also, a great secretion of limpid urine; and this, unfortunately, is sometimes discharged. There is also violent palpitation; just as in epilepsy.

Frequency of the Fits.—These fits will come and go in rapid succession. There is not merely one systematic fit, and then all is over; but there is a succession of these fits; and (as I have frequently observed with regard to nervous diseases) one side is often more convulsed than the other.

Tenderness of the General Surface.—Occasionally there is extreme tenderness, not during the fit simply, but during the time that women are subject to these fits; and this extends over the whole of the surface. If we press ever so lightly on the chest and abdomen, we find them complain; and the same is felt more or less in the extremities; but it is particularly the case with the trunk; and this has often been mistaken, and no doubt still is, for inflammation.

This morbid sensibility is a very remarkable circumstance; and we may frequently be deceived by it. I confess, I knew nothing about it for many years. Females, with some slight hysterical symptoms, will say they are so tender, that they cannot bear pressure; and such appears to be the fact. The least pressure or friction of the skin gives them agony. Sometimes it extends over the whole body, even to the extremities; and sometimes it is confined to the abdomen.

[a] Hysteria is also distinguished from epilepsy by the patient's being able to sit on a chair, by the pupils not being affected, by the mind's not being lost (for the patient can understand what is said), and by the absence of frothing.—*Dr. Fletcher.*

I am quite satisfied that there is no pretence in all this. I saw one young woman who had been in bed three months in this state. She had been blistered, and leeched; but without any benefit whatever. I saw one young lady, about nineteen, who was lying in bed in this condition. The uterus, I understand, was disturbed; so that she menstruated scantily; and there was fluor albus. Her bowels were habitually costive;—so as to require medicine. There was constant pain of the head, and much tenderness of the abdomen; so that any one would, without care, have thought it was inflammatory. She could not bear the least pressure; and yet there could be no inflammation; for the pulse was only 58, and the tongue clean; and, although there was much pain in the head and eyes, there was no drowsiness, and no intolerance of light. I had no hesitation in considering it a variety of hysteria. Some years ago I had, in the hospital, a woman, forty years of age; who, when I touched her, cried out as if I had been going to murder her.

Delirium.—Patients, when they are seized with hysteria, are sometimes violently delirious; so that a stranger would imagine there was phrenitis, which required active treatment. It comes on suddenly, however, and there are other hysterical symptoms present. We may generally satisfy ourselves that it is merely hysterical.

Tetanus, Clavus, &c.—Sometimes patients have locked jaw;—the mouth being closed; and sometimes they have other tetanic symptoms; but that is the general one. Sometimes, from the violent affection of the voluntary muscles, they have a sensation of extreme pain fixed in some part, called "clavus hystericus";—a sensation as if a nail ("clavus") were driven in; and I have no doubt that it is the same as the generally diffused morbid sensibility of the surface; only that it is collected in one spot, and is therefore more acute than when diffused. Sometimes there is catalepsy; which I shall presently notice. There are all kinds of movements of the body, and all kinds of noises made. Sometimes patients will bark like dogs, or imitate various animals.

Affections of the Joints.—It is a curious circumstance, mentioned by Sir Benjamin Brodie, that hysterical women, when the paroxysm is over, sometimes have an evanescent stiffness of the joints, attended with heat and pain.[a] In the case of a young woman, who was seized at church with hysteria, which ended in hemiplegia after she got rid of the fits[b], one knee was stiff, although applications were resorted to for a month. Sir Benjamin, in one of his lectures published in the "Medical Gazette", mentions the occurrence in the wrist[c]; but, in my practice, I have seen it in

[a] Sir Benjamin Brodie has published a work specially devoted to hysterical diseases. The title is—"Lectures illustrative of certain Local Nervous Affections." He says, that "at least four-fifths of the female patients who are commonly supposed to labour under diseases of the joints, labour under hysteria, and nothing else." (Page 37.) These Lectures were reported in the "London Medical Gazette"; Volume 19; Pages 197, 246, and 279. (Nos. 466, 467, and 468; November 5, 12, and 19, 1836.)

[b] See Page 682.

[c] Females of nervous and irritable temperament, especially those who have suffered from mental anxiety, are liable to a peculiar affection of the wrist; and, unlike the generality of hysterical complaints, the married and unmarried are subject to it in nearly a similar proportion. The patient complains of a pain in the wrist; which pain, after continuing a certain space of time, is followed by a kind of puffy swelling, extending up the fore-arm, and down to the fingers. This swelling has many of the characters of that produced by synovial inflammation; but differs from it in being more diffused. Sometimes the swelling is extensive; sometimes so slight as barely to be seen. Having lasted some days or weeks, it subsides; while the pain remains, constant in its character, aggravated by every motion, and rendered worse by the patient's attention being drawn to it. To prevent that

various parts of the body. It is usually an evanescent state; but still it is sufficient to prevent the patient from using the parts.

Mostly occurs in Females.—This is a disease which occurs much more frequently in females, than males; and in females particularly during their sexual period,—if I may so call it; that is to say, during the thirty years in which they are in their prime; namely, in this country, from about fifteen to forty-five. It must vary in different countries; but in England women menstruate from fifteen to forty-five. If the disease appear at other periods, it is more frequently earlier than later. We more frequently see hysteria in girls who have not menstruated, than in old women who have done menstruating.[a]

Occasionally in Men.—But, although this disease is usually seen in females, it is certainly not altogether confined to them; for it will sometimes be observed in boys, and in men under very violent emotions. There is a passage in "King Lear", which refers to this:—

> "O how this *mother*[b] swells up towards my heart!
> *Hysterica passio*, down, thou climbing sorrow!
> Thy element 's below."[c]

It has been said that this disease can never occur in men, because it is hysteria; but we must not attend so much to the etymology of a word, as to its meaning. The name was given to the disease, from its having been supposed to arise from the womb; but the collection of symptoms called "hysteria", will sometimes occur in males;—in boys and young men whose constitution approaches to that of females, and who are susceptible of violent mental emotion.

Causes: Emotion.—Any woman may have hysteria, if she can but have emotion of mind strong enough. Epilepsy is a disease which only occurs in certain individuals, as it would appear, from a certain degree of predisposition[d]; but mental emotion will cause more or less hysteria in almost any woman. Anger or grief, especially grief from ungratified desire, or (to use a more elegant expression) "disappointed love", is the

motion which she dreads so much, the patient keeps her hand in one position; in consequence of which the joint grows stiff and rigid, and the parts assume a very characteristic appearance;—the skin being tense and glossy, and appearing to adhere pretty closely to the textures underneath. The pain may continue for three months, six months, or one or two years; at the end of which time it generally subsides;—leaving behind it a stiffness of the hand and fingers, from which the patient will gradually recover. In one case, however, the pain continued for three or four years; when the hand was left shrunk and withered;—the fingers being contracted and drawn into the palm. The nails had grown lank, scabrous, and rough.

As the health is in general weak, remedies calculated to improve it, are of service to this local complaint; and, in two instances, bark was decidedly of use. From a scruple to half a drachm of the carbonate of ammonia, in the course of the day,—paying at the same time attention to the bowels,—is often a powerful remedy. If the menstruation be irregular, that irregularity is to be corrected by suitable remedies;—as the Vinum Aloës, steel, and similar means. As a local application, the following embrocation will frequently lull the pain:—Misturæ Camphoræ ℥viss; Spiritus Rosmarini ℥iss. M. This should be applied tepid, on a rag. A plaster, composed of equal parts of the Emplastrum Saponis, and Emplastrum Belladonnæ, is frequently useful; at any rate, even when it does no good, it can do no harm. The vapour-bath, especially in the advanced state of the complaint, is also a serviceable remedy. At the same time that local or general means are employed, the surgeon should bear in mind one important caution:—never to draw the attention of the patient to her disorder, more than is absolutely necessary.—"*London Medical Gazette*"; *Volume* 2; *Page* 755. (*No.* 50; *November* 15, 1828).

[a] It occurs most frequently in young widows, and next in virgins.—*Dr. Fletcher.*

[b] See Page 681.

[c] Act 2; Scene 4.

[d] See Pages 664 and 665.

most common cause. I presume it is quite as frequent from disappointed *lust*,—in which desire is the only ingredient; as from pure, simple, unrequited *love*.

Most Common during the Menstrual Period.—It occurs particularly during the uterine period of life, on several accounts. First, because derangements of the uterus are a very common source of the disease; and (of course) the uterus is not deranged particularly, except during that period. Women do not suffer much in the uterus, till it performs its functions; and very little after those functions have ceased, except in cases of organic disease. It is during the period of its activity, that it suffers particular derangement; and, therefore, during that period, it will suffer particular sensations. Secondly, it is during the period of menstruation, that women fall in love, and have their attachments strongest. Sorrows of all sorts, whether real or imaginary, take place with the greatest severity during that particular period. Thirdly, it is during that period of life, that all the feelings of women are most active. A woman's character becomes altogether developed, when she begins to menstruate; and after the period of menstruation has ceased, all her feelings become more or less obtuse. All our feelings dry up in the decline of life, and we are less susceptible of all emotion. I should suppose there is scarcely a woman who has not had hysteria in some slight degree; such as a choking in the throat; but it is generally a temporary disease, and by no means dangerous. Sometimes it is dangerous, but very rarely so; and, for the most part, it is only temporary. Epilepsy is so obstinate a disease, as to be an "opprobrium medicorum"; but hysteria generally ceases at last, although it may continue for a long time. When we consider that a slight cause is sufficient to produce hysteria in women, we shall see that it must be a temporary affection, and cannot be dangerous. Emotion of mind, costiveness, plethora of the head, suppression of menstruation, or any thing of that kind, will excite it.

Pathology of Hysteria.—There can be no doubt, I should suppose, that regular hysteria is situated in the head. The cause may be anywhere; but the disease must be in the head. If a patient is partially convulsed, it may arise from an affection of the spinal marrow; but, in hysteria, muscles that arise *above* the spinal marrow are affected; in addition to which there is insensibility; which, I should suppose, shews that the seat is in the head. We see patients laughing, sobbing, and crying; and then they are suddenly in high spirits again;—so that it certainly must be an affection of the head; only that it arises from a variety of causes, situated in a variety of parts. It very rarely arises from an organic affection in the head, as epilepsy does. As to the other affections,—the palpitation, the faintness, and similar phenomena,—they only shew the extent of the affection.

[My[a] views, as to the pathology of hysteria, are as follows:—1. Hysteria arises from the state of the organic nervous influence endowing the generative organs of the female; and a similar state of the sexual organs of the male very rarely occasions it, and then only in peculiar circumstances. 2. This state of nervous influence nearly approaches to, or consists of, excitement, nervous erethism[b], or irritation; or is of an active or sthenic kind, as respects the functions of these organs. 3. This is generally attended by vital turgescence of the vessels of the uterine system; and these states, consequently, occur chiefly during the prime of life, or while the nerves of generation and the uterine circulation possess their functional energies. 4. These conditions of nervous influence and circulation in these organs, are

[a] Dr. Copland's.

[b] From ἐρεθίζω, *to excite*.

generally insufficient of themselves to occasion the fully developed complaint; and, in addition, there are increased sensibility and irritability of the sentient and motive systems; and, consequently, augmented susceptibility of impressions, from mental or physical causes; arising either from original conformation, or from acquired habit or diathesis. 5. When these states of the generative organs are excited by mental emotions, or by other circumstances, the affection is propagated by direct or immediate sympathy,—by the organic nerves,—to the digestive tube and urinary organs on the one hand, and to the cerebro-spinal nervous system on the other; and thus the phenomena constituting the hysterical seizure are developed. 6. The hysterical phenomena, proceeding from *direct* sympathy with the uterine organs, consist chiefly of those referred to the bowels,—the borborygmi, globus, &c.; and to the urinary organs; as the increased secretion of urine, &c. 7. The extension of the disorder of the uterine nerves (by means of the ganglial system and its communicating branches) to the roots of the spinal nerves, gives rise to the symptoms depending upon *reflex* sympathy; especially the convulsions, pains, &c.; and the affections of the respiratory organs, throat, head, &c. 8. The phenomena of the developed states of the disease, and of its irregular forms, are principally sympathetic, and of the kind which I was the first to denominate "reflex." 9. Although hysteria is often connected with deficient or irregular menstruation, yet this function is sometimes excessive, and is occasionally regular (in every respect) in hysterical persons.[a]]

Treatment.—The treatment of this disease is for the most part very successful; because there is scarcely a predisposition required for it; and the slightest exciting cause is sufficient to produce it. This is not an "opprobrium medicorum"; but, on the contrary, medical men gain the greatest credit in treating it. Although it would cease spontaneously, you may expedite the cure.

Treatment in the Seizure.—The treatment during the fit, should be the same as that for epilepsy.[b] We must set the patient up, and loosen any thing tight about the bosom and neck; and if we find plethora,—so that there is danger of apoplexy,—we should bleed her. The best thing, however, and one that does not answer so good a purpose in apoplexy, is to get a pail of water, or a large wash-hand basin full, and throw it strongly upon the patient. She is almost sure to come to. The water requires to be thrown with considerable force; and should not be spared. It is in hysteria that filling the mouth with salt[c], answers the best purpose. If this be done, the patient generally comes round.

General Treatment.—In treating the disease at large, however, we should follow exactly the same plan as in epilepsy.[b] We must, in the first place, look out for any exciting cause; and, if we can find it, remove it (if possible). In the next place, we must adopt antiphlogistic treatment;—provided there be signs of congestion of the head. Many cases of hysteria are cured rapidly by bleeding and purging. There is so frequently mere fulness of the head in this disease, and so frequently does costiveness produce it, that bleeding and purging very speedily (in general) get rid of the disease, or mitigate it considerably. Women are much more subject to costiveness, than men. They are not so particular in these matters; and their pelvis, being large, will hold a great deal; and therefore we continually hear women confess, that they have not had a motion for a week.

[a] Dr. Copland's "Dictionary of Practical Medicine"; Volume 1; Page 285.

[b] See Page 670.

[c] See Page 671.

At charitable institutions, particularly dispensaries,—where patients attend in great numbers,—we find costiveness occurs far more frequently among women than men; and the hysteria will cease on unloading the bowels.

Ascertain the State of the Uterus.—It is necessary, in the treatment of this disease, always to inquire into the state of the womb. It was supposed, formerly, always to arise from the condition of the womb; and the name of the disease ("hysteria") comes from ὑστέρα, *the womb*. Hippocrates says, that it occurs only in females; and the idea of its dependence on the womb, is shewn by the name which common people give it;—"the fits of the *mother*."[a] The swelling of the abdomen, and the rumbling noise ascending the throat, were thought to be occasioned by the rising of the womb; and therefore attacks of hysteria were formerly called by the name I have just mentioned. The doctors formerly endeavoured to get rid of the fit, by attracting the womb, and by driving it downwards. They put assafœtida, garlic, and all sorts of disagreeable things into the mouth, to warn the womb to descend out of the way; and put "roses and posies" below, to coax it downwards.[b]

Although the disease frequently *does* arise from the state of the womb, yet very frequently it does not; and therefore, in all cases, we should examine into the state of the womb. If we find amenorrhœa, we should endeavour to remove it by cupping the loins; and when we have done that,—provided the state of the patient will allow it,—we should stimulate the womb by oil of turpentine, and injections of ammonia thrown into the vagina; and, if possible, we should recommend marriage; which is by far the most effectual mode of curing amenorrhœa, in many ladies.

When Arising from Sexual Desire.—But I believe that where it arises from something connected with sexual desire, the cause is, for the most part, situated in the head. It is astonishing how many young women, with good full bodies, have pain of the head and cerebellum. We have only to ask the question, and we find that the pain is situated there; and I know that by cupping that part well, and purging thoroughly, we may frequently get rid of hysteria, without attending to the womb. The state of the womb is only one cause among a number of others.

Tonics and Antispasmodics.—Besides removing any exciting cause that may be present, and removing a plethoric state of the whole body (by bleeding, low diet, and purging), we find it necessary, in other cases, to do just the reverse;—precisely as I mentioned in epilepsy.[c] These, however, form only a very small number of cases. It may be necessary to give tonics (and I think iron is the best), together with cold affusion and cold bathing. I think the cold-bath answers better than any thing else. Occupation is essentially necessary; and, if possible, a good regulation of the mind. For certain symptoms various remedies are useful. For faintness and choking, the fetid gums (although they have been given on a strange hypothesis[d]) are very useful. Assafœtida, by the mouth and anus, is very proper. Camphor and musk are more or less serviceable for the wind following the spasms. Stimulants of various descriptions are often required. For the extreme languor the patient feels, and the extreme sinking of which she complains at the epigastrium, stimulants are absolutely proper;

[a] See Page 678.

[b] Borborygmus was once thought to arise from gas generated by semen putrefying in the womb. Burnt feathers, and other substances, were applied to the nostrils, to repel the uterus; and aromatics were introduced into the vagina, to tempt the womb. *Dr. Fletcher.*

[c] See Page 672.

[d] See the last Paragraph but two.

particularly that preparation of iron called "ferri ammonio-chloridum." Some patients complain of experiencing a sensation as if they had no inside. All the tonic medicines that I recommended in epilepsy [a], are useful; and they will frequently cure the disease. I am sure that the best way of treating hysteria, is to remove any exciting cause that may exist; to get the womb into good order; to prevent all fulness; and, if there be debility, to remove it. Let the patient be in the open air, and occupied; attend to regular exercise; and use the shower-bath frequently.

Oil of Turpentine.—To speak of particular symptoms which sometimes attend it. The trismus may in general be got the better of, by a good dose of oil of turpentine. We may throw up two or three ounces by the rectum, or give it the patient to swallow; but the latter is not an easy matter. The jaw generally opens, as soon as the turpentine reaches the intestines; and I have never seen it fail in effecting a cure. Sometimes it has instantly removed the affection; but, in other cases, not for a few hours.

The disease sometimes produces paralysis. I have seen paralysis of the whole of one side (hemiplegia); but it disappeared. I recollect particularly one case of a young girl, who was seized at church. It is very common for patients to be seized at church. I suppose they get excited by the discourse, and by the heat; and sometimes they see persons whom they like very much; but true it is that young ladies are very fond of going into hysterics at church; and they shriek out, disturb the congregation, and put a stop to the service for a time. Now this young woman did so; but there was no pretence in it; and afterwards she was in a complete state of hemiplegia. By dosing her well with oil of turpentine, and bleeding her copiously, she got completely well very speedily. I have seen several of these cases; and they have all done very well. The paralysis is not of a permanent nature, but depends on a temporary state.

I do not know a better remedy for a great number of cases of hysteria, than oil of turpentine [b]; and, to illustrate its efficacy, I may mention the case of a kitchen-maid, who was seized with violent convulsions (supposed to be hysterical) and comparative insensibility. She had continued in that state all the day in which she was seized, all the night, and all the following morning. I took thirty ounces of blood from her, and purged her with salts and senna; but she still remained insensible; and I then had her brought to St. Thomas's Hospital.—I ordered two ounces of the oil of turpentine; and in half an hour she was perfectly well. It had no purgative effect whatever; but—after she had been insensible for two days and one night, and had been freely bled and purged—a full dose of oil of turpentine restored her completely. The symptoms of insensibility, of trismus, and of paralysis, will give way to this, much better than to any thing else; but it is right to bleed, in many cases, in consequence of the state of the head. The turpentine took no purgative effect, till a dose of castor-oil was given; and then it went to work directly. After this she had an attack of paraplegia; but from that she perfectly recovered. I believe, therefore, that in trismus, in hemiplegia, in delirium, and in continual stupor,—provided we have proper recourse to bleeding and purging,—the best remedy is oil of turpentine. In the same class of medicines are the fetid gums; and, wherever we think proper to employ them, we may employ the oil of turpentine to the same advantage. It has the property of a strong purgative; though it requires to be set off by something else. We

[a] See Pages 673 and 674.

[b] See Page 674.

ay give one ounce first,—to see if that will do; and then follow it up by
stor-oil.[a]

Hysterical Irritability.—Frequently nervous women are in a state of what
ey call "the fidgets." They cannot sit still a minute; and the state is
ceedingly distressing. Sometimes this is removed by the warm-bath;
it it is best combated by mild narcotics. Sometimes I have given opium;
d, now and then, I have known prussic acid tranquillize them, when
thing else would; but, in other cases, we find other things do good. The
ower-bath, if we can get them to use it, is of great service. Besides this
te of morbid irritability of mind and body, they are very perverse, and
t great discredit by their bad temper; but I am satisfied it is a morbid
te. They are very sulky. I have frequently known them correct the
edical attendant, scold, and even swear, and do all sorts of malicious
ings;—pretending to be worse than they were. I have no doubt all this
a morbid state of mind. Some of these attacks will come on periodically,
rticularly at the menstrual period; and, when they fall into this extra-
linary state, it can only be treated on the same general principles as
mmon hysteria;—removing fulness if there be any, and enjoining the use
the shower-bath.

I have treated those cases of morbid sensibility of the surface, which
ve fallen under my notice, on the same principle as neuralgia;—supposing
em to be an affection of the nerves; namely, with iron; and they have all
ne well. I have not found it so in that particular state called "clavus
stericus"[b], where the pain is all felt in one spot; but where the pain is
fused, it is one of the best medicines that can be employed. As to
steria at large, I do not believe that iron has any power over it. It is
y in those cases where there is debility, that it is of use; and then, I
sume, it is not serviceable from any specific power over the disease; but
being the best tonic we have.[c]

SECTION I.—CATALEPSY.

There is a disease which is spoken of separately; but which, I cannot
p thinking, is merely a variety of hysteria;—it is called "catalepsy."[d]

Symptoms.—In this form of the affection, the voluntary muscles will take
any state that we think proper to give them; and so they will remain.
e may mould the body into any form we choose. Consciousness and per-
tion are sometimes entirely destroyed; and sometimes only partially so.
equently the person is not aware of her existence, or of what is going on
und;—consciousness and perception being both absent. Dr. Gregory[e]
d to speak of the case of a lady, who had undergone great mental
uish. Her history, he said, was like that of Isabella, in the tragedy of
"Fatal Marriage"; and she was seized with catalepsy. If her child
s presented to her, she gave signs of knowing it; but that was the only
of she exhibited of the least consciousness.[f]

More Frequent in Women than Men.—It is a disease which occurs more
quently in women than men;—just as hysteria does[g]; but, like hysteria,
ometimes occurs in males.[g] There is a case mentioned by Bonet, of a

[a] Hysteria may be kept off by affections
he mind, particularly ridicule.—*Dr.*
cher.
[b] See Page 677.
[c] See Page 673.
[d] From *καταλαμβανω, to seize.*
[e] See Note to Page 270.
[f] "*Walking* catalepsy" is somnambu-
lism coming on in the *day.*—*Dr. Fletcher.*
[g] See Page 678.

deserter who was captured, and when taken shrieked violently; and who then entirely lost his voice, from the violent mental emotion. He was a man of no great courage. He became immoveable and unconscious, and then fell into catalepsy;—so that they could mould him into any thing. This man neither ate nor drank, nor did he discharge his fæces or urine for twenty days; at the end of which time he sank.

Sometimes Periodical—Occasionally the affection has been periodical. Dr. Heberden mentions, in his "Commentaries", that he once saw at St. Thomas's Hospital a case, which he visited from curiosity. The woman was thirty-six years of age; and had a paroxysm of catalepsy morning and evening. It usually continued from one to three hours; but, on one occasion, it lasted *twelve* hours. The fits came on without any warning; and during them, he says, the pulse and the breathing were natural; the eye was fixed, as if she were looking attentively on some object; the arm continued as it was placed, for twenty minutes together, and once for a whole hour; and he was told that it would sustain a weight of seven pounds, in any posture in which it was placed. The jaws were closed; but if the nostrils were closed, then the mouth opened for the purpose of breathing. A slight winking was noticed, on approaching the finger to the eye; and a little contraction of the iris.[a] There was a case in St. Thomas's Hospital a few years ago. It came on in paroxysms at one certain period; but it was not under my care. It occurred (as hysteria so often does[b]) in a girl. The symptoms of the disease are not always regular. It is sometimes impossible to mould patients. They are perfectly rigid; and we can lay them out like corpses.

Prognosis.—This disease is not necessarily dangerous,—any more than hysteria[c]; but it appears, now and then, to have proved fatal; or, at least, that state of the system in which it occurred, has proved fatal. Such a case is mentioned by Dr. Gooch; and has been published in the "Transactions of the College of Physicians."[d]

[a] On the twenty-sixth of June, 1764, in St. Thomas's Hospital, I saw a woman six-and-thirty years of age, motionless, with a fit of the catalepsy. Her pulse was quite natural; her breathing easy. Her eyes were fixed,—as by attentive contemplation;—not like those of a person who is either dying, or sick, or under any pain or uneasiness. Her limbs always retained the situation in which they were placed by the bystanders,—however inconvenient. I extended her arm, and saw it remain stretched out for twenty minutes; and I was told it continued so, on a former trial, above an hour; which scarcely any body in health could support. I heard even that it would remain extended with a weight of seven pounds in the hand. If the patient was placed upright, she continued upright; and was not very easily thrown down. While she was sitting down, both the legs were extended, and raised from the ground; and they remained in that uneasy posture; as if they had been made of clay or wax. Her mouth was closed; and I was unable by any means, to open it. The eyelids were constantly open; or, if forcibly closed, they opened again as soon as the force was removed. She winked, but in a very slight manner, upon moving the finger quick towards the eye; at other times the eyelids did not move. At the approach of a candle the pupil contracted. If the nostrils were compressed, after a little effort, and apparent struggle, the lips opened for the purpose of breathing. I heard that she had been in this state some months. The fit returned morning and evening, almost every day; and continued sometimes an hour, at other times three hours. The nurse reported, that one fit had lasted twelve hours. She used to be suddenly seized, without any previous notice.—"*Commentaries on the History and Cure of Diseases. By William Heberden, M.D.*" *Chapter* 69. (*Page* 361 *of the First Edition.*)

[b] See Page 678.

[c] See Page 680.

[d] Mrs. —— is twenty-nine years of age, and has long been unusually subject to the common forms of hysteria. I [Dr. Gooch] have seen her, after being strongly excited in conversation, sink down insensible; and, a few minutes afterwards, recover with choking and sobbing. Her husband tells me that he has often seen her, while sitting a

Diagnosis.—It is necessary in this disease, just as in hysteria and epipsy, to ascertain whether the case is real. We are told that John unter discovered that a case of this disease was feigned, by putting a ring round the wrist of a patient, after the arm was extended, and apending a weight to it. The string was suddenly cut; and, as the man had en no weight to support, the arm was immediately raised. It appeared John Hunter, that the man had sustained the weight by the exertion of s muscles; and the throwing up of the hand after the string was cut oved the correctness of that opinion.[a] Another device has been, to

e dinner-table, become apparently insense, with her eyes open, and still sitting ; — continuing in this state several inutes, and then coming to herself again; t totally unconscious of what had taken ace in the interval. She married nine ars ago; has been pregnant many times, t has only borne one living child: every her time, she has either miscarried during e early months, or (what was more mmon) the child has died, without any vious cause, about the sixth or seventh nth, and premature labour has come on out a week or two afterwards. A few ys after her last delivery (of a dead child the seventh month),—a circumstance ributed to some domestic agitation,—she s seized with a violent aching of the ad and face;—confined to the left side, d subsiding under the use of hemlock; t she continued to suffer flatulence of the mach, had a quick weak pulse, and was ch depressed in spirits. One evening, e told her husband, that she had never charged the duties of a wife as she ought do; and that her death would be a happy ease, both to him and her; the next rning, she made an unsuccessful attempt cut her throat. I now saw her, in contation with a physician of extensive exrience in these diseases. She was put der the care of a regular attendant; and s at times so violent, that it was necessary confine her with a waistcoat. A few ys after our first visit, we were summoned observe a remarkable change in her mptoms. The attendants said she was her dying, or in a trance. She was lying bed, motionless, and apparently senseless. had been said, that the pupils were di-ed, and the iris without motion; and some prehensions of effusion on the brain had en entertained; but, on coming to exine them closely, it was found that they dily contracted, when the light fell upon m. Her eyes were open; but no rising the chest, no movement of the nostrils, appearance of respiration could be seen; e only signs of life were her warmth and lse. The latter was (as we had hitherto served it to be) weak, and about 120: r fæces and urine were voided in bed. e trunk of the body was now lifted,—so to form rather an obtuse angle with the limbs (a most uncomfortable posture), and there left with nothing to support it. There she continued sitting, while we were asking questions, and conversing;—so that many minutes must have passed. One arm was now raised, then the other; and where they were left, there they remained. It was now a curious sight to see her sitting up in bed, her eyes open, staring lifelessly, and her arms outstretched; yet without any visible sign of animation: she was very thin and pallid; and looked like a corpse that had been propped up, and had stiffened in that attitude. We now took her out of bed, placed her upright, and endeavoured to rouse her by calling loudly in her ears; —but in vain. She stood up; but as inanimate as a statue. The slightest push put her off her balance; no exertion was made to regain it; and she would have fallen, if I had not caught her.

She went into this state three several times. The first time, it lasted fourteen hours; the second time, twelve hours; and the third time, nine hours;—with waking intervals of two days after the first fit, and one day after the second. After this the disease resumed the ordinary form of melancholia; and, three months from the time of her delivery, she was well enough to resume her domestic duties. — "*Medical Transactions, published by the College of Physicians in London.*" *Volume* 6; *Pages* 266 *to* 270.

[a] A patient in the hospital [St. Bartholomew's] feigned to be afflicted with catalepsy; in which disorder, it is said, a person loses all consciousness and volition; yet remains in the very attitude in which he was suddenly seized with this temporary suspension of the intellectual functions. Mr. Hunter began to comment, before the surrounding students, on the strangeness of the latter circumstance; and, as the man stood with his hand a little extended and elevated, he said—"You see, gentlemen, that the hand is supported, merely in consequence of the muscles persevering in that action to which volition had excited them, prior to the cataleptic seizure. I wonder", continued he, "what additional weight they would support!" So saying, he slipped the noose of a cord round the wrist, and hung to the other end a small

throw the patient into a cistern of cold water. If the disease be genuine, it is supposed that the patient will go to the bottom; but that if not, she will make an effort not to be drowned, and will struggle about. I should not, however, consider this any proof; because nothing is so good in hysteria, as throwing a woman into cold water. Therefore, in catalepsy, plunging the party in cold water, is likely to stop the paroxysm; and, if the paroxysm be stopped, then the person may struggle about, and yet not be an impostor.

It is said, however, that a very ingenious mode of discovering whether the disease was feigned or not, was put in practice by a physician (or at least by a *practitioner*) in the East. Pocock mentions, in his travels, that a case of this disease occurred in one of the favourites of a celebrated caliph; or, at least, that one of his favourite damsels pretended she was in this condition. Pocock says there was general sorrow throughout the palace; the women all sobbed; the eunuchs all groaned; and the Dey was distracted. He sent for all the royal physicians, ordinary and extraordinary. They used stimulants and warm fomentations to soften the limbs, but all in vain; when a man, who had cured the grand vizier (the prime minister) of some secret disease, was recommended to the Dey. This man was named Gabriel; and he obtained a promise, that no offence should be taken at whatever plan he adopted to cure the lady. Being thus himself secure, the lady was brought into the presence of the court, with all the women around her, and covered with a fine muslin robe, flowing down to her feet. Gabriel ran up to the lady boldly; seized the hem of her garment; and endeavoured to raise it,—so as to expose her person. The lady modestly put down her hand to prevent the insult; when he immediately turned round to the caliph, and said—"O defender of the faithful, so and so is cured." Here was a case of complete deception, from the beginning to the end; and the poor man devised this ingenious means for detecting the cheat.

Treatment.—With regard to the treatment of the disease when it is real, I believe the best mode is to adopt exactly the same plan as in common hysteria.[a] In the paroxysm we should dash cold water on the patient; and give her oil of turpentine, either by the mouth or the rectum. We should purge the patient well; and, if possible, remove any source of irritation that may be present. There are cases which, I have no doubt, will be best remedied by antiphlogistic measures, and the removal of plethora. On the other hand, there are cases which will be best treated by tonics. I have never had to treat a case; but, from what I have seen in other instances bordering upon it, I have no doubt that the same treatment as that employed in common hysteria, would answer very well.

SECTION II.—TRANCE.

Symptoms.—One of the curious forms of hysteria is long-continued insensibility, which is called "a *trance*." Sometimes there is continued insens-

weight; which produced no alteration in the position of the hand. Then, after a short time, with a pair of scissors, he imperceptibly snipped the cord. The weight fell to the ground; and the hand was as suddenly raised in the air, by the increased effort which volition had excited for the support of the additional weight. Thus was it manifested, that the man possessed both consciousness and volition; and the impostor stood revealed.—"*Hunterian Oration for the Year* 1819. *By John Abernethy, F.R.S.*" *Pages* 58 *and* 59.

[a] See Page 680.

ibility for a few days or weeks; and sometimes for *many* weeks. Sometimes patients will eat, if food be put into their mouths; and sometimes not. Sometimes they will wake for a few hours, or perform certain actions, shew some power over volition, and then fall into the same state again. Some will open their eyes, and then fall asleep again. Some, in this state, are perfectly conscious of what is going on around them; but cannot make the least effort.

There is an instance mentioned of a female (for these strange things generally occur in females) who was presumed to be dead. Her pulse could not be felt, and she was put into a coffin; and, as the coffin lid was being closed, they observed a sweat break out, and thus saw she was alive. She recovered perfectly; and then stated, that she had been unable to give any signs of life whatever; that she was conscious of all that was going on around her; that she heard every thing; and that when she found the coffin-lid about to be put on, the agony was dreadful beyond all description; —so that it produced the sweat seen by the attendants. I have seen a case of this extraordinary insensibility, where the patient continued for two or three weeks (with the exception of short intervals) in a state of insensibility, though not without signs of life; for the heart was still beating; and sometimes she performed, in this state, certain voluntary actions, and would afterwards be conscious of having done so. Sometimes she would be unable to do any thing, and yet retain her consciousness;—so as to mention it afterwards.

[There is another state of stupor or coma, in which the mind is entirely cut off from intercourse with the external world. This occurs in the worst states of fever, and in various diseases of the brain and injuries of the head; and the same condition takes place, from a very different cause, in the state of fainting. In such cases, there is seldom any recollection of mental impressions; yet there are facts which tend to show, that the patient is not in such a state of total insensibility to external things, as his appearance would indicate. Facts are wanting on this curious subject; but there can be little doubt, that many of the stories related of things seen by persons in a state of trance, are referrible to this head; and that their visions consisted of the conceptions of the mind itself, believed for the time to be real, in a manner analogous to dreaming. That such impressions should not be more frequently remembered, in ordinary cases of stupor, probably arises from the higher degree and greater permanence of the affection, than of that which occurs in sleep. For we have reason to believe, that dreams which are remembered occur only in imperfect sleep; and that after very profound sleep, we do not remember any mental impressions, though we have satisfactory proof that they exist. Thus, a person will talk in his sleep,—so as to be distinctly understood by another; but without having the least recollection of the mental impression which led to what he said.[a]]

Sometimes Fatal.—Hysteria, in these irregular forms, although for the most part a disease without danger, may become fatal. Two sisters were affected in the same way; one of whom died before I saw her; and I went to see the other. Although she was well supported every hour, as she lay apparently a corpse; yet I believe she sank at last. The other was a case of regular hysteria; and I concluded the patient would do well under ordinary treatment; but all at once she sank. Swelling of the hands came

[a] "Inquiries concerning the Intellectual Powers. By John Abercrombie, M.D." Part 3; Section 1; Sub-section 5; Head 5. (Ninth Edition; Pages 144 and 145.)

on, the pulse became weak, and she died; but *why*, I cannot tell; for I could not obtain leave to open the body.

SECTION III.—LETHARGY.

When consciousness and voluntary motion only are suspended, and a state resembling sleep is produced,—differing from it in being more prolonged,—the affection is termed "lethargy", and (by some writers) "cataphora." This is only another form of catalepsy; but it is not necessarily, though it is occasionally, complicated with hysteria. A case is mentioned in the "Philosophical Transactions" for 1694, of a man, twenty-five years old, residing near Bath, who slept nearly a month in a state of lethargy. In two years, he again fell into an inordinate sleep. At first, he ate, drank, and discharged his urine and fæces; but at length his jaws set; and he ate nothing more, and did not awake for seventeen weeks. It so happened that the barley was being sowed when he fell asleep, and when he awoke it was being reaped. In August he fell asleep again; and was bled, stimulated, and treated *secundem artem*; but did not wake till November. The termination of the case is not given.

It is recorded, in Plott's "Natural History of Staffordshire", that a woman slept forty days. In the "Medical Observations and Inquiries", there is an account of a woman who slept seventeen or eighteen hours, every day, for fifteen years. Dr. Good mentions seeing a lady, who was only in the habit of waking for one or two hours, two or three times a week, during the summer.[a] I believe an affection of this description is not dangerous. I have heard (but I do not know the particulars of the case) that there has lately been an extraordinary person of this description, who was in the habit of sleeping for weeks together. The only cases of the kind that I have seen, have been trances;—those affections of an hysterical nature, which I have already mentioned.[b]

Sometimes Fatal.—Although this disease is usually not of a dangerous character, Dr. Willan mentions, in his "Reports of the Diseases in London", that lethargy is very common among the Jews of this town; and that it frequently ends in fatal apoplexy.[c] Occasionally, after fever, persons will sleep for a very considerable time. Willis mentions a case of putrid fever, which terminated in a perfect sleep of four days; and, at the end of that time, the man was imbecile for two months. Mr. John Bell (the surgeon) saw a man who, in consequence of a fall, lay a great length of time in a sleep of this description; and when he awoke he was incoherent; but he finally recovered.

[a] I was some years ago acquainted with a very singular example, that continued for five years. The patient was a young lady of delicate constitution, in her eighteenth year at the time of the attack; her mind had been previously in a state of great anxiety. The remissions occurred irregularly, twice or three times a week; and rarely exceeded an hour or two. During these periods she sighed, ate reluctantly what was offered to her, had occasional egestions, and instantly relapsed into sleep. Her recovery was sudden; for she seemed to awake as from a night's rest, by a more perfect termination of the paroxysm, not followed by a relapse.—"*Study of Medicine*"; *Class* 4; *Order* 4; *Genus* 8; *Species* 4; *Variety* 2.

[b] See Page 686.

[c] Lethargy is not a frequent disease among our own countrymen [the English]. I have seen it mostly in Jews, and other aliens of a dark, swarthy complexion; who sometimes lie six or eight weeks, in a torpid insensible state. — "*Miscellaneous Works of the late Robert Willan, M.D. Edited by Ashby Smith, M.D.*" *Page* 339.

CHAPTER XI.

DISEASES OF MOTION.

SECTION I.—PARALYSIS AGITANS.

Definition. — The first disease of this description which I shall notice, consists in a very slight tremulous motion; and is called "paralysis *agitans*", or (in common language) "shaking palsy." It is defined to be an involuntary, chronic, tremulous motion of more or less of those parts of the body which are subject to volition, together with lessened muscular power; occurring in parts when they are not in action, and even when supported; together with a tendency to bend the trunk forwards, and to pass from a walking to a running pace; the senses and the intellect being uninjured. Tetanus affects the voluntary muscles; but palsy does not affect them, like tetanus, with spasms; but with minute convulsions called "tremors"; alternating perhaps with relaxation, and quite involuntary. Not only are the motions involuntary; but the patient has not the same power in producing voluntary motion, that he has in tetanus. It is not the tremor which a person who has been intoxicated the night before, or has taken a cup of strong coffee or tea, shews when going to put the glass to his head;—shaking it till he spills the contents; but there is a tremor when the parts are still, and even supported. Of course, when we run, we make a much greater voluntary effort, than when we walk. The faster we run, the greater is the effort we make, and the more powerful and steady is the motion. We can therefore conceive, that, by a strong effort, the patient is more likely to overcome involuntary motion, than if he be only exerting half the volition; so that persons in this disease are not to be interrupted, and are constantly on the trot (as it were).

Progress of the Disease.—The muscular weakness and tremors begin, generally, in some one part of the body only;—for instance, in the head; but most frequently they begin in the hand or in the arm; and perhaps it is not till after some months, or even some years, that another part is affected. But the disease frequently increases both in degree and in extent; more parts become affected; and parts affected before become more affected; and, at last, the whole body shakes. Like St. Vitus's dance [a], it may be checked for a moment, or a few moments, or even to the extent of a minute, by a violently strong voluntary effort; but it soon returns. The patient becomes less upright, bends forwards, walks upon his toes, and steps quick and short; till at last he comes (as I stated in the definition [b]) almost to a running pace. If the disease remit in one part, it generally increases in another; so that if both arms tremble, and one is improved, the other will immediately shake in a twofold degree. This, we shall see, is also the case in St. Vitus's dance.[c] A change of posture will sometimes

[a] See Page 691. [b] See the previous paragraph. [c] See Page 692.

disturb the action that is going on. This tremulous motion ceases during sleep;—the same as in St. Vitus's dance; unless the case be very severe, and has continued for a long time; for then the tremors will continue even during sleep. At length the muscles of articulation, mastication, and deglutition, become affected; and, finally, the urine and fæces are discharged involuntarily. Such is the loss of muscular power; and, in the midst of all this misery, the patient becomes emaciated, and death generally supervenes.

However, sometimes the disease does not extend at all. Many persons have shaking palsy of the head, for several years, without any other part shaking, and without any increase in degree. This is a disease which frequently attacks persons in the decline of life. There is a curious instance mentioned by Mr. Parkinson, in which hemiplegia occurred, and the paralyzed parts ceased to shake; but when the hemiplegia ceased, then the shaking returned.

Diagnosis.—We have to make a diagnosis between this disease, and the tremor induced by drunkenness, or violent passion, or that which occurs in delirium tremens. The tremor, in these cases, occurs particularly when an effort is made, and is not lessened by an effort. It is not lessened by support; and generally the cause is obvious. Many old writers have made this distinction;—Galen, Sauvages, and others; yet I believe paralysis agitans was not well characterized, until Mr. Parkinson wrote his pamphlet on it, in 1817.[a]

Pathology.—Mr. Parkinson gives only one post-mortem examination; and that was a very severe case, where the disease was universal; where there was great muscular debility, impediment of speech[b], and (at last) impairment of intellect. He found, in that case, the lingual and brachial nerves tendinous;—that is to say, greatly indurated; the "medulla oblongata" and "pons varolii" were very compact and large; and the "medulla cervicalis" (the cervical part of the spinal marrow) was hardened.

Treatment.—This is a very obstinate disease; and I have no doubt its obstinacy arises, generally, from there being an organic affection. Mr. Parkinson imagines the disease to exist in the superior part of the cervical "medulla spinalis", extending upwards to the "medulla oblongata"; and he suggests antiphlogistic measures, directed particularly to this part. I have not been, by any means, successful in the treatment of this disease. When it occurs in old people, (where the head, or one hand shakes,) I have never known good to be done. Where it has occurred generally, I have never been able to cure more than one case; and, in that instance, the patient was not more than five-and-thirty years of age, and I am satisfied there was no organic disease; whereas in old persons, I should think, there is organic disease;—probably induration; or, at least, a process going on which *leads* to induration. This man, who was in the middle period of life, was not likely to suffer from structural change, unless induced by inflammation. There was pain and heat of the head, and giddiness; and, therefore, I treated him

[a] "An Essay on the Shaking Palsy. By James Parkinson." It is the best work that has been written on the subject.

[b] Palsy of the tongue is often a local disease, arising from an affection of the ninth pair of nerves ("lingual");—causing stammering, &c. It may be caused by a stroke of lightning, and might be cured by another; and the same observation applies to galvanism; which, together with strong gargles (as of cayenne-pepper), is the best remedy. The general affection occurs chiefly in old persons who have laboured much with poor diet. The best plan is to give tonics, and apply blisters to the spine. —*Dr. Fletcher.*

antiphlogistically. I bled him well, blistered, mercurialized, and starved him; and he had setons introduced; but all without any benefit. Finding, after a long trial, that the plan did no good, I gave him zinc; which is a very useful remedy in St. Vitus's dance. He took a considerable quantity, three times a day; but without any benefit; and I then exhibited sesquioxide of iron, under the employment of which he became perfectly well; and remained so for some time afterwards. I have since had four or five cases of the disease under my care, and have exhibited the same medicine; but it has not produced the least benefit. Most of the cases remained unaffected by the remedy. One or two were certainly a little improved, for a time; but nothing farther.

In Young Persons.—Now and then, the disease occurs in young persons in a transient slight form, not connected with any organic affection; but appearing to be in females an hysterical affection, and in males to depend on congestion of the head. I have seen several young adults, who have had a shaking of one arm or hand; which has been cured by purging them frequently, and using antiphlogistic remedies directed particularly to the head. We may cure that form of the disease very well; but when it occurs in the decline of life, I have hitherto found it incurable.

SECTION II.—CHOREA.[a]

Definition.—The next disease which I shall notice, is very much allied to paralysis agitans [b];—so far as it consists of irregular, slight, convulsive motions; and is unattended by any serious disturbance of the intellect, unless it continues for a very great length of time; but it is one which occurs, on the contrary, in young persons. It is called "St. Vitus's Dance."[c]

Symptoms.—This disease is characterized by a catching of the fingers and other joints, a twitching of the head, corrugations and contortions of the face, very extensive flexions, extensions, and rotations of the extremities; in short, by perpetual motion, with a rolling of the eyes. The patient is observed, in the first instance, to drag one foot; and, frequently, there are such catches of the tongue, and of the muscles of the neck and throat, that articulation, deglutition, and mastication, are difficult; and so likewise is walking, standing, sitting, or lying. I have seen the skin of the chin and breast rubbed off, by the perpetual scraping of the one on the other. I have sometimes seen the patient, unable to lie on the bed, rolling off it; so that it was necessary to strap him down. These, however, were very severe cases. It is often very difficult to feed patients. It will sometimes require the aid of two or three people, to give them their meals;—two to hold them still, and one to catch the favourable opportunity of putting the spoon into their mouths. The motion is increased temporarily by fear, or any mental emotion. Nothing is more common than for the motion to increase when a medical man appears. Any mental agitation will have the same effect. If a child be made cross, the motions will be doubled almost directly. These motions are a little under the power of the will: persons can restrain them temporarily, but their best effort in the disease is little more than a sudden catch.

Persons walk quickly better than slowly; and Dr. Heberden mentions the

[a] The Latin word "*chorea*", comes from the Greek word χορεια. There is the best authority for calling it "*chorea*", and not "*corea*." The latter word has been used; but only by a poetical license: the proper one is "*chorea*."

[b] See Page 689.

[c] See Page 697.

case of one individual, who could not *walk*, though he could *run*[a];—exactly as in paralysis agitans.[b] The movements are suspended during sleep, unless in extreme cases. If we hold one part, then another is agitated the more; and, generally, one side is more affected than the other. This is very common in all convulsive diseases; and, indeed, in diseases of *sense* as well as of *motion*. In many of these diseases, it is common to see only one side affected; but where both are attacked, it is usual to see one more affected than the other. This circumstance occurs in St. Vitus's dance; and the side most affected will, in the progress of the disease, frequently change;—so that the *right*, at one time, shall be most affected; and, at another, the *left*.

One leg and one foot generally first shew the disease. The arms are generally more affected than the legs. The face has very frequently a fatuous appearance: the mind is apparently a little affected; and persons are certainly a little childish in this disease. The pulse is sometimes very quick, when the motions are very rapid; and sometimes there is headach, heat of the head, vertigo, and drowsiness. Sometimes patients will scream, and even epilepsy will come on; and sometimes there is hardness of the abdomen; but, in a large number of cases, we find nothing the matter with the patient, except this extraordinary movement. We may meet with additional symptoms; but, in a great number of instances that I have seen, such has not been the case.

Duration.—The disease may last some weeks, or some months; and may then disappear;—either spontaneously, or as the result of treatment. Now and then it continues during life; but the majority of patients recover, and even regain their looks. The fatuous aspect of countenance, and the imbecility of mind, disappear. In a local form, this disease will continue for life. Many persons always have a catching of one leg, or one arm; or a catching of some of the muscles of the face. Some are always winking; some run with their head forwards, like a goat; and some throw their head down;—so that they have been a great inconvenience to auctioneers, who imagined they were bidding. There are many persons, with these unfortunate local forms of the disease. When it is so local, it almost always continues for life; and it often runs in families. I have observed, that where one part of a family has these catches, another has something else peculiar in the nervous system. That is very common.

Termination.—When the disease occurs in adults, I believe it is seldom cured. It is where it occurs universally, and in very young adults, that it is cured. It is hardly a proper mode of speaking to say, that the disease may terminate fatally; but that state of the nervous system which produces it, may end in death. I recollect a case, in a strapping girl about nineteen, which ended fatally. She did not die of St. Vitus's dance, but of apoplexy. The congestion of the head, which in one degree produced chorea, in another gave rise to apoplexy; and pathologically it could not be said she died *of* the disease, but *in* the disease. It was an affecting circumstance; and I have no doubt might have been prevented, had she been well bled and purged.[c]

Usual Period of its Occurrence.—This is a disease which occurs, chiefly,

[a] A boy had his leg so violently agitated, that the involuntary motions overpowered all the weaker efforts of his will to move them; but a stronger exertion of the power which excites spontaneous motions, was able to control his distempered agitations;—so that he could *run*, but could not *walk*: the same is observable in men intoxicated, to a certain degree, with strong liquors.—*Dr. Heberden's "Commentaries"; Chapter* 20.

[b] See Page 689.

[c] See Page 694.

between three or four years of age, and fourteen. Dr. Heberden says it is most frequent between the ages of *ten* and fifteen[a]; but my experience leads me to say, from *three* or *four* years to fifteen.

More Frequent in Girls than Boys.—It occurs, too, more frequently in girls than in boys. Dr. Heberden says, that one-fifth only of the patients under his care were males[b]; and that has been about the proportion I have met with; at least, in 1826, I looked over my cases of this disease; and found that, in the hospital[c], I had had seventeen patients altogether; and twelve of them were girls, three were boys, and the rest were adults. I may mention that, at the same time, I looked over my cases of epilepsy; and found they were just the reverse;—that out of twenty-five cases of epilepsy, nineteen of the patients were males. Dr. Heberden made the same observation.[d] In 1829, I had (altogether) thirty patients labouring under St. Vitus's dance; and twenty-two of them were females, and eight males;—about the same proportion as in 1826. With respect to epilepsy, out of thirty-seven patients, in 1829, twenty-seven were males.

Causes.—The tendency of this disease is constitutional. I do not know that it is hereditary; because adults, frequently, cannot tell whether they had St. Vitus's dance when they were young or not; but it is very common to see two or three children in a family have it;—not at the same time, but at different periods. It affects all sorts of children;—those who are pale and sickly, and those who are ruddy. It frequently affects those who are otherwise in perfect health, and generally there is no obvious cause, either predisposing or exciting. All I can make of it is, that it is a morbid excitability of a certain portion of the centre of the nervous system, (the "medulla oblongata", or spinal marrow,) with which the nerves of voluntary motion are connected; but not a sufficient irritation to produce that violent action which characterizes tetanus. As to its being inflammatory, almost every case may be cured, not by antiphlogistic measures, but by those which are just the reverse. It has been said to arise from an irritation of the alimentary canal; but I am quite sure that, in nine cases out of ten, (I might almost say *nineteen* out of *twenty*,) the alimentary canal is healthy. If the cure arose from purging, the fæces would be unhealthy. Now and then a distant exciting cause may be found; but I have never been able to discover any, except in one instance; where it came on after a discharge from the thigh had been suppressed. A scrofulous sore had continued in the thigh for some time; and when this healed up, St. Vitus's dance began. Whether it was accidental or not, I cannot tell; but it was not cured by re-exciting the discharge, but by iron; and that with the greatest rapidity.

Proximate Cause.—The proximate cause, I have no doubt, is seated in the head, as well as the spinal marrow; for the very highest nerves are affected. The eyes roll; the very highest muscle of the body (the "corrugator supercilii") is affected; the countenance is fatuous; and the mind is frequently a little impaired. Now and then we have constipation, and now and then headach and throbbing; but these form only a very small proportion of the cases.

[Chorea is distinctly an affection of the "true spinal" system. It affords

[a] See the twentieth chapter of his "Commentaries." He adds:—"It has come on so early as the *sixth* year, and so late as the *twentieth*."

[b] Among the patients I have attended, there have been four times as many girls as boys.—*Dr. Heberden's "Commentaries"; Chapter* 20.

[c] St. Thomas's.

[d] One would expect, that the weaker sex would be greater sufferers by epilepsy; but it has appeared to me, that though boys and girls be equally subject to epileptic convulsions, yet fewer women are afflicted with them than men.—*Dr. Heberden's "Commentaries"; Chapter* 33.

an example of the want of harmony between the cerebral and true spinal acts: *volition* is normal; the "true spinal" action is abnormal. The *action* is abnormal, or irregular, for want of a precise harmony between the two. It is by acts of volition that the acts of the "true spinal" system are called into play: it is, therefore, when volition is excited, that the chorea is most distinctly manifested. The articulation and all the voluntary movements are irregular and impaired: the same thing is observed on any emotion. During sleep and repose, on the contrary, the chorea is mitigated, or disappears altogether;—especially in the early stage. That chorea is excited through a morbid state of the bowels, there can be no doubt: it ceases frequently on removing this disorder. It involves, however, a morbid condition of the "true spinal" system; which certain tonics, and especially arsenic and carbonate of iron, remove. In the beginning, however, it is not a *centric*, but a *centripetal* disease.[a]]

Treatment.—With regard to treatment, if there is drowsiness, headach, or heat of the head, we ought to purge the patient well, take away blood either by the arm or by leeches, and treat it as a case of congestion, or an inflammatory state of the head. It is a much shorter mode to apply leeches to the head, and take away blood from the arm, than to go on with purging. Purging is good; but it is a roundabout way of affecting the head; and if there be much congestion of that organ, the best way is to take blood from it directly. Sydenham's practice was to take away blood from the arm, and purge; but what his success was, I do not know. It was rather a violent practice; and I am quite sure that, in a great number of instances, neither bleeding nor purging is required; but had those measures been practised in the case where apoplexy supervened[b], the patient would probably have lost her St. Vitus's dance, and not have become apoplectic. If there be costiveness, it is our duty to remove it; if there be pain of the abdomen on pressure, besides emptying the bowels, we ought to try the common remedies of inflammation. There can be no doubt, that purgatives will sometimes cure the disease; sometimes by relieving a loaded state of the alimentary canal; and, in other cases, by circuitously emptying the head. But purgatives very often fail;—as I have repeatedly found. Children are continually brought to us after they have been well purged; and yet they are none the better for it.[c] An inflammatory or congested state of the head, is by no means more necessary to this disease, than it is to hydrophobia or tetanus; but it is always right to look out for congestion, and an inflammatory state, and to remedy them if found.

Tonics: Sulphate of Zinc.—My reason for maintaining that the disease is not essentially inflammatory, and that, more frequently than otherwise, it is a mere morbid irritability, is this;—that tonics are the best remedies. Sulphate of zinc will cure a very large number of cases; and it may be given to a very considerable quantity. We may begin with a grain, in the form of a pill; but we must not exhibit it on an empty stomach, but after meals; and, in many cases, we may increase it to six, seven, or eight grains. I have given to adults from twenty to twenty-five grains, three or four times a day; but children will bear six, seven, or eight grains, three or four times a day, without nausea. This is not a newly discovered fact. It was

[a] Dr. Marshall Hall's "Diseases and Derangements of the Nervous System"; Page 195.

[b] See Page 692.

[c] Very free purging is generally recommended. Dr. Hamilton brought away, in a few days, fæces amounting in weight to that of the whole body. But such treatment will not do in London; where tonics must be used. Antispasmodics may be given, and blisters applied to the spine.—*Dr. Fletcher.*

mentioned, long ago, that these doses may be given in epilepsy, without causeating. The circumstance is ascribed, by Dr. Good, to the insensibility f the stomach in epilepsy[a]; but there is no reason for supposing that to e the cause; for it is now proved that persons in health, with no insensiility of stomach, will take it in these quantities, if we begin with a grain, nd gradually increase it every day. I have repeatedly given it in this uantity, and seen others do the same.

Copper; Silver.—The sulphate, and other preparations of copper, will ure the disease; and so also will the nitrate of silver; but the latter is an bjectionable remedy, on account of its producing a discoloration of the kin.

Sesquioxide of Iron.—The sesquioxide of iron[b] has, undoubtedly, very reat power over the disease. I have had (I should suppose) forty cases n succession, all cured by this remedy. Perseverance is sometimes required; but I never had a case occurring in a child, where it was fully iven, that the patient was not cured; though I have never cured a case in dults, where the disease was quite local,—situated in the head or arm. When cases occur in children, they generally become better, and the disease radually ceases. I have not yet met with a single failure. In one, after t had been cured, the child had fever; and during the excitement of fever t returned. The child was brought to me again; and the disease ultimately disappeared. In general, the affection disappears when the remedy has been given about six weeks or two months; but I have had some obstinate cases, where it was necessary to continue it twelve weeks. I believe that a large dose will sometimes cure it, where a small one fails; but I should not give a large dose, where a small one would do; but if that would not answer, rather than give it up, I would double the quantity. Children generally like it; and, after a time, they ask for it; because I exhibit it in double its weight of treacle. Generally there is no necessity to give purgatives. I have seen headach, drowsiness, and giddiness disappear, under the use of this remedy;—an occurrence which would not, *à priori*, be expected; but if there be much heaviness of the head, I should employ leeches instead of giving this remedy;—at least at first. Some have an idea, that if we purge the patient well first, and then give the remedy, it answers better; but I have not seen that to be the case. I tried the sulphate of iron only once; and in that case the disease gave way;—the child was of a plethoric habit. It is right to continue the iron, for some time after the disease is cured; for, if we do not, the disease is very likely to return.

The oil of turpentine has sometimes been used with success; and some say colchicum. Electricity along the spine, the cold-bath, the shower-bath, hot and cold baths in succession, and musk, will undoubtedly do good, and will now and then cure the disease; but I have tried most of them, and never found any thing so useful as the sesquioxide of iron.

Arsenic.—[Dr. Reese, of New York, says:—"After very considerable opportunities, I have learned to rely upon the tonic powers of *arsenic*, in preference to any and all other medicines of this class; and, having never known it to fail in effecting a radical and permanent cure, I feel great con-

[a] Such has been the state of exhausted irritability produced by this disease, in some instances, that the patient would bear almost any quantity.—"*Study of Medicine*"; *Class* 4; *Order* 4; *Genus* 7; *Species* 3.

[b] Dr. Elliotson first directed the attention of the profession to the efficacy of this remedy in the treatment of chorea, in a paper which was published in the Thirteenth Volume of the "Medico-Chirurgical Transactions"; Page 232; where the details of eight successful cases are given.

fidence in recommending it to the profession, in all those cases where the tonic plan is decided upon, either with or without preliminary medication. The arsenite of potassa, as existing in the formula of Fowler's solution, is the preferable mode of exhibition; and its dose should be graduated according to the ability of the stomach to receive it without nausea. In the most numerous subjects,—varying from seven to sixteen years of age,—six or eight drops should be given night and morning;—gradually increasing its dose and frequency. Adults may take ten drops (increasing to fifteen and even twenty) three times a day; and, in all cases, it should be persevered in for a week or more after all the spasmodic symptoms have disappeared. The only unpleasant effects, are nausea or vomiting, if the dose be too large; and occasionally a tumefaction of the head and face, if too long persisted in. On either of these effects being produced, the medicine should be discontinued for a few days, and then resumed in a diminished dose. With these precautions, I have employed this remedy in more than two hundred cases of chorea, without ever having witnessed any of the untoward results upon the constitution, said to follow the exhibition of arsenical preparations. So far from any of the sequelæ which are apprehended by the alarmists, my patients have, under its use, not only recovered from chorea, but many of them seem to have since acquired vigorous constitutions and improved health. I have used it in infancy, in delicate females during pregnancy, and in circumstances supposed by many to forbid its employment; and I have never once seen cause to regret its exhibition.

"But while I thus dwell upon the value of arsenic as a remedial agent in chorea, I have not failed to superadd auxiliary treatment; and hence nutritious diet, active exercises, cordial drinks, and the cold-bath (both plunging and showering), have all been usefully employed. And in the examples, comparatively few, in which counter irritation has been indicated, I have obtained most favourable results by the aid of rubefacients, blisters, setons, issues, and the eruption produced by tartrate of antimony applied to the spine. But I have never had occasion for active depletion, even by purgatives; although, when constipation exists in connexion with chorea, or where there has been present the suspicion of worms, I have interposed a cathartic or anthelmintic; while, at the same time, persevering in the tonic treatment."[a]]

SECTION III.—LEAPING AGUE.

History.—The form above described[b], is that in which the disease usually occurs; but, now and then, persons have it in another form;—so that they dance or leap; and then it is called "leaping ague." Perhaps it is called "ague" from not being constant, but coming on in paroxysms. This form of the disease has been very frequent in the northern parts of Scotland[c]; and also in Germany, and some other places. In this form of the affection, persons will sometimes run, with extraordinary facility, over dangerous places. If they have a place fixed in their imagination, they will dart forward towards it; and on arriving at it, they will drop down exhausted. Horstius states, that certain women in Germany were affected with restlessness of body, and disorder of mind; and went annually to the chapel of St. Vitus near Ulm; where they danced, night and day, till they dropped down

[a] Braithwaite's "Retrospect of Practical Medicine"; Volume 1; Page 15.

[b] See Page 691.

[c] Particularly Forfarshire.

exhausted. They then remained well till the following May; when the affection returned, and they went through the same ceremony. It is from this circumstance that the common form of the disease is called "St. Vitus's dance."[a] The French call it "the dance of *St. Guy*"; but, not being a Catholic, I do not know who St. Guy was. Sometimes it is said, that a roll on the drum gives persons this tendency to dance; and that it is assuaged by music;—just like fits of dancing in chorea. Some do not believe that the beating of the roll has much power; but that the effect results from the motions of the body, arising from the excited state of the feelings; just like the other form of the disease which I have mentioned.[a]

Symptoms.—In this extraordinary form of the disease, some will climb in a very singular manner; others will have fits of rolling; others, fits of leaping; others will whirl round; others will tumble regularly; and others will spring and dart forwards, in any direction, to a given spot. Paroxysms of this kind will sometimes come on daily, or even oftener; and sometimes not so often. Occasionally they have been observed to be periodical to the minute; and, as in common chorea, this affection is somewhat under the will. It is a strong desire for motion, and a pleasure in yielding to it; but a strong effort will produce a little diminution of the motion. A curious case of this kind (occurring in a woman), is given by Dr. Watts, of Glasgow, in the Fifth Volume of the "Medico-Chirurgical Transactions."[b] In this woman, there were various movements at different times; and the doctor states, that he witnessed them himself. He says that she would roll over, fifty or sixty times in a minute; and would be sometimes seized with tetanic rigidity; but that she was conscious of her own existence during these fits. In the Seventh Volume of the same "Transactions"[c], a case is mentioned by Mr. Kinder Wood; and which, likewise, occurred in a female. She had violent fits of dancing; and it was observed by some one, that (when dancing) she struck the table, and every thing that came in her way, in regular time; and that she danced in very good time. A drum was procured, and a man beat it to the time in which she danced; and she immediately turned towards it, and danced up to it. It was not known that she had ever danced before; but she now danced in regular time, and very gracefully;—showing an infinite variety of steps. Beating the drum suddenly in a roll, or a little out of time, always stopped her; and by perseverance in this plan, whenever she began to dance, she was cured. This repeated interruption at last broke the chain. She was sensible during the paroxysm; and between the paroxysms she nursed her child, and attended to her household affairs, and had a great wish for her recovery. All the account she could give of it was, that she had a tune in her mind, which irresistibly compelled her to dance. Occasionally there are these motions, without any musical ideas whatever; and occasionally patients have involuntary musical ideas;—causing them to hum a tune, without any motion taking place in accordance with it.

Attributed to Witchcraft.—When these cases occurred formerly, they were ascribed to witchcraft. A case of this description occurred in Renfrewshire in Scotland, in 1696; and the ministers watched the patient in turn. A commission was appointed by government, to examine into the business, and was signed by eleven privy councillors; and it was declared that she was bewitched. A warrant was granted, and several persons were apprehended, and afterwards brought to trial, for having bewitched her. After six hours' deliberation of the jury, three men and four women were

[a] See Page 691. [b] Page 1. [c] Page 237.

found guilty; and were condemned to be burnt for having caused the disease; and the sentence was actually executed at Paisley, on the tenth of June, 1697. A case exactly like this, but not ascribed to witchcraft, is recorded in the "Edinburgh Medical Journal" for 1829. Bishop Jewel, in a sermon preached before Queen Elizabeth, said:—"It may please your Grace to understand, that this kind of people, (I meane witches and sorcerers,) within these last few years, are marvellously increased within this your Grace's realme. These eies have seene most evident and manifest marks of their wickedness. Your Grace's subjects pine away, even unto the death;—their collour fadeth; their flesh rotteth; their speech is benummed; their senses are bereft. Wherefore your poore subjects' most humble petition unto your Highnesse is, that the lawes touching such malefactors may be put in due execution. For the dole of them is great; their doings horrible; their malice intollerable; the examples most miserable. And I pray God they never practise further than upon the subject." In the next session a bill was brought into parliament for making witchcraft felony; and those who know any thing of history, must be aware that thousands of victims were sacrificed. All singular nervous diseases, and many other calamities, were ascribed especially to witchcraft.

There is an account, in the "Ephemerides", of a girl who sprang up while in a horizontal posture, and came down again. The mother consulted a medical man; and he told her he could do nothing for her. He attributed it to the devil; and directed her to go to a clergyman. Voltaire says, that the greatest enemies the devil has are the doctors;—that it is the doctors who do away with one half of his dominions;—so much was formerly ascribed to him, and to those connected with him.

Pathology.—One has some clue, I think, to these motions, in the experiments of Magendie. He says, that if the white matter of both "corpora striata" be cut, the animal darts forward; or, if this be prevented, it still retains a progressive attitude. He says, that if the "crura cerebelli" or the "pons varolii" be cut, from before backwards, an animal rolls over sixty times in a minute. That I have witnessed myself. He likewise states, that if we cut vertically from the "crura cerebelli", through the arch of the fourth ventricle, it has the same effect; and the motion is more rapid, as the section is nearer that point. If incisions have this effect, we may easily conceive that a certain local affection may have a similar effect in being the cause of this disease. Cases are recorded of persons, who had a mere propensity to rush forward or backwards.[a]

Causes.—Some of these affections are clearly the result of mere excitement of mind;—some violent passion. Sometimes they arise from witnessing other people under the disease; but occasionally they appear to arise from certain causes within the nervous system itself, independently of all external circumstances. When they arise merely from external circumstances, a large number of cases occur together; and in Germany they have been epidemic;—that is to say, they have affected a large number of people at a time.

Treatment.—When these cases are sporadic, we should naturally be inclined to treat them like St. Vitus's dance[b]; and I have no doubt they would be cured in the same way. When they are epidemic, we ought to

[a] Sometimes there is an uncontrollable propensity to running; which appears to be from both "corpora striata" being affected. If only one of these bodies be engaged, a rotary motion is produced; as is often seen in dogs labouring under inflammation of the brain. When the upper limbs are convulsed, it is probably from an affection of the optic thalami.—*Dr. Fletcher.*

[b] See Page 694.

have recourse to mental remedies. We should separate the patients; and not allow one to be excited by seeing another. Strong corporeal measures can be of little use, and medicine must be out of the question; but when these cases occur without any external excitement, from simple irritation (although I never had such a case), I have no doubt that the cold-bath, oil of turpentine, and those things which cure St. Vitus's dance[a], will also cure this affection.

[a] See Pages 694 to 696.

CHAPTER XII.

TETANUS.

SECTION I.—SYMPTOMS AND PROGRESS.

Definition.—The name of the disease I am now about to consider (tetanus), is derived from the Greek word τεινω, *to stretch*;—in consequence of the great stretching and spasm that exist in this disease. There is a constant rigidity and contraction of certain voluntary muscles, not alternating with relaxation; yet there is a much more violent contraction at one moment than at another. There is a *constant* contraction of the muscles affected; but they are not constantly contracted to the *same extent*. There are *paroxysms* of spasm, as well as *constant* spasms; and the paroxysms are more frequent, and also more violent, in some cases, and at some periods in the same case, than in others. Synchronous with these violent spasms, there is violent pain; and the muscles so affected by spasm, are always very hard. There is one extraordinary case mentioned by Sir Gilbert Blane, of a man in the navy who had tetanus; and, instead of experiencing a violent agony from the spasm, he had nothing but pleasurable sensations. It is considered a very extraordinary case; and the disease could not be trifling, for he died on the fourth day. I do not believe that Sir Gilbert Blane saw the patient himself; but he relates the case on the authority of a surgeon in the navy.

Varieties.—These painful spasms chiefly affect the muscles of the lower jaw, of the neck, and of the trunk. When they affect the jaw, that variety of the disease is called "trismus." When the spasms are such that the body is drawn backwards and arched (the convexity of the arch being *forwards*, and the whole body drawn *backwards*), this state is called "opisthotonos"; when the body, on the other hand, is drawn *forwards*, it is denominated "emprosthotonos"[a]; and if the body be drawn to one side, then it is termed "pleurosthotonos."[b] Trismus and opisthotonos are the most common. Sometimes the spasms affect the muscles of the extremities; but in general they do not; and the fingers are often flexible to the very last; while the trunk, the neck, and the jaw, are in a state of the utmost rigidity.

[Some writers divide tetanus into "general",—when the whole muscular system is affected; and "local",—when there is rigidity of one or several muscles, as in cramp, priapism, &c. Tetanus has also been distinguished, as regards its duration, into "acute" and "chronic"; though the limits where the one terminates, and the other begins, have not been fixed. Two varieties have also been established,—"idiopathic" and "symptomatic";—the former arising from causes acting directly on the nervous system, the latter

[a] From εμπροσθεν, *forwards*; and τεινω, *to draw*.

[b] From πλευρον, *the side*; and τεινω, *to draw*.

from the irritation in other organs being propagated indirectly to the nervous centres. Thus tetanus following wounds (termed "traumatic") belongs to the latter variety. It has also been divided into the "continued" and "periodic": in the former the rigidity does not disappear entirely, but the symptoms sometimes suddenly increase; in the latter there are complete intervals, or interruptions of the tetanic rigidity;—the symptoms, in some cases, recurring at stated or fixed periods. The "continued" forms are always acute or subacute; the "periodic" always chronic. Dance has recorded four cases of the latter variety.[a] Hufeland[b] has also seen a case that for years returned at regular periods, which lasted eight hours.[c]]

Symptoms.—The muscles of the face are affected; and the consequence of this is, that the brow becomes very much corrugated. The "corrugator supercilii" of each side suffers in the spasm, and the other muscles of the face are affected; so that the angles of the mouth are drawn up into an agonizing expression; and the patient is compelled to a wretched grin; which is, no doubt, greatly increased by the agony which the patient suffers. The nose is drawn up; and the eyes are fixed, staring, and startling. The tongue is continually protruded during the patient's sleep, if the jaw be not completely closed; and when it is protruded, spasms continually affect the masseter and temporalis muscles; so that the jaws snap, and the tongue is caught and wounded. The diaphragm, too, is greatly affected; on which account there is a catching of the breath, and violent pain at the end of the sternum. At any rate, these spasms produce a catching of the breath; and, I presume, the pain at the end of the sternum arises from the same source. From the spasmodic state of the abdominal muscles, the abdomen is extremely hard and swollen;—in fact, as hard as a board. The rècti muscles are seen prominent in all their departments. The least motion, or the least attempt at motion, frequently excites these violent spasms; so that if the patient attempt to move in bed, violent spasms follow. The "sphincter ani" sometimes seems to be violently contracted; so that a clyster cannot be given. This, however, is not invariably the case. From this violent muscular action, there is great heat and great sweating. Dr. Fribo, of Geneva, found the temperature of the body 110 degrees in the axilla. In this disease the pulse is quick, exactly in proportion to the severity of the affection. It is much quicker at the moment the spasm is aggravated, than at any other time. The first symptoms of the disease, generally shew themselves about the neck and tongue. Usually the first symptom of which the patient complains, is a difficulty in mastication and deglutition; and then there is generally a slight stiffness about the back of the neck.[d]

Duration.—The course of the disease is various. Sometimes it proceeds very rapidly, and sometimes very slowly; so that it may last only one day;—destroying life in twenty-four hours; or it may last many weeks. It frequently kills before the fourth day; and when it does terminate fatally, it generally proves so before the ninth day. As to duration, Dr. Parry mentions that a horse attacked with this disease, did not die before the

[a] "Dictionnaire de Médecine et Chirurgerie Pratique."

[b] "Manuel de Médecine Pratique; par Jourdan"; Page 234.

[c] "Library of Medicine"; Volume 2; Page 231.

[d] Tetanus begins in the jaw;—the motific branch of the third division ("inferior maxillary") of the fifth pair of nerves ("trigemini") being first affected. There is "risus sardonicus"; the eyes are half open; the disease extends to the neck; and then to the trunk. In the extremities, the *flexors* are first attacked, and then the extensors;—as in all cases of spasmodic disease; whereas, in paralytic diseases, (as in the affection of the wrist from "painters' colic",) the *extensors* are first attacked. Thus, *added* and *diminished* nervous power, affects different sets of muscles first.—*Dr. Fletcher.*

eighteenth day of seizure. When a patient dies, it is either during the violence of the paroxysms, or from being completely exhausted.[a] The mind is usually quite unaffected, except sometimes towards the last. It is common to almost all diseases, for the mind to become slightly affected. The bowels, in this affection, are always costive.[b] If the patient recover, it is generally by a very gradual cessation of the symptoms; and the disease lasts from two to four weeks, and sometimes six or eight. It is from these long-continued cases, that recovery usually takes place. It now and then, of course, remits; and then again it is aggravated.

Morbid Appearances.—After death, in most cases, nothing wrong is found; and therefore the morbid appearances which are sometimes found, are not *essential*, but *incidental*. Occasionally, we find inflammation of the spinal marrow; but sometimes (and I cannot but fancy I have seen instances of it myself) the congestion so common about the spinal marrow, when the body lies long, has been mistaken for inflammation of the spinal canal. In the ordinary position in which dead bodies lie, the blood gravitates towards the spine; and if the body be not soon examined, and the weather be hot, we may expect great redness of the spinal membrane from the blood effused there; and yet there may be no inflammation. When we consider that, in the majority of cases, there are no signs of inflammation, we cannot but conclude that, although inflammation of the spinal marrow may sometimes give rise to tetanus, yet the disease is not necessarily the result of inflammation of that kind.

State of the Nerves.—[In traumatic tetanus, the nerves in the neighbourhood of the wound have often been found more or less injured, or to have undergone morbid alterations. In certain cases they have been contused, lacerated, partially divided, irritated by spicula of bone, or other foreign substances, included in ligatures placed on arteries, or participating in the inflammation of the surrounding textures. In the latter case, the appearances have differed according as the inflammatory action was acute or chronic;—injection (more or less intense), and softening being evidence of the former; and thickening, induration, and discoloration of the latter. Lobstein[c] and Andral[d] have observed signs of inflammation or redness in the semilunar ganglion; and Swan[e] has often seen the ganglia of the sympathetic system in general considerably injected;—an appearance which has been occasionally observed by other authors.

Other Morbid Lesions.—In an individual who died of opisthotonos, Dupuytren found the muscles gorged with blood, and lacerated. Larrey and Curling give cases where one of the "recti abdominis" muscles was torn across. The pharynx and œsophagus were often seen by Larrey contracted; and their mucous membranes red, inflamed, and covered with a viscid reddish mucus. The large papillæ at the root of the tongue, have occasionally been found thickened; and the mucous lining of the larynx, injected and covered with frothy mucus. Andral gives a case, where unequivocal marks of gastritis were discovered; and, in four cases, M'Arthur found inflammation of the alimentary canal, with a peculiar yellow matter covering the mucous membrane of the stomach and œsophagus; which in one case,

[a] Death generally results from asphyxia, nervous apoplexy, or a general convulsion. —*Dr. Fletcher.*

[b] This costive state has been attributed to spasm of the anus; to spasms extending from the voluntary muscles to those of the intestines; to the opium administered; and to a spasm of the extremities of the intestinal arteries. But none of these causes are satisfactory.—*Dr. Fletcher.*

[c] "De Nervi Sympathetici"; Page 152.

[d] "Clinique Médicale"; Tome I; Page 49.

[e] "Diseases of the Nerves."

effervesced on being exposed to the external air. Worms have been discovered in the intestinal canal by Sauvages, Laurent, Larrey, O'Beirne, and others. The last writer states, that distension of the cæcum and colon is a constant pathological appearance. In a case related by Mr. Howship, the heart was much indurated, and presented considerable resistance to the knife.[a]]

SECTION II.—CAUSES.

Predisposing Causes.—The predisposing causes of the disease, are, in the first place, hot climates and hot seasons. The disease is far more common in hot climates, than in temperate ones; and more common in hot seasons, than in those which are mild. It appears that, in hot climates and hot seasons, it prevails most from the want of ventilation, the want of good food, the want of comfort, and the want of attention to the bowels. On this account it is much less frequent in the army and navy now, than formerly. Dr. Lind says that, in the West Indies, at the end of the former war, five cases of amputation out of six proved fatal, through the occurrence of tetanus[b]; but Dr. Dickson, physician to the Fleet, (in an article published in the Seventh Volume of the "Medico-Chirurgical Transactions"; Page 448,) says that there were not under his care, in the West Indies, above six cases of tetanus arising from amputation, for upwards of seven years. He ascribes this fact to the improvement in the treatment of sailors, both in sickness and in health; and to their having more comforts, and being less exposed to noxious causes. Dr. M'Arthur, of the Naval Hospital at Barbadoes, says[c] that only four cases occurred there, in the course of nearly four years; and yet there were many wounds, and many amputations during the war.[d] This is another instance of the effect of external circumstances upon the existence and severity of various diseases. Fever prevails most among those who manifest a want of cleanliness; and so, it is said, do cholera and typhus. But diseases very dissimilar to each other, will be predisposed to by a want of comfort; for the more the comfort of the body is attended to, the less is the influence of all noxious agents, and noxious circumstances.

Males are thought to be more disposed to the disease than females; but this is not proved; for males are more exposed than females to the exciting causes of the complaint. It is also thought, that the strong and muscular are more liable to it than the weak; but whether that is really the case I do not know; for I have seen a great number of instances of tetanus, in persons of all sorts of constitutions, both strong and weak. It is supposed to occur particularly in young adults; but it occurs also, in the West Indies, in infants. Children there (though now less frequently than formerly) die of locked jaw; so that one variety of the disease is called "trismus *nascentium*."[e]

Exciting Causes.—Among the exciting causes of the disease, is to be mentioned sudden refrigeration, when the body is hot; but the most common is a wound; and (what is singular) it is wounds of the hands or feet,

[a] "Library of Medicine"; Volume 2; Pages 237 and 238.

[b] "Essay on Diseases Incidental to Europeans in Hot Climates. By James Lind." Part 3; Chapter 1; Section 4.

[c] In a letter dated February 22, 1808; and published in the Seventh Volume of the "Medico-Chirurgical Transactions"; Page 466.

[d] "Medico-Chirurgical Transactions"; Volume 7; Page 476.

[e] See Page 704.

that most frequently cause it; and, among wounds of the hands and feet, it is wounds of the fingers and toes, that most frequently cause it; and among wounds of the fingers and toes, it is most frequently wounds of the thumbs and great toes, that produce it.

Depends on the Kind of Wound.—Every wound has not an equal tendency to produce tetanus; for contused wounds much more frequently occasion it than any others. A wound will sometimes not produce the disease, till the person is suddenly exposed to cold; and then he will have it immediately. This is a similar occurrence to that which takes place in ague; namely, that a person may be exposed to the causes of ague, and yet the disease will not appear, until he is exposed to cold and wet. The cause then becomes efficient. So a wound will frequently not produce tetanus, till another cause of the disease takes place;—sudden refrigeration; and then the affection makes its appearance. The reverse of this, however, sometimes happens. The person is exposed to wet; but the disease will not shew itself, until a wound takes place.

The State of the Wound.—It occurs in all states of the wound;—in healthy and unhealthy wounds. Sometimes it appears when the wound is nearly healed; and sometimes when it is perfectly healed. It occurs, too, whether the wound be large or small. I had a case of tetanus, as severe as any I ever saw, where there had been merely a contusion of the thumb. There was no pain,—no irritation. The nail was separated and loose; but under it, all was dry. No secretion was going on, and there was no irritation to be found; and yet the contusion of the thumb produced the disease. There is a case mentioned in the "Transactions of the London Medical Society"[a], in which the disease occurred after a burn; at the time when there was merely a dry scab on the leg, and no inflammation around it; nay, the disease has sometimes declined and ceased, while the wound every day grew worse and worse. I had a case of tetanus from compound dislocation of the great toe; in which the disease declined, and ceased, while the pain continued in the foot. Inflammation and suppuration went on, accompanied by great suffering; and yet the disease was declining all the time. Trismus nascentium,—the "lock-jaw" of new born infants[b], has been ascribed to the state of the navel,—to the condition of the parts connected with the umbilical cord[c]; but it appears, that it is greatly disposed to by the unhealthiness of the circumstances in which the children of the West Indies are placed.

Period at which it may Occur.—Sir James M'Grigor says that it appeared, from his immense experience in the Peninsula (as army-surgeon), that a person wounded was safe, as it regarded tetanus, if the disease had not begun by the twenty-second day after the infliction of the wound. But Sir Gilbert Blane (who had, if not *equal*, yet very *great* experience in the navy, many years ago) says, that he has seen the disease occur at all periods of a wound, between the second day and the end of the fourth week. Sir James M'Grigor found the twenty-second day the limit; but Sir Gilbert Blane has seen it up to the end of the fourth week, from the time of the infliction of the wound; so that a person is not safe, according to him, even if he have passed the twenty-second day. Dr. Parry mentions seeing a horse seized with the disease on the thirtieth day. I may mention, that tetanus is not only common in horses; but that lambs

[a] Volume 6; Page 77.
[b] See Page 703.
[c] It has also been attributed to cold, and to the retention of the meconium. Hide-bound children often die of this disease.—*Dr. Fletcher.*

are affected with it, if their ears be bored with a red-hot iron, to check the rot. It has been said to arise, frequently, from worms in the intestines.

Pathology.—All I can venture to say as to the nature of the affection is, that it is a peculiar state of that part of the brain or spinal marrow, which is immediately connected with the nerves of the voluntary muscles. What that state is, I cannot pretend to define; but that is the situation of the proximate cause, I have no doubt. The mind is entirely unaffected in the disease; and so is sensibility. It appears to be an affection of the voluntary muscles, through the medium of the voluntary nerves.

SECTION III.—DIAGNOSIS AND PROGNOSIS.

Diagnosis.—In almost every case, we observe that the tongue is bitten. Before the mouth is completely closed, and the patient falls asleep, the tongue is protruded by the spasms. The spasms affect the entire set of muscles; and therefore we may expect, in most cases, a biting of the tongue. A second symptom, very characteristic of the disease, is the pain at the "scrobiculus cordis." It is a pain not increased by pressure; but a sudden, violent, sharp, stabbing pain. It may be more or less constant; but at periods it is exceedingly severe. There is also a peculiar swelling and rigidity of the muscles;—a state which is spasmodic, but *constant*, not *convulsive*. It is what they call "a *tonic* spasm";—not a spasm alternating with relaxation ("clonic"). Then, again, the body is drawn into a peculiar posture;—opisthotonos, emprosthotonos, or pleurosthotonos[a]; and in trismus the jaw is closed, or nearly so, without any inflammation around, and without any organic disease to account for it.

From Hydrophobia.—There is no terror in this disease;—no excitement of the mind;—no morbid corporeal sensibility. We shall see, that in hydrophobia there is excessive terror,—excessive excitement of mind,—a great sensibility to external sensation; so that neither noise, nor light, nor a sudden draught on the body, can be borne[b]; but in tetanus, although the patient is miserable enough from the agony, yet there is no *mental* distress,—no terror of mind; neither is the body extraordinarily sensible to external applications.

From Rheumatism.—Rheumatism, when it occurs, chiefly takes place in the joints, and not in the bellies of muscles; or if it do, the joints are affected likewise; and there is no spasm, but a difficulty of motion, and great pain when the patient moves; and many joints are frequently affected at the same time. As to the distinction between a locked jaw and rheumatism, it may be observed that, in the latter, other joints are most probably affected. The jaw may be stiff; but there is violent pain flying from one part to another; and the patient is not subject to a snapping of the tongue. In rheumatism, too, there is generally tenderness in some part of the jaw; and generally there is a great deal of heat, as well as constant pain.

From Hysteria.—Tetanus, more especially trismus, is very frequently hysterical; but this occurs, in ninety-nine cases out of a hundred, in females; and there are other hysterical symptoms;—such as "globus hystericus", great flatulency, and irregular convulsions. If hysteria be present, and

[a] See Page 700.

[b] See Page 712.

trismus (or any other form of tetanus occurs), we may take it for granted that it is an hysterical affection altogether.

Occurring during Ague.—I mentioned, when speaking of ague, that tetanus sometimes occurs during that affection, particularly during the cold stage[a]; and I presume it is not dangerous. The utmost that I have observed, is a constant tonic spasm of the arm;—that is to say, I had two patients under my care, whose hands were clenched during the cold stage.

Narcotics.—Narcotics sometimes have occasioned this disease. A tobacco-clyster will sometimes occasion it; but it is strychnine, more particularly, that has this effect. In these cases, if we knew that poison had been swallowed, we should ascribe it to that; but if a narcotic had been taken, I presume we should, in most cases, find some other symptom present in addition to the tetanus.

Prognosis.—The prognosis, in this disease, is always bad; unless it be a sympathetic affection. If hysteria be present, or if the disease have been produced by a narcotic, the prognosis will not be so unfavourable; for the narcotic will frequently be got the better of. In such circumstances, the prognosis is very various. If, however, the disease be what is called "traumatic" (arising from a wound)[b], or if it be occasioned by worms in the intestines, few persons recover from it. But every description of tetanus, whatever be the cause from which it occurs, admits of recovery. Dr. Parry says, on the subject of prognosis, that if the pulse be not above 100, or 110, up to the fourth or fifth day, patients almost always recover; but that if the pulse be quicker early, the disease almost always proves fatal; and that there have been but very few recoveries, when the pulse has been 100 the first day. There is less danger in proportion to the length of time which the disease lasts. If we are called to a case which has lasted some time, our prognosis may be favourable.

SECTION IV.—TREATMENT.

Bleeding.—If the wound be inflamed, or if there be any internal inflammation, or if there be fulness of the system, undoubtedly we should bleed. It is said, that enteritis sometimes exists in the disease; but I have not seen it. We are not to imagine, that because the blood flows freely, the patient must be benefited by blood-letting; because, while there is such violent action of the voluntary muscles, the effect must be the same as that which we every day procure in common venesection, by making a person contract his hands, so that the muscles may press on the internal veins. When all the muscles are in a state of violent spasm, as in tetanus, we may expect that the circulation will be irregular;—that a great quantity of blood will be forced to the superficial veins; and consequently that the blood will flow freely; and bleeding is not at all useful, unless the wound is inflamed, or there is some decided internal inflammation, or the patient is clearly in a state of plethora.

Purgatives.—Purgatives are often useful; especially in the case of children, when they are labouring under "trismus nascentium."[b] I believe there is benefit, in general, from clearing out the intestines well; and some cases have done well under the use of purgatives in adults, where there has been some irritation in the intestines (worms, or something else) producing

[a] See Page 266. [b] See Pages 703 and 704.

the disease. In general, both bleeding and purging do good; but, at any rate, it is always right to clear out the bowels. Among purgatives, I think the oil of turpentine is one of the best. It clears the bowels thoroughly; and, in cases of *hysterical* locked-jaw, I have seen it produce an instantaneous effect. Cases are on record (and I have seen several instances myself) where, in trismus of a hysterical nature, the jaw opened the moment an injection of oil of turpentine was passed up; and in other cases I have seen it open a few hours afterwards. If two or three ounces of this medicine cannot be got down by the mouth, (and it is of no use to give less,) we may exhibit three ounces (diffused in gruel) by the rectum. Should this not answer, a large dose of calomel should be given. If the pills cannot be swallowed, we may place the calomel in the mouth. Mercury to ptyalism has been said by some to do good.

Narcotics.—Opium and other narcotics have been tried in this disease; but the agency of all remedies is greatly resisted, and therefore very large doses of narcotics are borne. Half a pint of laudanum has been given without doing injury. Dr. Morrison, a gentleman who has practised in the West Indies, says he has been in the habit of treating these cases there; and that it is very common to give one hundred drops of laudanum, as a starting dose; and to follow it up every two hours;—increasing each dose by one-third of the preceding one. He also allows the patient wine and ardent spirits; employs the warm-bath; and exhibits mercury to ptyalism;—paying due regard to the bowels; and he states, that the result of this practice was the recovery of more than one-half of his cases, although the tetanus was of a traumatic character. However, we have all seen opium exhibited in a large quantity, even to stupefaction, without doing any good. Prussic acid appears to have failed entirely in this disease. It has been frequently and freely given; but it has failed; and so likewise has belladonna. Some cases appear to have done well, by means of an injection of tobacco. It appears to have relaxed the spasm, and cured the disease. Dr. Latham (Senior) praises opium and ipecacuanha; which, he says, produced copious sweating. He states, that the success from a combination of these remedies, has been very great.

Warm and Cold-Bath.—The warm-bath appears to have done no good, and sometimes to have been really injurious; while, on the other hand, the cold-bath and cold affusion have relaxed the spasm; but have sometimes killed the patient at once, as if he had been shot. I presume, if the cold-bath or cold affusion be employed, it ought to be at the moment that the violent spasm is on. I know of an instance where a patient was taken out of bed, in a hospital[a]; put on a chair; placed in a tub in the middle of the ward; and a pail or two of water dashed upon him. He fell down dead, as if he were shot;—never spoke again; and all the other patients were very much shocked. Yet there are cases in which that very remedy appears to have cured the disease. There are many cases of the latter description on record; so that the practice, I should imagine, is justifiable; though I have no experience of it. The error, if there be error, consists in the cold water not being thrown on the patient when he is at the very worst. The moment we find a catching of the breath, from violent spasm, I would dash on the water; for I think its agency, in that case, would not be sufficiently severe to produce danger. But Sir James M'Grigor says, from the result of very extensive trials of the cold-bath, in the Peninsular war, that it was worse than useless.[b]

[a] St. Thomas's.

[b] See Note (b) to Page 708.

Blisters.—Blistering along the spine *may* be serviceable; but it is often found useless, and is unquestionably a very cruel remedy.

Result of Sir J. M'Grigor's Experience.—Sir James M'Grigor says, as the result of his experience in the army, that all remedies (except one that I do not see spoken of,—iron) have been fully tried in some hundreds of cases; and that there is little or no dependence to be placed upon them. I have looked over the list he has furnished; and, upon my word, there is almost every thing mentioned that ever was used in medicine. Sir James M'Grigor says, that the mode of treatment is certainly still to be discovered [a]; and that, as there is no analogy to guide us, there is little hope that any remedy will ever be found out.[b] Recovery has taken place under all means of treatment; and recovery has taken place under *no* means.

Iron.—It struck me, from seeing the benefit that iron produced in St. Vitus's dance, that as this is a similar disease, although infinitely more severe, (characterized, not by a *slight catching* of the muscles, but by *violent spasm*,) that iron might still have the same effect. I saw clearly that, in the exhibition of narcotics, we were on a wrong scent; because we may give opium till the patient is stupid, and yet the disease generally proves fatal;—at least, in this country. In these circumstances, I determined that, if ever a case came under my care, I would give iron a fair trial.

Case.—At length a case did occur; this remedy was fairly exhibited; and the man recovered. The case was one of traumatic tetanus, arising from compound dislocation of the great toe. It was a well-characterized case; and several persons went to look at it. The sesquioxide of iron was made into an electuary, with double its weight of treacle; and each dose was mixed with a quantity of beef-tea, and stirred up well, as it was going into the patient's mouth. It was given every two hours. He took it *ad libitum*; and recovered.

Case.—It was not long before I had another case. It arose from a contusion of the thumb; and was the case in which I stated the nail was separated.[c] This was as severe a case, not terminating fatally, as ever I saw. It was a *frightful* case; and, in this patient, the sesquioxide of iron was administered in still greater quantity. There was no limit fixed; and it was found that he had taken two pounds in a day! His bowels were carefully attended to; and an injection was given three times a day. The iron came away in large lumps;—very similar to the balls of fæces which come from a horse; and they were perfectly red. However, the man in two days was decidedly better; and he repeatedly came, after his recovery, to thank me for what had been done for him.

Case.—A third case came under my care, some years ago; and occurred in a boy who had had a chilblain on his heel, or a little higher up. He was brought to the hospital [d], in a most frightful state; and the disease was so violent, that I had no hope of doing him good;—fearing that he would die, before the remedy could be brought into operation upon his body. It was prescribed for him; but he died before twenty-four hours had elapsed. Iron is a medicine that will not produce an immediate effect. To produce its effect upon the system, it must be given for a few days.

[a] "Medico-Chirurgical Transactions"; Volume 6; Page 459.

[b] "Sketch of the Medical History of the British Armies in the Peninsula of Spain and Portugal, during the late Campaigns. By Sir James M'Grigor, M.D." Read at the Medical and Chirurgical Society of London, June 20, 1815; and published in the Sixth Volume of its "Transactions"; Page 381. The department of the paper allotted to Tetanus, extends from Page 449 to Page 462.

[c] See Page 704.

[d] St. Thomas's.

This patient died in a violent paroxysm. I saw him in the afternoon, about one or two o'clock; and he died early the next day;—so that it was not a case in which the remedy could exert its influence. It is not a remedial agent which produces an instantaneous effect, like bleeding. In St. Vitus's dance, it is sometimes months before it produces its effect; and so it is in tic douloureux, and also when given as a tonic.

Whether the two first of these were cases cured by the iron, I will not pretend to say; I dare not assert that they were. I employed it from the analogy of the affection to St. Vitus's dance; both cases were traumatic; and the patients did well;—not by lingering out; for in two or three days they began to mend; and were well speedily. There is a *probability*, but no *certainty*, that the disease was cured by iron. The cases, however, are interesting; as they make it an object to give iron a fair trial, in any other cases that may occur. I have had but three cases of tetanus, from the time that I determined to give this medicine a trial. In two of these it appeared to succeed; in the third there was no time for the fair exhibition of it.

I was mentioning the circumstance to a gentleman, whom I had met in consultation some few months ago, and who had practised in the West Indies; and he informed me that, in consequence of the publication of those cases, in the "Medico-Chirurgical Transactions"[a], he had used it in the West Indies; and I think he said eight cases recovered out of ten; and in the two cases which did not recover, the symptoms were so severe, and the jaw so thoroughly closed, that it was impossible to get the iron, or anything else, down the throat.

Constant Refrigeration.—There is a case mentioned by Sir James M'Grigor, in the sixth volume of the "Medico-Chirurgical Transactions"[b]; and also in his reports (which are very interesting) of the diseases of the army in the Peninsular war. It proceeded from a slight wound in the finger. The patient (a soldier, of course) was carried in a bullock-car after the battalion to which he belonged, in a severe state of tetanus, in the midst of pouring rain; which completely drenched him in the early part of the day;—the heat being 52 degrees: and then they ascended the highest mountain in Gallicia, the snow on the summit of which was knee-deep; and there the temperature was only 30 degrees. He was exposed in this condition, from six o'clock in the morning till ten o'clock at night; and arrived at his journey's end, half starved from cold, but perfectly cured of his tetanus. Whether such a mode would succeed, if it were put into practice intentionally, I do not know. I stumbled on a similar case, published in 1827. A horse which was in a state of tetanus, happened to be in a wet park, and was drenched with rain;—precisely as was the case with this unfortunate man; and the horse also did perfectly well. Whether the depressing power of cold and wet, regularly kept up for a certain number of hours, has a tendency to cure the disease, I do not say; but I think that, in a disease of violent excitement as this is, the constant,—not *sudden*, but *constant* refrigeration (by means of a low temperature, united with moisture), is likely to be of great service. There are at least two such cases on record; and it is surprising to find a soldier, so exposed from morning to evening, recover; and especially in so short a time as one day.

Whirling Machine.—For the purpose of lessening the spasms, some have proposed a whirling-machine;—so as to make the patient giddy and powerless; but I do not know that it was ever attended with success.

[a] Volume 15; Page 161. [b] Page 449.

Amputation.—If there be a wound, the removal of the part is perfectly useless. I had a case of tetanus, some years ago, in which an operation was proposed;—in consequence of the disease having arisen from a compound fracture of the leg. The extremity was cut off, but the patient was no better; and now it is with me, and I believe most others, an established rule, not to remove the wounded part. After a long search for cases, in scores of journals and medical books, I have been able to find only one instance, where the removal of the part appeared to be attended with the removal of the disease. Instances are so rare, that (I believe) amputation of a part is never thought of at the present day.

Division of the Nerves.—[Whenever the symptoms appear a short time after the reception of a wound, and there can be no doubt that the wound is the exciting cause of the disease, all nervous communication between it and the spinal marrow should be cut off as soon as possible. It is a singular fact, that this practice,—which our knowledge of pathology and physiology shows to be necessary, and likely to be successful,—has only (as far as medical records go) been performed four or five times, but in all these with perfect success. In a case related by Dr. Murray [a], occasioned by a wound in the left foot, the posterior tibial nerve was divided; and although the patient could not articulate distinctly before, from the closure of the jaws, he immediately opened his mouth with an exclamation, and expressed himself as being benefited. He rapidly recovered.[b]]

Protect the Tongue.—In treating the disease, whatever remedies we employ, it is right to introduce a cork (or something of that kind) into the mouth, to save the tongue; or the latter will be dreadfully bitten. This should always be carefully attended to.

Support the Patient, in the Chronic Form.—When the disease runs on, and becomes chronic, it is necessary to support the patient well. By doing this, we give him a greater chance of recovery. Dr. Currie, who wrote on Cold Affusion, has given [c] an account of a man labouring under tetanus so chronic, as to last forty-two days; and who, in this time, drank one hundred and ten bottles of port (so that he got something by his tetanus); and yet not the least approach to intoxication occurred; and he recovered perfectly. Certainly one hundred and ten bottles of port, in forty-two days, was very good allowance; and, I should think, made him pass his time pleasantly. There is also, in the same paper, an account of a horse labouring under tetanus; which, during the disease, drank as much port-wine as he was worth. I do not know his value; but his owner was so fond of him, that he allowed him port-wine; and he recovered, after drinking as much as his original cost. In the chronic form of the disease, therefore, we ought to support the patient as well as possible; and wine is highly serviceable.

[a] "Transactions of the Medical and Physical Society of Calcutta."

[b] "Library of Medicine"; Volume 2; Page 242.

[c] In a paper published in the "Transactions of the London Medical Society."

CHAPTER XIII.

HYDROPHOBIA.

SECTION I.—SYMPTOMS AND PROGRESS.

Dysphagia.—I NOW proceed to another disease, bearing a certain resemblance in some of its symptoms to tetanus, of which we have just spoken; —I mean hydrophobia (ὑδωρ, *water*; and φοβεω, *to fear*);—so named because it is imagined there is a fear to plunge into, to swallow, or even to look at water. But although the disease has its name from a dread of water, yet this dread of swallowing water, as well as other things, is seen in certain common nervous and other affections. People will take an antipathy to all liquids; and sometimes, in common sore-throat, there is such a spasmodic disposition in the throat, that the attempt to swallow excites great irritation; and the recollection of it excites fear at the very sight of water; while the attempt to drink it is terrific. On the other hand, the fear of water,—the fear of swallowing, is not universal in hydrophobia. Persons sometimes swallow very well in hydrophobia, and put their hands into cold water[a]; dogs will swim across a stream; and some persons, it is said, drink quite well to the very last. I believe I have seen this occurrence myself.

In many cases of this disease, there is as great difficulty in swallowing *solids* as *liquids*; an instance of which is published by Dr. Marcet, in the first volume of the "Medico-Chirurgical Transactions."[b] Still, in this disease, it must be allowed that it is most usual for a person to have a fear of swallowing, touching, seeing, or hearing the sound of liquids. Some years ago, there was a patient in St. Thomas's Hospital, labouring under this disease; and the circumstance of one of the dressers who sat up with him making water within his hearing, threw the boy into a violent agitation. But the dread of drinking, and of touching water, is only a symptom; and there can be no doubt that even though it never happened, death would equally occur.

Extreme Sensibility of the Surface.—The real character of the disease, is to be taken from the circumstance of the extreme sensibility of the surface of the body, and the extreme sensibility of the nerves of deglutition and respiration; so that any attempt at swallowing, the application of cold air to the surface, the application to the surface of a drop of fluid, whether warm or cold, if made suddenly (as by sprinkling);—even the circumstance of an insect crawling on the face or hands, or the slightest agitation of the

[a] See Pages 712, 713, and 714.

[b] Page 132. The following extracts illustrate the fact mentioned above:—"He swallowed his bolus before us with great determination, though not without much pain and difficulty." (Page 141.) "He took his bolus before us, with great self-command; but, in the act of swallowing, he had a convulsive paroxysm, very much resembling those which occur in tetanus;—his body being drawn backwards, with great violence." (Page 145.)

bed-clothes; any of these things will produce a catching of the breath,—a sudden inspiration;—just such as we experience when we step into a cold-bath. The diaphragm descends;—just as if cold water were thrown upon us, or the wind blew suddenly upon us. Contemporaneously with the descent of the diaphragm, there is a violent spasm about the larynx and pharynx; so that swallowing is impossible, and so likewise is breathing. The diaphragm will descend; but a spasm of the glottis occurs, and the air will not go down. The glottis will relax again, and a number of successive closures take place; and, at the same moment, from the fear of being choked, there is extreme anguish, and extreme terror.

Intolerance of Noise and Light.—Even noise and light will produce this. Not merely the circumstance of cold air blowing on the patient, but the mere draught occasioned by a pocket-handkerchief, or by waving the hand,—so as to cause the air to come with full force against him,—may produce this violent spasm; and not only so, but the mere reflection of a looking-glass will have the same effect. If a looking-glass be allowed to play before the eyes, or if a loud noise be suddenly made, this descent of the diaphragm, and this closure of the glottis, immediately take place. Bright colours will have the same effect as the use of a looking-glass;—at least when the disease has become very severe; nay, at length,—from the recollection of what has been suffered,—the very mention of swallowing will produce extreme agitation.

Every muscular effort, of whatever kind, has the same tendency; and if the patient be compelled to make an effort to swallow, when he really cannot, it will throw him, not only into agitation, but into absolute convulsions. There is extreme anxiety of mind and despondency; and the patient looks around him, with an eye of suspicion. He has a great aversion to strangers; and the countenance is expressive of his anxiety and distress. We notice, in this disease, very frequent sighing. Breathing is not carried on in a regular uniform manner, but is altered. The patient is extremely restless; tosses about his hands; rolls his eyes; and whatever he attempts to do, he overdoes. Such is his agitation, that if he attempt to rise, he makes more effort than is necessary; or if he attempt to take any thing into his hand, or to swallow, he dashes the cup to his mouth, and gets it all down at once.

Irritability of Mind and Body.—There is also such extreme irritability, both of body and mind, that violent fits of passion are induced; and these are more particularly observed, on a proposition being made to swallow; and, in their fury, patients will sometimes bite. Not that they will bite like a mad dog; but the temper is so irritable, in this disease, that they will bite a stranger. This I have seen myself; but I believe it depends, very much, upon the natural temper of the individual. The mind is often so strong, in the midst of all this, that at the moment they have attempted to bite or strike, they will apologize, instantly regret it, and endeavour to make all the amends they can. They are conscious of their morbid irritability; and they beg others to get out of the way, lest they should injure them. They will make very great efforts to swallow, in order to please bystanders; but, for the most part, after declaring they will swallow, or after taking up the cup into their hands, as soon as they have got it near their mouth, they turn their heads away, and declare it is impossible. Sometimes, again, they have more firmness of mind. They will open their mouths; put the liquid into it; and then a regular paroxysm of the disease will occur. They are seen sometimes so to command themselves, that they will not only drink, but even wash their hands. I had under my care a patient, who

'to please me) washed his hands, stirred the water about, and played with it.

Symptoms in the Latter Stage.—Those paroxysms which I have mentioned as coming on in the disease, sometimes take place without any external excitement. When the disease has become more violent, these paroxysms occur, from time to time, without any external circumstance having occurred to provoke them. There is, for the most part, sleeplessness; or, if the patient do drop asleep, he wakes in great agitation, and is sometimes delirious. The delirium, when it does occur, is generally of a peculiar nature; and the patient will talk violently of the past, as though it were present; and yet, in a moment, he will become calm and perfectly rational. At last, however, there is sometimes complete delirium. The eyes, towards the close, do not roll; but become red and glassy. The pupils are dilated; and the mouth is very clammy. There is extreme thirst; and, from the clammy nature of the secretion, the patient suffers as much as if his mouth were dry. It very frequently makes the sufferers cry out for something to relieve their thirst; and yet, when fluid is brought, for the most part they cannot take it. From the clamminess of the mouth, they are continually hawking, and scraping their tongue against their teeth; and, in the midst of their rage, they will spit at those about them. They will sometimes put their fingers into their mouth, and pull out a very viscid secretion. The pulse is very rapid and irregular; and during their agitation it is particularly so. It is for the most part feeble at last; but it is constantly quick, even when respiration is slow. Patients generally, at last, sink very rapidly. We are surprised, on our visit, to find them dead.

Duration.—The duration of this affection may be from rather less than twenty-four hours, to six or seven days; but the patient generally dies in two or three days; or, at the utmost, on the fourth day from the first appearance of the true signs of hydrophobia;—the dread, the difficulty of swallowing, and the extreme sensibility of the surface. I had two patients with this disease;—little girls; who died in less than twenty-four hours from the symptoms being first observed. In two American cases which I have read, (one occurring in a subject under four years of age, and the other in a person aged seventy-three,) both patients died on the sixth or seventh day;—shewing that the duration of the disease has not any relation to the age of the patient. I might have imagined, from having had two patients, under ten years of age, die in less than twenty-four hours, that the young die soonest; but here is a case of a child and an old man, both of whom lingered the same length of time; and I have found this verified in other cases. Old persons will sometimes die very quickly; and young ones will sometimes live as long as I have stated. This is the general character of the disease.

Order in which the Symptoms Appear.—The first symptoms in hydrophobia, are uneasiness or feverishness, a general feeling of indisposition, and dizziness in the head; together with chilliness and flushes; and these symptoms may continue some days. Dr. Parry furnishes instances, where these symptoms lasted five or six days; and I believe they may go off entirely;—just as other specific diseases (diseases from morbid poison) are seen to do. We all know, in the case of gonorrhœa, that a person will have every trait of the affection one morning, or one evening, and it will entirely go away; although he knows he has been where he was very likely to contract the disease. Continued fever will thus go off; so I believe will the plague; and ague certainly will do so. A person who has been exposed to malaria, will have merely a shivering; which will go away and

not return. I believe it is just the same in hydrophobia. I saw two little girls (sisters) who were bitten by a dog at the same moment, and in the same place,—the face. One of them died; and the sister had exactly the symptoms I have described [a], as ushering in hydrophobia; but, after lasting four or five days, they ceased; and she did perfectly well.

After these symptoms have continued some little time, perhaps a couple of days, suddenly the person is surprised by a difficulty in swallowing liquids; and finds a spasm of the throat, and an impossibility of swallowing. At the same moment, perhaps, he has great anxiety and great terror; or perhaps a draught of wind suddenly blows upon him; his breath catches; and he wonders (as do also those around him) what is the matter. That was the case in a boy whom I once saw. The first symptom of his disease, was induced by a draught from a door. A person went into his bed-room, in the morning; and, on opening the door, the draught occasioned by it came full upon him; and he was observed to go almost into fits. The sudden impression of the air took away his breath; and agitated him to this violent degree.

Sometimes Remittent.—In the course of the disease, there is sometimes a remission. The disease does not *necessarily* go on in an uniform tenor. In a case published by Dr. Satterley, one of the physicians to the Middlesex hospital, the patient had fits of biting; and between these he was perfectly well;—even took warm fluids, and had a sound sleep. The disease is not so continuous but that, in some persons, there will be a decided remission; so that the patient can absolutely swallow liquids very well, and will go into a quiet and sound sleep. Some say (but one can hardly believe it) that there are absolute *intermissions*; that the disease altogether,—every symptom of it,—will sometimes cease for a time; and will even become *periodical*! There are cases of remission and recovery mentioned, as having occurred in dogs; but it is doubtful whether recovery ever took place in the human subject.

Peculiar Symptoms.—Now and then peculiar symptoms arise;—such as are not observed in ordinary cases. One case of this kind occurred at Guy's Hospital; the particulars of which were published by Dr. Marcet, in the first volume of the "Medico-Chirurgical Transactions." [b] From some disturbance of the brain, or of the olfactory nerves, the patient complained of an intolerable stench around him. [c] This is sometimes observed in ague. In some cases, (from irritation, I presume, in another part of the nervous system,) there has been an erection of the penis; and an oozing from the mouth of the urethra. These are all accidental circumstances.

Dysphagia not always Present.—Sometimes, in this disease, there is no inability to swallow either liquids or solids. There is a mere tremor;—a mere agitation; and that not very considerable; together with great debility, rapid pulse, and extreme restlessness. This has been said to occur, chiefly, when a cat has inflicted the bite. Dr. Fothergill mentions this circumstance, in the fifth volume of the "Medical Observations and Enquiries"; but it is not universal; for I saw a man who had been bitten by a mad cat, and who swallowed perfectly well. I saw him eat a basin (holding a pint) full of bread and milk, an hour or two before he died. All his symptoms were rapid pulse, extreme restlessness, and great agitation. He thought nothing about the cat;—his mind seemed at ease on that subject; and he sat up, if desired. During the whole of the case, there was no delirium whatever. The man died, I believe, on the second

[a] See Page 713.
[b] See Note (b) to Page 711.
[c] "Medico-Chirurgical Transactions"; Volume 1; Page 152.

ay after the commencement of the symptoms; and a short time after I aw him. He was not my patient; but I saw him in the wards of the ospital.[a] He had been bitten, six weeks before; but had forgotten it;—he friends alone remembering the circumstance. A case is published by)r. A. T. Thomson, in the "Medico-Chirurgical Transactions"; where ydrophobia, well formed in every respect, arose from the bite of a cat.[b]

All Ages Liable to the Disease.—This is a disease which affects children s well as adults. We seldom hear of women labouring under it; but hildren of both sexes, and men more frequently than either, become its ictims. I have already cited two cases, from the American Philosophical 'ransactions, where the disease occurred in Patients, one of whom was a hild four years of age, and the other a man who had attained his seventy-hird year[c]; so that we have here the extremes of life. Infants may not be xposed to a rabid animal; and the reason it attacks men more than fe-nales, is because the former are so much more out of doors than the latter.)r. Parry mentions a child, only three years and a half old, having the isease.

SECTION II.—PATHOLOGY AND CAUSES.

Morbid Appearances.—After death, there is sometimes found a fulness f the vessels of the head; and sometimes marks of decided inflammation, ot only in the head, but within the spine. Sometimes there is an effusion f *serum*, either pale or bloody; and sometimes *lymph* has been found ffused, particularly about the base of the brain. In the case of an old an who died without suspecting the nature of his affection, and the par-culars of which are contained in the "Medical Gazette"[d], there was in-ammation of the whole of the base of the brain, of the spinal cord, the erebellum, the "cruri cerebri", and the two "thalami nervorum opti-orum"; and the "corpora striata" were redder than natural. This was n *inflammatory* case of hydrophobia; but in other cases no such thing as been discovered. I have seen patients opened, where there was no ffusion, or redness, or any thing that would lead the best anatomist to say, at the brain and spinal marrow were not perfectly healthy;—just as is the ase in tetanus.

[a] St. Thomas's.

[b] Volume 13; Page 298.

[c] See Page 713.

[d] Volume 3; Pages 123 and 124; No. 6; December 27, 1828. The morbid ppearances, as there detailed, were the llowing:—"On opening the chest, the eart was observed to be free from disease, ith rather more water in the pericardium an natural; the lungs were completely orged with grumous blood, and the pleura dhered on the right side. On removing e cranium (which was remarkably thin), nd cutting the substance of the brain, nu-erous red spots presented themselves in e medullary portion; there was about a ble-spoonful of water in each ventricle; e plexus choroides was turgid; the cor-ora striata, thalami, and basis of the brain ere everywhere preternaturally injected; nd the cerebellum, and crura cerebri and erebelli, in a high state of inflammation. On removing the spinous process of the vertebra, the whole cord was considerably inflamed; and opposite the two last cervical and dorsal vertebræ, the cellular substance was studded with dark patches of coagulated blood, the theca vertebralis thickened, and the cord in an active state of inflammation. The larynx and pharynx bore not the slightest vestige of disease. The preparation of the cord is deposited in the Museum of the London University. The post-mortem examination of this case, tends to prove the correctness of Professor Thompson's theory of the proximate cause and seat of this afflicting malady; and the plate accompanying a case recorded by him in the thirteenth volume of the "Medico-Chirurgical Transactions" [Page 298], gives a faithful delineation of the state in which the spinal cord was found in this case."—For the previous history of this case, see Note to Page 718.

Sometimes red spots are found in the fauces, larynx, trachea, and bronchia; and likewise in the stomach. In a great number of cases, there is considerable redness of the glottis and epiglottis; and great congestion of the lungs. The latter circumstance would be expected, *à priori*; in consequence of the difficulty of breathing, and the spasm which takes place and disturbs their functions. Sometimes, however, nothing has been found from head to foot; and Magendie says, that sometimes he has opened dogs and found nothing. I mentioned, that red spots are sometimes found in the stomach; but sometimes there are none at all. It appears, therefore, that the disease (like tetanus[a]) is not necessarily of an inflammatory nature. Now and then signs of inflammation may be found; but in many cases they are not; and it is clear, that the nature of the disease is not essentially inflammatory.

Nature of Hydrophobia.—Some gentlemen, from observing redness and congestion about the air-passages, and others from observing similar appearances in the alimentary canal, have ascribed hydrophobia to a morbid state of these parts; but I think the extreme sensibility of the surface of the body, the extreme agitation on attempting any muscular effort, the convulsive movements that take place in swallowing, the spasmodic catching of the breath,—even on touching the lips with liquid, or the application of cold air to the surface,—the anguish and irritability of the mind (anguish not arising from *pain*), the great suspicion, and at last delirium, all shew something more than an affection of the lungs or stomach. Such symptoms as these indicate an affection of the nervous system. In tetanus there is no morbid irritability either of body or of mind.[b] There is only a spasm of the voluntary muscles; and this, in all probability, arises from an affection of the origin (or termination) of the nerves, in the head or the spinal marrow. Such a state, I said, is not necessarily inflammatory; though occasionally inflammatory signs are found.[a] But in hydrophobia there is no irritation of the voluntary muscles in general; but a morbid sensibility of the nerves of sense;—particularly those of touch, and of those running to the muscles of deglutition and respiration. In addition to this, the mind is altogether in a state of suspicion and irritability;—shewing that it is the centre of the nervous system, that is particularly affected. What it is exactly, it is impossible for me to say; but so far we may trace it. One cannot attribute it to the nerves; or to that part of the brain connected with the nerves of deglutition and respiration; because we see extreme suspicion of mind,—extreme mental anguish; and we see that many parts of the nervous system are affected.[c]

The blood, in this disease, is not buffed; neither is the urine high coloured. On the contrary, it is pale. The tongue is perfectly clean; but the mouth is clammy, and is filled with viscid mucus. The pulse is not full. It is not at all an inflammatory pulse; but it is, nevertheless, rapid and irregular;—frequently very much so. I may mention, that many

[a] See Page 702.

[b] See Page 705.

[c] The disease seems to begin in the pharynx, and to spread through the body. The pharyngitis is rather a *consequence* than a *cause* of it. Some think it arises from turgescence of the spinal marrow; but that may be a consequence of the general convulsions. Rush places the cause in the stomach and bowels; Morgagni in the brain; and it has also been placed in the bronchi; and attributed to an exanthematous disease under the tongue. Some have maintained, that it is not a specific disease; but a variety of tetanus in men, and hysteria in women; but the symptoms are different from both. The patient often dies of a universal convulsion, or a spasm of the diaphragm or respiratory muscles, or nervous apoplexy from exhaustion. The *organic* disease appears to be the result of the *functional*.—*Dr. Fletcher.*

ersons have not found any inflammation whatever; but there have been ases where local inflammation has existed, particularly at the base of the rain. The thirst in the disease does not arise from an inflammatory state, r from feverishness; but is either a part of the disease, arising from the isturbance of the nerves, or from the clammy secretion of the mouth. When all the parts of the mouth are dry, or are covered with only a viscid ecretion, and not moistened by a thin fluid, thirst is the necessary consequence. There is, in general, only morbid heat from time to time, when ne patient is particularly excited. I will not pretend to say what the tate of the nervous system is;—any more than in tetanus.[a] We may mit the disease to the nervous system; particularly to the nerves of touch, nd the nerves running to the muscles of deglutition and respiration; ogether with general excitement of the brain itself; but what the particular tate is, it is impossible to say.

Is it Contagious?—When speaking of contagion in general, I mentioned nat the contagiousness of this disease had been denied.[b] There was a urgeon, (I think at Brighton, though I have not the pleasure of knowing is name,) who lately denied that this was a contagious disease; and, from is conviction that his opinion was correct, he inoculated himself with me of the saliva from the rabid animal; and did so with perfect impunity. So, perhaps, he might have exposed himself, with impunity, to ne danger of contracting syphilis or gonorrhœa; but that would be no roof that there was no such contagion. However, unfortunately there is o novelty in this denial of contagion. Gerard also denied it; and there ould be no other reason for denying it, than a desire to be peculiar. De oe denied the contagion of plague; but he was soon convinced of his rror.[c] I mentioned that two students, at Paris, denied the contagion of

[a] See Page 705.

[b] See Page 346.

[c] I could give several instances, within ne compass of my own knowledge, where, hen a servant had been taken sick, and ne family had either time to send him out r to retire from the house and leave the ck person, they were preserved; whereas hen, upon one or more sickening in a faily, the house has been shut up, the whole mily have perished, and the bearers have een obliged to go in to fetch out the ead bodies;—not being able to bring them the door; and at last none left to do it. his put it out of the question to me, that ne calamity was spread by infection; that to say, by some certain steams or fumes which the physicians call "effluvia"), by ne breath, or by the sweat, or by the tench of the sores of the sick persons, or ome other way, perhaps beyond even the each of the physicians themselves; which effluvia affected the sound, who came within certain distances of the sick;—immediately penetrating the vital parts of the said sound ersons, putting their blood into an immediate ferment, and agitating their spirits to hat degree which it was found they were gitated; and so those newly infected persons communicated it, in the same manner, o others: and this I shall give some instances of, that cannot but convince those who seriously consider it. And I cannot but with some wonder find some people, now the contagion is over, talk of its being an immediate stroke from heaven, without the agency of means;—having commission to strike this and that particular person, and none other; which I look upon with contempt, as the effect of manifest ignorance and enthusiasm: likewise the opinion of others, who talk of infection being carried on by the air only;—by carrying with it vast numbers of insects, and invisible creatures; who enter into the body with the breath, or even at the pores with the air; and these generate or emit most acute poisons, or poisonous ova (or eggs); which mingle themselves with the blood, and so infect the body;—a discourse full of learned simplicity, and manifested to be so by universal experience. I have so many examples fresh in my memory, to convince me of it, that I think none can resist their evidence; and I must be allowed to believe, that no one in this whole nation ever received the sickness or infection, but who received it in the ordinary way of infection from somebody, or the clothes, or touch, or stench of somebody, that was infected before. The manner of its first coming to London proves this also;—namely, by goods brought over from Holland, and brought thither from the Levant; the first breaking of it out in Long Acre, where those goods were carried and first opened; its spread-

syphilis; and inoculated themselves with the virus.[a] Both of them became affected with the disease; and one committed suicide. If the disease were an imaginary one, why should it attack children, who have never heard of it? Two little children, whom I attended in this disease, one a year after the other, could have had no idea of it; and they died, perfectly unconscious of what was the matter with them. Adults have died of the affection, without recollecting that they had been bitten. The thought of the disease has not preyed on their spirits in the least; but they have been suddenly surprised by it; and it has never occurred to them what the disease was, or that they had formerly been bitten. Mr. Godrich (of Brompton) mentions the case of an old man, sixty years of age, who had been bitten and died of the disease; but who was unconscious of its nature to the last.[b]

ing from that house to other houses, by the unwary conversing with those who were sick; the infecting the parish officers who were employed about persons dead; and the like. These are known authorities for this 'great foundation-point;—that it went on and proceeded from person to person, and from house to house, and no otherwise. In the first house that was infected, there died four persons; a neighbour, hearing the mistress of the first house was sick, went to visit her; went home, and gave the distemper to her family; and died, and all her household. A minister called to pray with the first sick person in the second house, was said to sicken immediately and die; with several more in his house. Then the physicians began to consider; for they did not at first dream of a general contagion; but, being sent to inspect the bodies, they assured the people that it was neither more or less than the plague, with all its terrifying particulars; and that it threatened a universal infection;—so many people having already conversed with the sick or distempered, and having (as might be supposed) received infection from them, that it would be impossible to put a stop to it.

The people of London thought themselves so plague-free now, [when the disease began to decline,] that they were past all admonitions. They seemed to depend upon it, that the air was restored; and that the air was like a man that had had the small-pox;—not capable of being infected again. This revived the notion, that the infection was all in the air;—that there was no such thing as contagion from the sick people to the sound; and so strongly did this whim prevail among the people, that they all ran together promiscuously,—sick and well. Not the Mahometans, who—prepossessed with the principle of predestination—value nothing of contagion, let it be what it will, could be more obstinate than the people of London. They that were perfectly sound, and came out of the wholesome air (as we call it) into the city, made nothing of going into the same houses and chambers, nay, even into the same beds, with those that had the distemper upon them, and were not recovered. Some paid for their audacious boldness with the price of their lives. The physicians had more work than ever; only their patients generally recovered. There were more people infected and fell sick now, when there did not die above a thousand or twelve hundred a week, than when there died five or six thousand a week;—so entirely negligent were the people, in the great and dangerous case of health and infection.—"*Journal of the Plague-Year* (1655). *By Daniel Defoe.*" *Edition published in the "Pulteney Library"; Pages* 27, 66, 67, *and* 78.

[a] See Page 346.

[b] On Thursday morning, November 25 [1828], I was called up, at seven o'clock, to see a man who (I understood) was exceedingly ill, and waiting in the surgery very impatiently for my arrival. I found my patient (Mr. Barham) a fine-looking old man, about sixty; labouring, at intervals of about five minutes, under strong spasmodic paroxysms, affecting the muscles concerned in breathing and deglutition. There was a wildness and an impatience depicted in his countenance, totally different from any thing I had ever observed in other spasmodic affections. His bowels were open, tongue clean, skin moist, pulse full, and a little accelerated. I took away twenty ounces of blood, and prescribed a mixture containing half a drachm of laudanum for a dose every hour, until I should see him again. He walked home, half a mile from my house (Gloucester Road, Old Brompton); and left me ruminating on the possible cause of so much mischief occurring suddenly in a fine healthy subject. At ten, a message was sent that he was much worse, and requesting me to call as soon as possible. He received me very tranquilly: and said he was very glad I had come to see him, for he was very ill. His symptoms were now more distressing than when I first saw him; he looked wildly and suspiciously at every one entering his apartment; and his breathing was accompanied by a short convulsive sobbing. On looking at his medicine, I perceived that he had taken none; and, on my expressing my surprise, he as-

Two cases are mentioned by Dr. Parry, in which the bite was forgotten; and another case in which the bite was spoken of with the greatest indifference. In the last case I had, the boy knew that he was bitten; but he thought nothing of it; and never seemed to attach the least importance to it. That there is such a disease, that its character is so peculiar, and that it unquestionably arises from a morbid poison, cannot admit of a moment's doubt. It is also to be remembered, that many persons who are bitten, and fancy they will have the disease, never have it at all. I have seen many persons bitten by dogs, wash the parts, take physic, have the parts cut out, and do all they could to torment themselves into the dis-

sured me that it was impossible for him to swallow a single drop; as the attempt had been followed by violent spasms; and produced so much distress, that he had desisted. At this period, no one had the slightest idea of the origin of his malady. I poured out some medicine into a teacup; the very act of which produced much excitement and alarm. My first impression as to the true nature of his disease, arose at this period; from the circumstance of his requiring a teaspoon, with which he endeavoured to take some of the medicine. The attempt produced much excitement and alarm; and, after two or three painful efforts at deglutition, with one desperate effort he swallowed a tea-spoonful; threw away the spoon; and begged, unless I wished to destroy him, that he might have nothing more to swallow. I now left his room; and inquired of a bystander whether any thing particular had occurred to him within the last few weeks. On recollection she said—"About a month since, late at night, a strange dog came into the premises, and fought with his own dog. He got out of bed to separate them; and the strange dog bit him, in two places, on the left arm and hand; and bit a puppy, which died (about a fortnight afterwards) in a strange way, which was thought to be some kind of a fit." To ascertain if this occurrence had produced any effect on his mind, while again bleeding him, I said—"You have been in the wars, Sir; and had your hand and arm torn: how did it occur?" "O!" said he, carelessly, "that was done by a dog a long time since; but it healed." The circumstance was never again mentioned to him; and he died in total ignorance of the cause of his malady. The wounds were perfectly cicatrized; nor was there going on the least action indicative of recent absorption. He bore the bleeding pretty quietly. Forty ounces were removed; and, on cooling, presented strong marks of inflammation. He was ordered four minims of hydrocyanic acid, every hour, in a little water.

Twelve o'clock.—With much difficulty, he has taken two doses of the acid; pulse full and hard, 110. Thirty ounces more blood were removed.

Three o'clock.—Has taken two more doses; complains of a dreadful sense of suffocation, and implores that nothing more may be given him. Pulse full, and beating at 120 to 130. The acid was ordered to be continued.

Eight o'clock.—Pulse full and hard. He has taken in all twenty-four minims of the acid; but so painfully distressing has the deglutition now become, that all attempts at repeating his medicine are discontinued. He was again bled to thirty ounces. During the bleeding, he looked wildly at the basin, and requested that no more might be spilt (a drop or two had fallen);—repeating frequently, in great agitation, as the blood was running—"Take care! take care!" Between two and three o'clock, next morning, my assistant (Mr. Davies) visited him. He found him tolerably passive, but observing every movement with intense anxiety. Pulse full and hard; face flushed; eyes denoting cerebral irritation. He had been at times outrageous. On its being intimated that bleeding was again necessary, a paroxysm more intense than any preceding, came on; and with great effort he submitted. As the blood flowed, he became more and more alarmed; till at length he became quite unmanageable; he raged violently at his nephew, who was holding the basin: and ordered it, peremptorily, to be taken away. Thirty or forty ounces were taken away. It was found necessary to put on the straitwaistcoat. About four o'clock, Mr. Davies wished him to take more of his medicine. He said—"I can take no more"; and, on Mr. D.'s reaching the bottle to put out a few drops, he became violently agitated, threw himself from side to side; and, as well as the incessant spasmodic sobbings would allow, he begged that not one more drop of any thing might be offered him, and that the bottle might be taken from his sight. He did not become tranquillized until its removal. He lingered on till ten (a. m.), in the same state; a few minutes before which he insisted on getting up, and walked a short way down his garden; returned, lay down on his bed, and died.—"*London Medical Gazette*"; *Volume* 3; *Pages* 123 *and* 124. (*No.* 56; *December* 27, 1828.)

ease; and yet they have never had it. The character of the disease is too plain, to allow of any doubt as to its existence.

Exciting Cause.—The exciting cause of the disease, however, is well known. It is a secretion from the mouth of a rabid animal. It is said to be the *saliva* which is poisonous; and it *may* be that fluid; but I do not know that it is *proved* to be the saliva, rather than the mucus. The saliva of the human subject is equally poisonous with that of the brute; or, at least, it is *also* poisonous; for Magendie says, that he inserted the secretion from the mouth of a rabid human being (that is to say, a person labouring under hydrophobia) into dogs; and they became the subjects of the disease.

Dr. Hertwig says, that he inoculated fifty-nine dogs with diseased secretion from hydrophobic dogs; and that only fourteen took the disease. He states, that he made experiments with the blood; and found that it was equally poisonous with the secretion of the mouth. He says the saliva will act, in producing the disease, at all periods of the affection; and in twenty-four hours after death, if it be taken from the body, it will still give rise to it; but he says, that if the poison be swallowed, it is perfectly inert. The poison of serpents, we are told, may be swallowed with impunity.

Period of Incubation.—After the poison has been applied, there is usually an interval before the appearance of the disease, of from one or two weeks, to three months. I believe the average interval is from one to two months. The disease is said to have appeared, sometimes, in five or six days; and a case was mentioned, in which the affection appeared to come on the next day;—at least, it was so said. In other cases, the disease has not appeared for nine or twelve months. There is a case mentioned in the "Philosophical Transactions", where the affection did not come on for nineteen months. Dr. Bardsley, in the "Literary and Philosophical Transactions of Manchester", has furnished an account of a case where the disease did not occur till twelve years after the bite. The case has given rise to a great deal of doubt. In the first place, we may almost doubt whether the disease was genuine; but, allowing that it was, then there is a doubt whether or not it arose from the morbific poison. As the wound had been inflicted twelve years before, there is great difficulty in supposing that the poison had existed so long; and, on the other hand, if it was not owing to this bite, it must have sprung up *de novo*. Dr. Parry, who has written on Cases of Tetanus and Rabies Contagiosa, thinks the case was not genuine; and he also considers that the shortest well-authenticated interval, is two or three days: but I have reason to believe it has occurred at a shorter interval. I also think, that Dr. Parry is wrong on another point; for he states that he can find on record only thirty-eight well-authenticated cases of hydrophobia. Now, in my limited period of practice, I have seen six or eight cases in London; and, during the same period, there have been others which I did not see. Two of these cases occurred in private practice; and four or five in the hospital; and, having seen these myself, I must think the disease is far more frequent than Dr. Parry intimates. The fact was, Dr. Parry saw a great number of cases *called* "hydrophobia", that were not instances of the disease; and he was too scrupulous in allowing that cases which he found recorded in books were genuine hydrophobia; and therefore he put too many in the spurious list. The interval, however, is various. It is said to be about the same in the dog as in the human subject. Among Lord Fitzwilliam's hounds, in Yorkshire, the interval varied from six weeks to six months. His pack

were bitten by a rabid animal; and the disease appeared at various intervals, from six weeks to six months.

The Poison must be Inserted into a Wound.—Persons usually escape, if the poison be not inserted into a wound. Cælius Aurelianus mentions the case of a woman, who was seized with the disease three days after having eaten some game which had been sent to her; and which was supposed to contain hydrophobic poison, in consequence of having been killed by a mad dog. If the case was true, there was probably a crack in her lips. Dr. Bardsley mentions a case, which occurred (at the common interval) in a shepherd, who had only been licked by a dog. His dog was rabid; but then shepherds continually have cracks in their hands; and nothing is more likely, than that there was a crack in some part of his hand.

Communicable by an Animal not known to be Mad.—It is possible for the brute to give the disease to the human subject, when the animal is not known to be mad. Many cases have occurred of persons being bitten by dogs, and becoming mad, though the dog was not, till afterwards, supposed to be mad. The disease must have existed at the time, or the dog could not have communicated it; but it exhibited no *signs* of madness,—so as to be considered in that state. It has been imagined, that all bites of animals have something venomous in them; and we are told that many bites of brutes have caused signs of hydrophobia, epilepsy, and even death; but, in all probability, these were nervous symptoms, induced by fear.

Many are not Attacked when Bit by a Rabid Dog.—On the other hand, most persons bitten by rabid animals do *not* suffer hydrophobia. Dr. J. Hunter mentions, that twenty-one persons were bitten by a dog; and among them only one became affected with the disease; although none of them took any steps to prevent it. Dr. Vaughan mentions, that between twenty and thirty persons were bitten by a mad dog. Some did nothing; others took the "Ormskirk medicine"[a], and had a dip in the sea; and yet, of this number, only one had the disease. Dr. Parry mentions, that several sheep and dogs were bitten; and that, among these, not one sheep had the disease, and only two dogs; and I may remark, that one of these dogs was bitten before the sheep, and the other just afterwards. I had a case of this disease in a little girl, who was standing at her father's door, when a dog snapped at her face, and did the same at another sister; and then passed on. At the expiration of six weeks, or two months, the sister who was bitten second had hydrophobia, and died[b]; but the other sister never had the disease, or the premonitory symptoms went off; and she may be alive now. We might imagine, that the girl *first* bitten would have been most likely to suffer the disease; because the teeth must have been covered with secretion; however, it was the *second* that died from the disease. Nothing, I understand, was done in this case; except that nitrate of silver was applied.

Much depends upon whether the part is bare or not. Hence we find that, by far most frequently, persons who have hydrophobia through a bite, have had the wound inflicted on the hands or face. In three cases that I had under my care, in private practice, one patient was bitten on the face, and two on the hands. If the part be not bare, the tooth is wiped as it passes through the clothes; and therefore no fluid is conveyed with the bite. It is a bite on the bare surface, that is generally productive of the disease. Some persons have so little disposition to the affection, that not-

[a] See Page 725. [b] See Page 725.

withstanding they are bitten on bare parts, and no precaution is taken, they do not suffer the disease; and sometimes persons will not experience it, till they are thrown out of health; or till they are frightened; or till they catch cold; or till something happens to disturb the constitution, and then it appears. This is precisely what happens in the plague, in ague, and in other affections.[a]

The Wound generally Heals before the Attack.—The wound is generally healed when the disease appears; and, as I stated formerly [b], it is sometimes entirely forgotten. Some say, that if there be a wound, it becomes livid when the disease appears; or that it looks yellowish; and that sometimes it re-opens. Sometimes, when it appears, there is pain and numbness in the bitten part, extending along the course of the nerves. This was the case in an instance I had under my care. The boy had been bitten in the hand, and the part had been cut out entirely; but pain was felt along the nerves, and extended to the neck, at the time that the disease began. It was curious that there was no pain in the wound, or in the hand, or in the upper arm. More frequently than not, it is along the course of the *nerves*, and not along the course of the *blood-vessels*, that the pain has been observed.

Various Animals Liable to it.—The animal which most commonly gives the disease, is the dog; but other brutes will have it; and probably *all* of them will imbibe it, and also communicate it. The wolf, the fox, and the dog, are all of the canine species; and they are well known to give and receive it; and they appear to *originate* it likewise;—that is, there is every reason to believe it will originate in them;—unless the poison may remain dormant as long as some people imagine.

Cause, when produced De Novo.—Unless it can exist in a dormant state for a long time, there is every probability that hydrophobia is produced *de novo*.[c] The cause of it, if it *can* arise *de novo*, is not well known. It is not putrid meat; for the Caffres, in Africa, feed all their dogs on putrid flesh; neither is it *salt* meat; neither is it a want of drink. The disease is unknown in Syria [d]; and, according to Dr. Parry, in the interior of the Cape of Good Hope, where there is plenty of heat; and, in some instances, plenty of putrid meat.[e] It is said never to be known in South America; but then two-thirds of the pups there die of "the *distemper*"; and some persons contend, that the distemper prevents the spontaneous occurrence of hydrophobia. I do not know whether that is correct.

SECTION III.—DIAGNOSIS.

Spurious Hydrophobia.—Spurious cases of nervous fever, or nervous irritability, are very different from these. If the case be spurious, the difficulty in swallowing generally occurs far too early after the bite. A certain period (usually some weeks) elapses between the bite, and the appear-

[a] See Page 358.
[b] See Page 719.
[c] See Page 720.
[d] Considering the heat of the summer, climate, and the thirst which the dogs [in Syria] then suffer, it seems strange that they are not subject to hydrophobia. Indeed, some distrust as to the popular ideas connected with that dreadful disease might be deduced from the fact, that hydrophobia is least known in the warmest climates. In Constantinople, cases of this disease sometimes occur, although they are exceedingly rare; but they become increasingly infrequent as we advance southward, and in Egypt are altogether unknown.—"*Pictorial History of Palestine*"; *Part* 17. ("*Physical History*"; *Chapter* 8; *Page* 357.)
[e] It has been attributed to the want of sexual intercourse.

ance of the disease; but where persons have a difficulty in swallowing from mere nervous terror, it generally begins at an early period. There is much too early delirium and general convulsions; the agitation of the mind arising from fear, brings on a degree of insanity.

In the spurious form, again, there is generally no catching of the respiratory organs. The great feature of this disease is the sudden inspiration, as though the patient were plunged into cold water; and this produced not only by an attempt at swallowing, by the sight of water, and by *speaking* of water, but by a breath of cold air, or the crawling of an insect upon the surface, or by any sudden impression. Patients who only *fancy* they have hydrophobia, have a difficulty of swallowing; but they forget to have a catching of the breath. They are not aware that that is a symptom. They only think of the difficulty of swallowing liquids; and therefore that symptom only arises. They are not conversant enough with the disease, to know another remarkable symptom; and therefore that never takes place; or if it do, it is only a simple local affection, producing irritation of the organs of respiration. So characteristic of the true disease is this sudden but deep inspiration, that when a paroxysm takes place during sleep, the person always awakes with a sudden deep inspiration. In the true disease, patients (in order to please their medical attendants) will make every possible attempt to swallow. They will say they cannot; but then they will try.[a] They will make the greatest efforts, and succeed to a certain length, and very frequently succeed entirely; whereas, if a person have the *fancied* disease, he concludes it is quite impossible. He will not *hear* of such a thing; and considers it almost an insult to have it supposed that he can swallow. In the fancied disease, the patient has not sufficient firmness of mind to make the attempt; and shudders at the very sight or name of liquid; whereas, in the true disease, patients will not only do this, but will even put their hands into cold water; and, as I have already said[b], will stir it about.

The people who *fancy* it, are not *surprised* by the disease;—it does not take them *suddenly*. They anticipate it; they look forward to it with a slow melancholy; and then, at last, they begin to find they cannot swallow; whereas, in the *true* disease, the symptoms come on suddenly. In the spurious affection, also, there are generally a variety of nervous symptoms; such as "globus hystericus", and other symptoms common to nervous derangement. There are not the usual effects, in the spurious disease, from the sudden impression of cold air, and the sprinkling of cold water. The former certainly does not produce the agitation, which it occasions in the true disease. It is to be remembered that the disease may be spurious, when a person has actually been bitten by a mad dog. He may have been bitten, and the poison may not have taken effect; and yet the person has agitation of mind, sufficient to produce difficulty of swallowing. It is probably in such cases, that persons have been said to recover from hydrophobia; but they have done no such thing. The persons have been bitten by a mad dog; and, for want of the practitioner being fully acquainted with the disease, he has not made a sufficiently accurate diagnosis; and has supposed that recovery has taken place from the disease.

From Distemper.—Dr. Jenner, in the first volume of the "Medico-Chirurgical Transactions"[c], lays down the diagnosis between hydrophobia and "the distemper." He says, that in the latter the eye is dull;—the dog looks stupid, and has an insatiable desire for water. "The distemper"

[a] See Page 719. [b] See Page 713. [c] Pages 267 and 268.

is a violent kind of catarrh; and we may therefore imagine that the eye will look heavy, and that the animal will become thirsty. The dog wanders from home; and, at length, he is disposed to be sluggish. But in hydrophobia, Dr. Jenner says, the eye of the dog is bright. He looks furious; and generally declines water. When a hydrophobic dog bites, it sneaks off directly, and is not found again; or, if found, it is dead. It goes away from the place, and is frequently afterwards found dead. It only gives a sneaking bite, and does not continue its attack like another dog; and after it has bitten an individual, it skulks into a corner, and then runs off. Hence it is, that many persons who have been exposed to hydrophobia, will say they were bitten by a strange dog, that was perhaps passing by;—that it attacked them without any provocation, and then made off.

Character of the Voice.—A German physician (Dr. Hertwig) says that the voice of the dog, in hydrophobia, is peculiar and pathognomic. He says that the bark of a dog labouring under the disease, ends in a howl; and the mouth at the time of barking is lifted up.

SECTION IV.—TREATMENT.

Excision of the Part.—With regard to the prevention of the disease, it is certainly our duty to cut out the bitten part as soon as possible; and, perhaps, at any time between the bite and the appearance of the disease. If the part cannot be cut out, I should think it proper to remove the whole limb. I am not sure that excision prevents the disease; because I know, that in many cases in which this has been done, the disease has occurred. A perfectly authenticated case was mentioned to me, in which not a moment was lost; for the person, the instant he was bitten, walked across the way to a surgeon, and had the part freely cut out; but, notwithstanding this, at the usual time he had the disease. It is, however, but common sense to do every thing we possibly can to prevent it; and excision is the most proper plan.

Cupping-Glasses.—Some have applied cupping-glasses; and this is a most ancient practice. It is mentioned by Celsus.[a] Dr. Parry also recommends it; and, still more recently, it has been recommended by Dr. Barry; who says that its use has been shewn, by experiments with various mineral and vegetable poisons. If these poisons be applied to a wound, and the poisonous effects begin, and the cupping-glasses be applied, in proportion as they act, the influence of the poison disappears. It is therefore recommended to us immediately to apply cupping-glasses to the wound; and to excite the part thoroughly;—so as, if possible, to draw out every particle of the diseased fluid. The stream, of course, will be towards the glass; and, as the fluid will be washed away, circulation and absorption will be prevented at the moment. Then we may cut the part out, and cup again. Whether it would be useful to adopt this plan, I cannot tell. If we could have a fair opportunity to cut the part out at once, I should think that would answer every purpose.

Caustics.—Caustics are by no means to be depended upon; but if they be used, they should be very strong;—such as caustic potash, or strong mineral acids; or (what perhaps is better than all) the actual cautery should be employed. I do not know (as I said before) that even excision is to be depended upon; but, after excision, in order to make what is considered certain *doubly* certain, caustic might be employed; or the actual

[a] Liber 5; Caput 37; Sectio 2.

cautery. Some have recommended the chlorides; and it is very possible that they may destroy the poison; but, even supposing they will, one cannot be sure that every particle of the poison has come into contact with a part of the solution of the chlorides. We are not sure that every particle has been decomposed; and therefore, if the chlorides be applied, still I should cut the part out in the first instance, and apply them afterwards. The use of these other things, in addition to excision, may be very great. If the part be one that cannot be cut out,—if the wound be so deep that it is impossible to cut it freely out, and the removal of the part by amputation be not possible, then use the actual cautery, or caustics. When the part is cut out, we are advised not to allow it to heal, but to keep it open; so as to produce a discharge for a length of time.[a] However, I know of plenty of cases where this has been done; and yet the disease appeared; though, certainly, one would fancy it was better than mere excision. After we have cut out the part, then we may apply caustic, or the actual cautery, and keep up a discharge.

Mercury.—In the way of prevention, we are strongly recommended to give mercury to ptyalism. A great many cases are recorded, where the disease never appeared after this was had recourse to; and it is stated that, in some instances in which mercury had not been employed, the disease appeared; but there are cases enough on record of the disease occurring, after mercury had been exhibited to the greatest extent. Not knowing what to do in the way of prevention, in the case of the sister of the little girl who died of hydrophobia[b] (two months having elapsed since the bite), I exhibited mercury freely. I was not content with its exhibition by the mouth; but she was washed with a strong solution of bichloride of mercury, till a rash was brought out; and then it was discontinued, lest inflammation should come on. In this way her mouth became tender; and she had nothing more than the premonitory symptoms. Whether the mercury had any effect I do not know; but I should think not; because I believe the symptoms went off before the mouth was affected. I should think there is no reliance to be placed on mercury. Dr. Good thinks, that belladonna united with the bichloride of mercury, in large quantity, has acted as a prophylactic in his hands.

Scutellaria Laterifolia.—Dr. Spalding tells us, that the exhibition of "scutellaria laterifolia" is successful; nay, that it prevented the disease in thousands of cases of men, dogs, oxen, and swine.

Ormskirk Medicine.—The "Ormskirk medicine" was once held in very high estimation. It is said to consist of powdered chalk, Armenian bole, alum, powder of elecampane-root, and oil of anise.

Sea-Bathing.—In London, sea-dipping was formerly thought very good; so that when a person was bit, he took a trip to Gravesend, which is the nearest point where the water contains a large portion of saline ingredients.[c] Any thing may do good which will fortify the mind; and the disease may, by that means, be more or less opposed.

Genista Tinctoria.—Dr. Marochetti published a pamphlet, a few years ago, in which he asserts that if the disease will appear, pustules form under the tongue after the bite; and if these pustules be abraded by a needle, and the mouth be washed with a decoction of "genista tinctoria" ("butcher's broom"), and it be taken internally, the disease is prevented. Others have, subsequently to the appearance of this publication, made a point of attend-

[a] With this view, Dr. Fletcher recommends powdered cantharides.

[b] See Page 721.

[c] See Page 726.

ing to this circumstance; but they have found no pustules, even in cases where the disease came on; and, though the genista tinctoria was fairly tried, the disease nevertheless made its appearance.

Venesection.—Venesection has been strongly recommended, on account of its supposed efficacy in some Indian cases; but it is doubtful whether it is serviceable. It was fairly tried by Dr. Rutherford, many years ago; and also by Dr. Parry. I employed it in one case; and I fancy I sent the patient out of the world, some hours sooner than she would otherwise have gone. As the blood flowed, the pulse became weaker, and the disease much more intense; and the patient died in a very short time. In Mr. Godrich's case, to which I have before alluded [a], the patient was an old man; and was bled to the amount of one hundred and fifty, or one hundred and sixty ounces. No relief was afforded; he became worse and worse, and died in twenty-seven hours from the period of the attack. Magendie and Dupuytren have employed venesection, and failed. M. Breschet also says, that the more he bled his patients, the more quickly they seemed to die. I am speaking of a *rational* degree of bleeding; and it certainly does harm.

Emetics.—In some cases published by Dr. Satterley, it is said that an emetic proved useful. All medicines, however, have been found useful in the hands of some.

Narcotics.—All narcotics—opium, belladonna, nux vomica, and prussic acid—have failed. Opium injected into the veins, has seemed to give no sort of relief; and musk also has been given without any real benefit.[b] I was told of a case where prussic acid was given, to a very considerable amount; and yet no benefit whatever arose from it.

Chlorides.—The chlorides and muriatic acid have also failed. I should tire if I were to enumerate all the drugs that have been recommended in this disease, and have failed. Every article that ever was swallowed, in the way of physic, has been given without any benefit.

Guaco.—I made a fair trial of a vegetable matter (guaco), which was said to cure the disease to a certainty; and Dr. Roots also made a fair trial with it; and the patient was better. Now and then, however, there are irregularities in the course of the disease; and whether the improvement was ascribable to the medicine, I cannot tell; but I should think not; for the patient died at the usual time. Some have recommended a whirling machine.

Submersion.—Van Helmont used to recommend putting the patient under water, and keeping him there till he was nearly drowned [c]; but I believe nothing will do good when the disease is formed; and I doubt whether much good can be done, even in the way of prevention.

Transfusion of Warm Water.—[Injection of warm water into the veins has been tried by Magendie;—from his having observed nervous debility produced in animals which had been subjected to it; and that the fluid parts of the blood were diminished by the impossibility of taking fluids, and the great cutaneous and pulmonary transpiration. A pint of water, heated to 30° (Réaumur), was injected into the arm of a man labouring under advanced and violent hydrophobia. Immediately after the operation, the patient became tranquil; and the pulse fell, in twenty minutes, from

[a] See Page 718.

[b] The Tonquin remedy is musk and cinnabar; the Carnatic or Mysore Pill contains arsenic; the Russian remedy is water-plantain.—*Dr. Fletcher.*

[c] He kept his patients under water, till the psalm "Miserere" [the fifty-first; containing nineteen verses] was sung; and, in one case, a poor girl was drowned.—*Dr. Fletcher.*

150 to 80. The spasms ceased, and the individual drank a glass of water without difficulty. He continued to improve until the fifth day; when swellings and acute pains in the wrists, knees, and elbows, appeared; and an abscess formed in the leg;—occasioned by the broken points of two lancets, which remained in the foot, from former unsuccessful efforts to bleed. He died on the ninth day. The swollen joints were found filled with pus; and, it is probable, these secondary purulent deposits were the cause of death. Dr. Pearson recommended the injection of small quantities of warm water, impregnated with narcotic substances, into the veins,—in order to relieve the spasms which prevent deglutition, followed up by cathartics, antispasmodics, the mineral and vegetable tonics, and sponging the body with cold water and vinegar.

In the midst of so many remedies which have been lauded by partisans, and in turn found to be useless—with a knowledge that the most powerful drugs are apparently inert—overwhelmed with the sad conviction that the learning and talents of the most experienced and energetic physicians have utterly failed in arresting the progress of this dreadful malady, the practitioner, when called upon to act, must still respond to the awful question—"What is to be done?" It is in such a situation only that he can experience the benefit of having studied the whole train of nervous diseases; of being able to detect and appreciate the analogies and dissimilarities which exist between each respectively; and of having deduced from the whole such general principles, as will enable him to act conscientiously in every case, as far as the present state of the art will permit. In hydrophobia, therefore, as in tetanus, and several other nervous disorders, no exclusive line of treatment should be followed. If the patient exhibit signs of plethora, be strong, of a vigorous constitution, and there be symptoms of increased vascular excitement, venesection, cupping, or the application of leeches to the occiput or back of the neck, and antiphlogistic remedies, should be actively unemployed;—so as to make an impression upon the nervous system. But if there be evidence of anæmia, and general depression of the vital powers, stimulants and tonics are indicated, and should be used energetically. With a view of overcoming the spasms, the tobacco enema, or cold affusion, may be had recourse to according to circumstances; and the same kind of treatment as has been recommended for acute tetanus[a], should be persevered in.[b]]

[a] See Page 706.

[b] "Library of Medicine"; Volume 2; Page 261.

CHAPTER XIV.

NEURALGIA.

Definition.—The disease of which I spoke last (hydrophobia), is characterized by morbid sensibility; and the disease of which I shall now speak, is also characterized by morbid sensibility. It is called "tic douloureux", or "neuralgia";—violent pain of the nerves. It is said to be called "tic douloureux" (which is a very odd appellation) because it resembles the sudden sharp pain arising from the bite of an insect; or because the horse bites the manger, when (as is supposed) he labours under it. The word "*neuralgia*" is very appropriate; but the word "*tic*" is one that I do not approve. It signifies a sudden catching or convulsive motion,—such as is noticed in the face or other parts of some persons; and is (as it were) a local chorea. Persons with such catchings, experience no pain; but when twitchings occur in neuralgia, they are attended by pain; and, therefore, to their name,—"*tic*" in this disease "*douloureux*" was added. As the disease was first noticed and distinguished on the face,—where there is an abundance of small muscles, and consequently twitchings usually attend it,—the twitchings usually attracted as much attention as the pain; and the disease obtained its designation from both symptoms.

Symptoms.—The disease is marked by a violent, stabbing, plunging pain; increased (or even brought on, when it does not exist) by the slightest touch of the skin. When it is present, it is increased by the least touch; but very firm pressure, I know, will relieve it. It is increased, too, when present, by blowing on the skin, or by the shaking of the room; and is then exactly like an electric shock. Sometimes, between the shooting pains, there is constant aching; and sometimes the part feels painfully benumbed. I have known the neighbouring parts, which were not in pain, benumbed. There is generally no swelling or redness. There may be; but it is not essential to the complaint. Tic douloureux generally takes place in the course of some well known nerve; and hence the disease is now more appropriately called "neuralgia";—"*nerve*-ache." Sometimes the pain does not follow the course of a nerve; but still we must consider it according to general rules. Sometimes it is not an aching of a nerve, but the whole of a part is affected together; so that the disease will exist in the breast, in the heart, or in the pericardium; and once I saw it in the loins;—apparently not following the course of any nerve, but affecting various nerves in the mass. If the nerve affected have small muscles in the neighbourhood, they are generally twitched; so that, when a patient has the disease in the face, we see the side of the face catching every moment. From these circumstances some have called the disease "neuralgia *spasmodica*"; but, I think, most improperly; because they are only incidental, and the severest neuralgia may occur without them. If the disease be dreadfully severe, as sometimes it is, then we have convulsions of the large muscles.

Parts liable to it.—When it is a distinct nerve that is affected, it is (more frequently than not) the supra-orbital, the infra-orbital, or the "pes anserinus"; and next to these the inferior maxillary.[a] When it is situated in these parts, there is a twitching; because the muscles of the face are small; and from the disease occurring in the neighbourhood of glands, there is commonly, in these cases, a great flow of tears or of saliva. Some doubt that it is ever felt in the "portio dura"; others declare they have known it in that nerve. A patient of mine in St. Thomas's Hospital, complained of it not only in the cheek, but in the course of the "portio dura",—from the stylo-mastoid foramen. I do not see why the disease should be confined to nerves of sensation. Two, or even all the three branches of the fifth pair are sometimes affected; and the pain may extend even to the other side of the face. I have known it extend down the neck to the shoulder, and along the inside of the arm, to the ends of all the fingers and the thumb. Various nerves of the legs, arms, fingers, and toes, are occasionally the seat of the disease; and an intercostal, a lumbar, and even the spermatic nerve has been attacked. The pain may be confined to one nerve, or to it and its branches; may extend to other nerves in the neighbourhood, or at a distance; or may affect nerves distant from each other, simultaneously or successively; and change its seat backwards and forwards. The pain does not always shoot in the course of the nerve; but frequently in the opposite direction. It may not shoot from a nerve through all the twigs, but only through some.

Progress.—The disease comes on in paroxysms, and the pain is dreadful; so that, occasionally, it brings on delirium. After a time it will, in some instances, cease spontaneously, without our knowing why; and, in other cases, it will produce great emaciation, and end in insanity, or some other disease of the nervous system.

In hysterical females, portions of the surface occasionally become exquisitely tender; so that the least pressure with the extremity of the finger, such as would not occasion pain were the peritonæum or viscera inflamed, —even the sudden falling of the bed-clothes upon it, causes anguish. The surface of the front of the body is most frequently affected, sometimes only of the abdomen, sometimes only of the chest; sometimes portions of the back only suffer, particularly at the spine; and sometimes nearly the whole surface of both the trunk and extremities. As no pain is felt while the part is not compressed, perhaps this condition ought not to be called "neuralgia." But the absence of heat, swelling, redness, and of all signs of internal no less than of external inflammation, and of structural affection and serious disease, the perfect inutility of all the remedies of inflammation, the power of the remedies of pure nervous affection and neuralgia, prove it to be a morbid sensibility of the nerves of touch, and perhaps make it merit the epithet *neuralgic*. Cases of this description are occasionally mistaken for chronic peritonitis, and other inflammatory diseases; and, when the tenderness is felt in the course of the spine, it is too often set down as a mark of disease of the spine or its ligaments, or perhaps the whole case is referred to an affection of that portion of the spinal cord; while the morbid sensibility of the spot is merely one of the number of symptoms. I saw this tenderness in a *hysterical* and neuralgic middle-aged *man* who had been exposed to malaria.

The nature of neuralgic affections may be evident during life, and imme-

[a] Neuralgia of the second division ("superior maxillary") of the fifth pair of nerves ("trigemini"), is distinguished from disease of the antrum, by its not being attended with fever, by its following the course of the nerve, by its wanting three of the four signs of inflammation (redness, heat, and swelling), &c.—*Dr. Fletcher.*

diately, or not till after a lapse of time; may become evident after death only; or may never be discovered. Inflammatory conditions of the nerves and structural changes, as well as mechanical causes of irritation, may be detected during life, if the seat of these conditions is within the reach of observation: and symptoms may be induced which clearly point out inflammation or structural change, even should these be beyond our observation.

History.—This disease is said to have been well described, first of all, in 1756, by a surgeon named André; who lived in London, and who wrote on diseases of the urethra. It is a strange place in which to look for an account of neuralgia. Dr. Fothergill wrote upon it, in the fifth volume of the "Medical Observations and Inquiries", published in 1776. He tells us he saw fourteen instances of it. I have not seen so many. He observed it oftener in women; but this greater frequency is not a general fact. He never noticed it in persons much under forty years of age; and this observation, I believe, is confirmed. It is rare in children; yet Continental writers record cases of it in subjects only seven and nine years old. It is a disease which (I suppose) has always existed; but, like true hydrophobia, it has not been well described till modern times.

Morbid Appearances.—After death nothing morbid has been found. Sir Charles Bell and Dr. Magendie both say, that they have examined neuralgic nerves, and found no morbid appearance; but, by the long continuance of the pain, the neurilema (the covering of the nerve) becomes thicker. The irritation has occasionally produced a tumour during life. From the great thickening of the surrounding parts, the veins around the nerves have sometimes been found varicose. Andral, the most recent writer on this subject, says that in acute and chronic sciatica, which is a kind of neuralgia, he never but once found any alteration of the nerve; and, in that one case, the nerve was merely a little redder than usual;—it having been injected. He says, that in a woman who had constant pain at the back of the neck, on the left side, he found nothing either in the trunks or branches of the brachial plexus. In the nerves, in a case where rheumatic pain existed at the moment of death, he found nothing wrong. The true nature of the disease, therefore, is very often a mystery.

When a portion of a nerve has been seen of an uniform dark red colour after death; when a portion has been found diseased and enveloped in gangrenous cellular tissue; or about double its natural size, of a violet red colour, and strewed with ecchymoses of the size of pins' heads; or a serous, bloody, or purulent effusion has been discovered among its fibres; or nerves have been found hypertrophied and connected with fungous ulcers; when a nerve has been bruised, lacerated, or half divided;—pain of greater or less intensity had been felt in the nerve or the parts upon which it is distributed.[a] Cotugno, Cirillo, Chaussier, Bichat, &c., have seen similar appearances after neuralgia. In some cases of disease of the brain or spinal marrow, even where paralysis is produced, pain is felt at a distance: the paralyzed parts sometimes ache severely in hemiplegia. In epilepsy and hysteria, pain is sometimes felt in the course of nerves. A portion of the pain in structural diseases of all organs, may occasionally occur in the branches and twigs of the nerves irritated by it.

Causes.—Neuralgia certainly arises, in many cases, from cold; and in some it certainly arises from mechanical irritation of the nerve; such as is occasioned by the stumps of old teeth, or by an exostosis. Many cases

[a] See Abercrombie's "Researches on Diseases of the Brain and Spinal Cord."

have occurred, in which the bones of the cranium have been found in a state of exostosis, or carious, when the disease appeared; but this is not by any means necessary.

To show that in some cases of neuralgia the cause becomes obvious after a time only, we may state that Dr. Abercrombie quotes one case of exquisite neuralgia of the face, that ceased on the removal of a piece of china which had been there fourteen years; and another, of ten years' duration, that ceased on the extraction of a tooth. Sir Henry Halford mentions the case of a lady who laboured under violent tic douloureux, till an apparently sound tooth was extracted,—on account of the attacks being frequently preceded by uneasiness in it; and that a large exostosis was found at its root. He relates the case of a nobleman, who was liberated from the disease by the exfoliation of a portion of bone from the "antrum maxillare." To ascribe neuralgia, however, to these causes, in most cases, is very unpathological.

The disease frequently occurs, when we cannot explain it at all; and after death nothing has been found. Dr. Macculloch thinks that it arises from malaria [a]; but then he ascribes almost every thing to malaria. I have no doubt he is quite right in a great deal of what he says; but still he ascribes too much to malaria. He considers, that almost every case of tooth-ache arises from that source. Dr. Macculloch appears (to all but himself) to ride his hobby a little too much. Errors have been committed on the other hand; and teeth have been pulled out, where the pain did not arise from the teeth. I have seen cases, where a person has lost almost every tooth; and has then been cured by quinine. However, it is possible that the nerve or the neurilema, one or both of them, may be inflamed; and, if that be the case, we must expect violent pain.[b]

Rheumatic Neuralgia.—Nerves also frequently suffer pain from rheumatism. There is decidedly a rheumatic neuralgia. The exquisite neuralgia, described as tic douloureux [c], may arise from those vicissitudes of temperature that occasion rheumatism, and may be rheumatic. But pain, not of that description, though perhaps very acute, perhaps dull and aching (as is usual in rheumatism), is every day witnessed in the situation of nerves, in persons who have rheumatism in those situations, and who have been exposed to cold, or perhaps cold and wet; and it yields as readily to the treatment of rheumatism, as the ordinary rheumatism of other parts. The neurilema, which is a fibrous membrane, is probably still more affected than the nerve; since rheumatism is chiefly a disease of the fibrous membranes.

Symptoms.—In rheumatic neuralgia we observe all the varieties of suffering occasioned in other parts by rheumatism: sometimes acute pain, with tenderness, heat and even throbbing, and aggravation of the pain by heat; sometimes dull aching only; sometimes pain on motion, pressure, or other modes of mechanical irritation; sometimes remittent, intermittent, or even periodical, pain. The pain is sometimes exquisite and sudden, assuming the character of tic douloureux; which, we may remark, not only when

[a] See Pages 286 and 299.

[b] Parry attributes neuralgia to inflammation of the neurilema; but it comes and goes suddenly; is relieved, not by bleeding, but by opiates; is not increased by firm pressure; wants three of the signs of inflammation; is not attended by fever; and does not go on to the terminations of inflammation; while, on the other hand, inflammation of the neurilema may be artificially produced, withoug giving rise to neuralgia. Monro looks on the twitchings of the muscles as the *cause* of the neuralgia. His opinion was favoured by a case in Guy's Hospital; in which the ointment of white lead was rubbed over the affected parts for months. It palsied the muscles, and cured the pain. Armstrong thinks it is a partial disease of the brain;—displaying itself in particular parts of the nervous system. His remedy is calomel.—*Dr. Fletcher.*

[c] See Page 728.

rheumatic, but sometimes when not apparently so, may assume a periodical type. It is the clear situation of the pain in a nerve, and not the character of the pain, when it is not like the pain called "tic douloureux", that justifies us in rheumatism to pronounce it neuralgic.

The nerves chiefly attacked by rheumatism, are the sciatic and the branches of the fifth. It is frequently very inflammatory; so that the surface is tender, hot, swollen, and even red. Sometimes no marks of inflammation are discoverable, and warmth and other stimuli relieve. In the case of the face especially, (one side only of which is usually affected, and perhaps not only the nerves, but some of the surrounding parts,) there is a great tendency to periodical intermission, and the paroxysms usually occur in the evening.

Treatment.—When inflammation is obvious or presumable, whether rheumatic or not, local bleeding, mercury, colchicum, and the whole antiphlogistic plan, general and local, are appropriate. Should these not succeed soon, anodynes may be added; and the pain may, from an inflammatory commencement, degenerate into pain without inflammation, and demand at last solely the treatment of another form of the disease.

Remedies for Rheumatic Neuralgia.—When rheumatic and yet not inflammatory, the remedies of this form of rheumatism in other parts are required;—stimulants internal and external, tonics, mercury, and all modes of counter-irritation.

Coldness indicates stimulants. Among internal stimulants, besides generous diet, the ammoniated tincture of guaiacum is one of the best. It should be exhibited in such quantity and frequency as to keep the patient comfortably warm. A dose of half a drachm may be sufficient, or six drachms may be required; and a frequency of three times in the twenty-four hours may be sufficient, or the dose may require repetition every two hours; and in general both may be diminished after the remedy has been continued for some time; because it stimulates more and more, and its effect lasts longer. When there is debility, and especially paleness, iron in full quantities operates in the most salutary manner;—much more so than quinine.[a] The hot-bath (of water or vapour), the douche, electricity, blisters, moxas, sinapisms, tartarized antimony, croton oil, and acupuncture, frequently cure, if combined with all other appropriate means. Mercury carried to ptyalism frequently cures; provided the strength will bear it, and the rest of the treatment is well conducted. Even the cold shower-bath or cold douche, if followed by good friction, will cure. A warm temperature of the atmosphere around the patient, and warm clothing, may be indispensable. Anodyne narcotics may be absolutely necessary; and the salts of morphia, stramonium, and belladonna, carried to a due extent, are by far the best, and sometimes alone will cure.

Removal of Decayed Teeth.—If there be an obvious exciting cause, it should (of course) be removed. If carious stumps in the gums produce it, they should be taken away: but when we consider how large a number of people have this cause of irritation, without any such disease being produced, one is more inclined to trust to the general remedies, than even to the removal of the stumps: for I know that after they have once excited the disease, or have existed with it, the disease will continue after they are removed; and though it would be but common sense to get rid of an obvious cause, yet the sulphate of quinine will cure many cases, notwithstanding the old stumps are allowed to remain.

[a] See Note to Page 734.

Sesquioxide of Iron.—Should no structural or mechanical cause, and no inflammation be discoverable, and should the disease be of the exquisite character, then iron is the best remedy.

The usual doses of the sesquioxide of iron are, I believe, from fifteen to thirty grains; and these are given two or three times a day. Some few practitioners, I know, exhibit (occasionally) a drachm at a dose; but they consider this a large quantity; and Dr. Hutchinson—who has written upon the virtues of the medicine in neuralgia, and probably employed it more than most others—tells us, that the greatest quantity he has ever found necessary, is ninety grains in the twenty-four hours. His mode of expression leads to the supposition, that this is the largest quantity he has ever given. Mr. Carmichael has employed it as extensively as Dr. Hutchinson; and appears—from the narrations in his work upon the efficacy of iron in cancer—to have generally given less than a drachm in the twenty-four hours; and once only so much as four scruples. But I have ascertained, by very numerous trials, that, when the use of the medicine is proper, it may be given in far larger quantities: that two, three, and four drachms may be given every six, nay, even four hours; that this dose of half an ounce may be at once commenced with; and does not require, in order that it may be borne, to be reached by slow degrees; and that it may be continued many weeks, without the slightest inconvenience.

It had, for many years, been my custom to prescribe the medicine in drachm-doses; but having several cases in which its exhibition appeared proper, and never having observed any sensible effect from it, I began to think that a drachm was probably not the utmost quantity which the stomach would bear; and resolved to ascertain, by cautious augmentations of the doses, how much might be taken. It soon became evident, that there was no occasion for timidity; and my uniform experience, in nearly a hundred cases, enables me to present the results just stated. When the medicine is proper, I believe there is no limit to the quantity which may be taken; except the unwillingness of the patient to swallow it, and the inability of the stomach to manage so heavy a mass. Neither headach, thirst, heat, foulness of tongue, griping, nor constipation has occurred[a], nor been increased if already present. Nay, pain and heat of the head, and giddiness existed already in some cases, and ceased during its employment.[b] I am enabled to say, that these quantities are ordinarily borne, (exactly as is the case with antimonial powder,) not because the operation of the medicine is resisted by an unnatural condition of the system, not because the quantity is gradually reached, and not because the article is bad. The article was procured from a variety of druggists,—from many of the most respectable houses in London; and was in fact, in several examples, known to be a genuine article, prepared according to the letter of the Pharmacopœia.[c]

Whether there is any advantage in these very large doses, I cannot say.

[a] I wish not to assert, that such inconveniences will never occur; but the absence of them in all my trials justifies me in believing, that they will not prove common occurrences, with even half-ounce doses. Many practitioners are no longer deterred from giving iron by headach, foulness of tongue, &c., if other circumstances indicate its employment. I believe, that when it excites and disturbs, this arises from a peculiar susceptibility to its influence; unless, of course, the system is already in a highly excitable state.

[b] See Page 695.

[c] If the articles used by me were all proved to be bad, the importance of my facts would remain little diminished; because the variety and respectability of the houses at which the medicine was purchased, shew that the facts, if not true of genuine sesquioxide of iron, are true of the sesquioxide now in common use.

A drachm-dose may perhaps be as useful as one of half-an-ounce. Even when (as in many cases) large doses effected all the good desired, after all the small ones had failed; it may be urged, that not the *increased quantity* but the *continuance* of the remedy produced the effect; and the question can be decided only by a comparison of cases, similar in every respect, treated one half by common and the other by large doses. Reasoning analogically, one would conceive that large quantities must be more serviceable. Cinchona, for instance, will cure an ague, in doses of a drachm, given every two hours; when two or three table spoonfuls of the decoction three times a day, or even a drachm of the substance given not more frequently, will altogether fail.[a] We are accustomed to increase the doses of all medicines, for the purpose of increasing the effect. In the very example of sesquioxide of iron, practitioners sometimes prescribe what they consider a small dose, sometimes what they consider a large one;—according to the force which they judge necessary to bring up against the disease; and they increase the quantity as the disease proves obstinate. Now, since it appears that the dose of this medicine has a much wider range than has been thought, and that the terms "*large*" and "*small*" must relate to quantities different from those to which they have been hitherto applied, the same habit of practice would incline us to these large doses in obstinate cases; unless such comparative observations as have been just alluded to, prove them to be nowise superior to what have hitherto been considered large. It may be worth while, too, here to quote a passage from Cullen:—"We are persuaded, that the good effects of the preparations of iron have often been missed, by their being given in too small doses. The saline preparations, in large doses, are ready to irritate the stomach; and—both on this account, and on some other considerations—it may always be proper to begin with small doses, and to increase them by degrees; but we have often found, that no great benefit is to be obtained, but when large quantities—either by the *size* of the doses, or by the *continuance* of them—have been thrown in." I may remark, that Sydenham's favourite form of iron was the filings; and that Cullen says—"We have found the simple rust as effectual as any other preparation; and we have always found the stomach bear it better. It is right, however, while quoting Cullen, to mention that he also says:—"We have been informed of its being given to the quantity of six drachms in one day; but we have hardly found any stomach that would bear the third of that quantity without sickness." The apparent variance of his experience from mine, is easily explained. He employed the *rust* of iron. Such only was the "carbonate" of the Edinburgh and also of the London Pharmacopœia, when he published his "Materia Medica." My observations relate, of course, to the present preparation of the London Pharmacopœia;—procured by *precipitation*, and therefore an impalpable powder. The grittiness of the rust would soon turn the stomach of any one, if administered in large quantities. I may state, from abundant experience, that a scruple of the sulphate of iron, made into pills with the extract of gentian, is borne just as well as half an ounce of the sesquioxide; and that every observation that I have made respecting this dose of the latter, applies to that dose of the former. I have occasionally given more, and even in solution, without sensible effect.[b]

Quinina, &c.—Quinina, arsenic, belladonna, stramonium, and colchicum,

[a] See Page 309.

[b] See Dr. Elliotson's paper on the "Medical Properties of the Subcarbonate of Iron"; published in the "Medico-Chirurgical Transactions", Volume 13, Page 232. A few supplementary observations on the subject, will be found at Page 466 of the same volume.

are said sometimes to cure this exquisite form. The want of attention to the stomach and bowels, and of the observance of good habits, will aggravate it. Relief is said to be obtained occasionally by the application of steam to the part, and sometimes by ice. The application of the strongest narcotics, and all irritants and escharotics, as well as the actual cautery, have occasionally done good.

Division of the Nerve.—When all has failed, the division of the nerve, or the removal of the part, if possible, may be proposed;—provided no cause in another part is obvious, and provided the pain is invariably limited to one part. Galen was acquainted with the division of the nerve as a remedy in the disease; but a royal French surgeon-maréchal appears to have been the first who performed the operation. Unfortunately it very rarely cures. One portion of the divided nerve suffers again, or the disease reappears in some other part. Too often there has not been even temporary relief. Yet amputation of the finger or thumb, in which the disease was seated, has succeeded, when the cause of the affection was local.

A case is mentioned by Mr. Wardrop, in the eighth volume of the "Medico-Chirurgical Transactions"[a], where the pain occurred in the nerve of one of the fingers, and where nothing short of amputation succeeded; but that succeeded perfectly. There is a case mentioned in the fourth volume of the same Transactions[b], in which amputation also proved successful.[c]

[a] Page 246.

[b] Page 50.

[c] The case is contained in a letter from Mr. Alexander Denmark, Surgeon to Haslar Hospital; to Mr. H. Leigh Thomas. It is entitled—"An Example of Symptoms resembling Tic Douloureux; produced by a Wound in the Radial Nerve"; and is as follows:—"Henry Croft, a healthy young man, belonging to the fifty-second regiment, was wounded on the night of the sixth of April, 1812, at the storming of Badajoz. A musket-ball entered the 'triceps extensor cubiti', about an inch and a half above the inner condyle of the 'os humeri'; and grazing the inside of that bone, passed obliquely downwards through the 'brachialis internus', and out anteriorly near the end of the arm. The wound soon healed, and without manifesting any particular morbid symptoms during the cure. On his admission into this hospital, I found him labouring under excessive pain, which the largest opiates could not assuage, with almost constant watching. The little sleep he had, (if it could be called such,) was disturbed by frightful dreams and starting. I always found him with the fore-arm bent, and in the supine posture, supported by the firm grasp of the other hand; the wrist also bent;—being unable to move it into any other position, by the voluntary exertion of its own muscles. He could suffer me to extend the hand; but with increased pain; and it always, on the removal of the extending power, fell into its former bent situation. The act of pronation he could also suffer me to perform; but, in like manner, with increase of pain. A small tumour could be felt in the site of the wound, on the anterior part of the arm, which he could not bear to be *touched* without evincing additional torture. He described the sensation of pain as beginning at the extremities of the thumb and all the fingers, except the little one, and extending up the arm to the part wounded. It was of a burning nature, he said; and so violent, as to cause a continual perspiration from his face. He had an excoriation on the palm of the hand, from which exuded an ichorous discharge. The cause of this he ascribed to a shell rolling over it. His agonies, he observed, were insufferable;—depriving him of sleep, and the enjoyment of his food, for which he had sometimes an appetite. He declared himself incapable of enduring it longer without some relief; and earnestly requested the removal of the arm. Before proceeding to any operation, I recommended him to try the effects of the warm and vapour-baths, anodyne embrocations, &c.; but from none of these he experienced any alleviation of his sufferings.

"The symptoms were sufficiently clear, I conceived, to lead to a correct prognosis. The part wounded, the nature of the pain, and its course from the fingers, with the exception of the little one, indicated the affection to be in the radial nerve. The increased pain attendant on the act of pronation, further corroborated that supposition;—from the pressure of the 'pronator teres' upon the nerve, in its passage through that muscle. The man said he had profuse bleeding after receiving the wound; yet I found the pulsation of the radial artery to be as strong as in the other arm. It was difficult to sup-

But even where amputation has been resorted to, the disease has sometimes reappeared in other parts.

Neuralgia arising from Malaria.—When neuralgia arises from malaria, whether ague has also been produced or not, quinina and arsenic, long continued in the largest and most frequent repeated doses that can be borne without the least inconvenience, are the best remedies; and when it is periodical or intermittent, without evident connection with malaria, they are all excellent. But sometimes a full dose of extract of stramonium or belladonna, repeated every hour or two, from just before the attack is expected to the termination of every paroxysm, succeeds better.[a]

pose the radial nerve wounded, and the humeral artery to escape; such, however, proved to be the case.

"I proposed to my patient the possibility of saving the limb, and relieving the pain, by cutting down upon the nerve, and removing a part of it, above the wound; which he willingly consented to; but observed, that he would rather have the arm amputated at once, than run the risk of a second operation. In a consultation which I held with my colleagues upon this case, when we considered the chance of failure, together with the injured state of the arm, and contracted elbow-joint, we determined on the propriety of amputation. I immediately performed the operation, with instantaneous relief to my patient. He was discharged cured in three weeks;—having, in that time, rapidly recovered both his health and strength.

"On dissecting the arm, I traced the radial nerve through the wounded parts. It seemed to be blended with, and intimately attached to them, for the space of an inch. It had been wounded; and, at the place of the injury, was thickened to twice its natural diameter; and it seemed as if contracted in its length. This contraction, I thought, partly accounted for the bent position of the arm, and the increased pain on attempting its extension; but, on further examination, I was surprised to find, on dividing the fibres on the posterior part of the wounded nerve, that there was firmly imbedded in it, a small portion of the ball; which had been driven off by grazing the bone. This description of the injury, more fully accounts for the exquisite pain felt by the patient. The 'os humeri' was discoloured, where it was grazed by the ball; and the humeral artery was uninjured! The nerve was evidently thickened, both above and below the wound."

[a] For further details we refer to Dr. Elliotson's paper on Neuralgia, in the third volume of the "Cyclopædia of Practical Medicine"; Page 165. A very severe case of the disease, with Dr. Elliotson's treatment of it, and remarks upon it, will be found in the "Lancet"; No. 484; Page 322. (1832-3, Volume 1; December 8, 1832.)

CHAPTER XV.

PARALYSIS.

HE next disease which I shall notice, is one which very often follows oplexy; and is the result of that state which, in the first instance, is oplectic. I refer to paralysis.[a]

Definition.—It may be defined to be a loss or diminution of sense, or of otion, or of both; independent of any stiffness of the part, or of inflamation, or any mechanical impediment; but dependent entirely upon the ndition of its nerves, or some other part of the nervous system. This sease frequently begins with sopor; or even with coma, and downright oplexy. If it begin with a great degree of heaviness, it is called "sopor" sleepiness").

Varieties.—It is usually divided into three varieties:—"hemiplegia", ecting one-half the body divided *vertically*; "paraplegia", affecting one-lf the body divided *horizontally*; and "paralysis *partialis*", affecting only e particular limb, or one particular sense. The partial paralysis may be the eye,—"amaurosis"[b]; of the smell,—"anosmia"[c]; of taste,—ageustia"[d]; of the touch,—"anæsthesia"[e]; or of hearing,—"dysecæa."[f] here is no particular name for paralysis of one leg, one arm, or one side the face.

The disease may not only vary according to the part it affects, but it may o vary in degree; so that the person shall have no use whatever of his ses, or of a portion of his body; or he shall have a use of them, only t it is impaired. Then the paralysis may differ according as it affects sation, or motion, or both. It is very common to see paralysis affect y sensation; this must, of course, be the case with parts which have urally no motion. If such a part be paralyzed, it must be paralyzed in *sation*. With respect, for instance, to the internal part of the nose, the ralysis which affects it must clearly be a paralysis of sensation; and so h respect to the internal part of the ear, and likewise of the eye. If paralysis be within the orbit,—so that motion is affected,—it is not the lt of the eye, but of the muscles which move it; but paralysis affecting globe itself, must be paralysis of sensation. Sometimes, however, in *extremities* we have a loss only of sensation; but that is rare. Sometes a person loses the sense of touch, in particular parts of the body; it is not of frequent occurrence; for generally, where a part is endowed h both sense and motion, the part either has only motion affected, or sation and motion together.

There is still another variety. When a part is paralyzed both as to sensn and motion, the proportion of the two is very various. Sometimes a son will be powerless entirely in a limb, or in one-half the body; and

[a] See Page 562.
[b] From *αμαυροω, to darken.*
[c] From *αν, without*; and *οζω, to smell.*
[d] From *α, without*; and *γινομαι, to taste.*
[e] From *αν, without*; and *αισθανομαι, to feel.*
[f] From *δυς, with difficulty*; and *ακοη, hearing.*

yet he will *feel* a little, while he cannot *move* at all; and sometimes the paralysis will be so perfect in both respects, that we may pinch him as hard as we please, and he may endeavour to move as much as he will, and yet both will be in vain.

There are some still rarer varieties than these. What I have now mentioned is almost of daily occurrence; but there are some variations not so common. For example: a person will sometimes lose *sensation* on *one* side of the body, and *motion* on the *other*. He may lose *sensation* as to a *leg*, and *motion* as to an *arm*; and *vice versâ*. There is even a more minute variety than this. There will be a *perfect* loss of sense and motion in *one* limb; while in *another* limb, on the same side, the loss of either sensation or motion is *imperfect*. The patient will *feel* a little with his *arm*, although he cannot *move* it; while, in his *leg*, he can neither feel nor produce the least motion. Nay, what is still more curious, this state has sometimes alternated. The part which could not *feel*, has become *motionless*; and the part which was *motionless* has, by and by, lost *sensation*.

Sometimes, when half the body is paralyzed, the other half is in a state of great agitation, and convulsions. These are cases of rare occurrence, but they are mentioned by the most respectable authors; so that there is not the least doubt as to their truth. Occasionally there is an opposite state to the *loss* of sensation;—the senses become morbidly *acute*; so that a person is quite powerless as to the *motion* of an arm or a leg, on one side of the body; and yet he will have such a morbid acuteness of *sensation*, that the creeping of a fly along the arm, will give him great uneasiness. I have seen many persons who could not use their arm, or say if a fly lighted upon it; but occasionally there has been such a morbid degree of sensibility, that the descent of a fly upon them has been most uncomfortable.

Morbid Sense of Temperature.—Cases occur where there is a morbid sense as to temperature, in the paralyzed parts. Some persons whose limbs are paralyzed, cannot, in the paralyzed parts, bear the slightest breath of cold air. It has often been known to excite convulsions. But, more frequently, patients will feel parts which are only of a *moderate* temperature to be exceedingly *hot*. I have met with several cases of this description. The first of the kind which occurred to me, took place in a gentleman, who was first induced to think there was something the matter with him from what he experienced on going to the water-closet. When he took his seat he felt one side so hot, that he thought some person in a burning fever must have been there before him. He wondered how the heat could be on one side; and he soon found that if he clapped his hand against the part it felt hot. He tried the other side; but no such sensation was experienced. It excited his astonishment; and he soon found that, as he walked along he shook his toe about. After a time, giddiness and hemiplegia occurred, and subsequently paraplegia of the lower extremities; of which he died. Some not only feel every thing hot, in this way; but they have a constant burning sensation, whether the parts are touched or not. This is very different from what we often see; for some persons (*many* indeed) have so little feeling, that a red hot iron has been applied to the paralyzed parts for medical purposes; and yet not the slightest heat has been felt. Many paralytic persons have sat near a fire, and their legs have been charred; and yet they have known nothing about it, at the moment.

I have seen many cases such as that I have just mentioned, respecting a morbid sensibility to heat; and it is a thing which has been mentioned by old, as well as by modern authors. The cases are by no means uncommon

r. Heberden mentions a case of hemiplegia, where there was a morbid nsibility of the sense of smell;—where the patient smelt every thing so utely, that any strong odour gave him great pain.[a] He reminded one of ope's line,—

"Die of a rose in aromatic pain."[b]

his I have never seen; but I have had two or three extraordinary cases paralysis, where persons had a morbid sensibility to cold. I made a te of one, which occurred in December, 1823. A man, aged fifty-six, d been for twelve years so sensible to cold, that he had regularly worn r flannel-waistcoats; and on his wife once putting her foot against him bed, he had rigors; which made the bed shake, and lasted for a whole ur. Once, he said, his granddaughter put her cold hand upon him; and felt an icy coldness in that spot for a month. Three years and a half fore I saw him, he had a fall on the back of his neck; and from that ne he had been considerably worse, as to all these sensations. He had rtigo; and laboured under a loss of the power of attention. He could t fix his attention; and his spirits were much depressed. I found him rsty and flushed, and frequently he had heat all over him; but, notwithnding that, he always felt cold. No one else, on touching him, could cover that he was so.

I had another patient under my care in 1829;—a man forty years of . He had a morbid sensibility to low temperatures, throughout his nk and along his arms, as low as his elbow; but no farther. He said t things of an ordinary temperature felt cold to him; and when he put a calico night-shirt it felt, at first, as though it had been dipped in cold ter; and the sensation remained for a quarter of an hour. The sensation putting it on next to his skin, would have been intolerable; and therefore he was obliged to case himself in flannel; and he kept his flannel-istcoat on as long as it would stay. He said that hot things felt hot; that any thing of a low temperature felt exceedingly cold.

It was owing to observations of this description, that Dr. Darwin (and haps others) imagined that there must be a particular set of nerves for perature. Seeing that persons sometimes lost the sense of touch, and had a morbid sensibility of temperature,—sometimes feeling things very and sometimes very *cold*,—he drew the conclusion to which I have just rred. It was analogous facts to these that led persons, ages ago, to gine there must be a distinct set of nerves for motion and sense; the fact has since been proved by Sir Charles Bell, and still more fully blished by Magendie. A French surgeon (who published in 1780) es, that there must be distinct nerves of sense and motion; because etimes the function of motion only was affected, and sometimes only sation. That has been proved to be the case; but it has never been ved with regard to temperature.

Temperature of Paralyzed Parts.—The temperature of paralyzed parts, erally follows the temperature of the surrounding air, or of bodies ed in contact with the part affected. It is said that the temperature of paralyzed parts, is generally below what it ought to be; but that is not roper expression; and I think Dr. Abercrombie's statement is the t correct: — "They have lost in some degree that remarkable

[a] Though paralytic persons often find the eption of the five senses dull and con-d, yet I attended one whose sense of ling, instead of being impaired, became xquisite, as to furnish perpetual occasions of disgust and uneasiness, and from some very ridiculous causes.—*Heberden's "Commentaries"; Chapter* 69.

[b] "Essay on Man"; Epistle 1; Section 6; Line 200.

power, possessed by the living body in a healthy state, of preserving a medium temperature; and according to the temperature to which they have been exposed, paralytic parts become hotter or colder than sound parts, which have been exposed to the same temperature."[a]

Mode of Invasion.—Paralysis may invade very slowly,—quite imperceptibly; or it may attack very suddenly. After it has once begun, it may extend or not; and it may proceed very slowly or speedily; and may likewise increase in intensity, or never increase at all. The patient may live many years, without any further increase. It may, therefore, take place suddenly, or very slowly; it may remain stationary, or it may cease; or, if it do not cease, it may remain stationary, or it may extend; or, on the other hand, it may become more intense. Sometimes one organ becomes affected after another.

Sometimes Intermittent.—Occasionally it is intermittent, and even periodical. I had long read of such cases without witnessing an instance; but at last I met with a case, which was decidedly intermittent; and, indeed, in some measure periodical. The attacks always came on about half-past ten, or eleven o'clock in the morning. They did not always occur after the same interval, though sometimes they did; but the hour at which the invasion took place, was always the same. After the lapse of many months, the disease became less; ceased to be periodical; and appeared to have more of the form of fixed paralysis.[b]

[a] "Researches on the Diseases of the Brain and Spinal Cord. By J. Abercrombie, M.D." (Third Edition; Page 276.)

[b] I have read of intermittent palsy; and it is mentioned by Cullen;—"paralysis *intermittens*." Now among all the patients I have ever seen, and which are between thirty and forty thousand,—including those in various public establishments and private practice,—I had never seen an instance of this description. This was a case of intermittent hemiplegia. The man was admitted into Jacob's ward [in St. Thomas's Hospital], some time ago; and I mentioned his admission at the time. I gave him no medicine; because I was desirous of seeing whether his account was true or not. I seldom give medicine in aguish or intermittent complaints, till some one in the hospital has witnessed the occurrence of the paroxysms. He stayed here [in the hospital] three weeks, without having a paroxysm; he was, however, a very respectable man; and I did not doubt his account. He then went out of the hospital;—enjoined by me to return, if his disease reappeared. One day when I came to the hospital, some time afterwards, I found him in the courts; and he said he had been seized with a paroxysm that morning, and he actually was then in a state of hemiplegia on the left side. I saw it myself. I made him walk, and he dragged his leg in a semicircular way,—as patients usually do when they are labouring under hemiplegia; and he could not raise his left arm. It began at ten o'clock; and this was the usual course of the disease. He had told me, originally, that the paroxysms came on at ten o'clock in the morning; not every day, but every third or fourth day; and never after a longer period, except on one occasion; when there was an interval of sixteen days. He had been subject to this affection for two years and a half; he was forty-eight years of age; and the paroxysm would last from three to four hours; but, although it only lasted that time, he was not perfectly clear from it the whole of the day. He never knew the paroxysms begin later than eleven o'clock; or earlier than ten; till a week before he had been admitted, when one attack came on at half past ten in the evening;—the usual *hour*, but in the *evening* instead of the *morning*. The affection was not more frequent then, than when it first began. The man looked sickly,—as if he had ague; but still more as if he had suffered from a hot climate; and it appeared, that he had been in the East and West Indies, and had a fever both at Bombay and Batavia. He had suffered from dysentery; and, when in the hospital, he had diarrhœa.

I do not doubt, that this man's disease was the effect of malaria;—that his hemiplegia was a form of ague. I will not quarrel about words. You may say it was not ague; because unattended by shivering, fever, or sweating: but I have no doubt it was as much the effect of malaria, as ague is. It was merely a variety of the same affection of the system. Supposing this to be the case, and witnessing a paroxysm myself, I now gave him the sulphate of quinine; and, as the disease was of long standing, I began with a good quantity;—five

Co-existent with Other Diseases.—Paralysis is very frequently united with other nervous diseases; particularly with mania and epilepsy. Persons who are epileptic, frequently become paralytic at last; though perhaps, if they be adults, not till after many years have elapsed. Insane persons, too, frequently are seen to be paralytic. When recovery takes place, it is in general very slowly; but sometimes, though rarely, recovery is sudden.

Causes.—This disease may be induced by any thing which compresses a portion of the nervous system; which *divides* any portion of the nervous system; or by the disorganization of a portion. It is obvious, that whether a part of the nervous tract be *compressed* (so that the function cannot continue along it), or whether it be *divided* (so that the function cannot continue along it), or whether it be *disorganized*, the result must be the same. Accordingly, if a nerve be divided, the parts below are paralyzed. If the spinal marrow be divided, or completely compressed, or softened at any spot, the parts below are necessarily palsied. The compression may arise from fluid effused around, from fluid effused in the substance, from a collection of blood, or (in fact) from any thing capable of producing pressure. But sometimes the disease would appear to arise independently of compression, division, or disorganization. The nature of this state we cannot exactly ascertain; but the part is unfit for its functions. Lead will have this effect; and arsenic, together with various other poisons, will deprive a part of the power of continuing its functions;—so that paralysis takes place, without our being able to say what is the exact effect produced by these agents. Cold, likewise, will produce paralysis. If a part be exceedingly benumbed, it produces common paralysis, for a longer or shorter time afterwards.

Its Extent Depends on the Part Affected.—Although I am not aware that any difference would be discovered by the eye of an anatomist, in examining the parts, yet the higher the source of the disease, the more extensive are

grains every six hours. This medicine very soon put a stop to the complaint, but not till I had increased the dose to ten grains, every six hours;—so that he took forty grains in the twenty-four hours. This is the dose that is often required in a quartan ague; and this was a worse form of the disease than quartan, because it occurred on the third or fourth day; and the longer the interval between the attacks, the greater is the difficulty of curing the affection, which may be considered so much the more of a chronic character. It is not a matter of wonder, therefore, that so large a quantity was required. He continued in the hospital from his admission on the thirteenth of October, till the twenty-third of December,—which was more than two months,—without any other attack whatever; and his health greatly improved. It is wrong to suppose, that malaria does nothing more than produce these particular forms of intermittent disease. It poisons the whole body; and many persons are destroyed by it, without having ague at all;—so deadly is the poison. His health, however, regularly improved under the quinine; he became strong, his countenance was better, and altogether he found that he had received very great benefit. However, on the twenty-eighth of December, five days after his dismissal, he came to me; saying, that he had had a very slight attack that morning, and that it occurred rather later than usual,—some little time after eleven o'clock. When I saw him, at about half past one o'clock, it was nearly gone off. I increased the quantity of sulphate of quinine, to fifteen grains every six hours; and, if that be not sufficient, I shall give him more; as he is to come to me from time to time. I had a case of a person in the hospital, who was not cured of ague with less than a scruple every six hours; and therefore I shall not be surprised, if it be required in the case of this man; but I have no doubt he will be perfectly cured eventually.

This is a very interesting case;—proving that paralysis is not necessarily an *organic* affection;—and that hemiplegia does not necessarily arise from effusion, or from compression depending on an organic nature. If any compression do occur in this man, it can only be during the fit; for at other times he is perfectly well. It is entirely, I presume, an affair of *function*, induced by a particular poison.—*Extracted from a Clinical Lecture, delivered at St. Thomas's Hospital, by Dr. Elliotson; and published in the "London Medical Gazette", No. 163; January 15, 1831.* (*Volume 7; Page 486.*)

the effects; so that compression, division, or disorganization of the lower part of the spinal marrow, does not produce so extensive a paralysis, as the same causes acting higher up; and if the cause be within the head, (in one of the hemispheres, or one of the "thalami nervorum opticorum", or one of the "corpora striata",) patients generally have paralysis of the upper part of the body. The cause of hemiplegia, therefore, is in the brain. If *both* sides of the brain be compressed to an intense degree, then we have apoplexy; for apoplexy is evidently double hemiplegia. If the cause, on the other hand, be very *slight* pressure within the head, we have an exceedingly slight paralysis;—merely a little numbness at the ends of the fingers. Many persons who have a little fulness of the head, will have a numbness at the end of the fingers, and tingling; and, on losing blood, it will go off. There is every degree of paralysis, according to the pressure. If the pressure be inconsiderable, we have no more than an affection of the nerves, at the most opposite part of the brain.

Irritability in Paralytic Limbs.—[The utmost discrepancy of opinion prevails amongst physiologists and medical writers upon this subject. Prochaska, Nysten, and Legallois state, that the irritability of the muscular fibre remains in paralytic limbs; whilst Professor Müller and Dr. Sticker assert the contrary. No attempt has been made to reconcile a contradiction not very honourable to our science.

The authors to whom I [a] have referred, misled by the generic term and idea of paralysis, have not sufficiently distinguished between its different species. Yet it will be found, that this distinction is of the utmost importance in the explanation of the phenomena. In fact, *cerebral* paralysis, or that which removes the influence of the *brain*, and *spinal* paralysis, or that which removes the influence of the *spinal marrow*, are in totally opposite conditions, in reference to the irritability of the muscular fibre in the limbs severally affected;—facts equally obvious in experiments and in clinical observations.

With a view to reconcile these apparent contradictions, I instituted a series of experiments; and found that the muscles of a limb, paralyzed by its separation from both cerebrum and spinal marrow, had lost their irritability; while those of the limb separated from its connexion from the cerebrum only, but left in its connexion with the spinal marrow, not only retained their irritability, but probably possessed it in an augmented degree. The next question came to be—"Do these phenomena obtain in the human frame?" I visited a patient affected with hemiplegia, including paralysis of the face; and I passed a slight galvanic shock through two pieces of metal, of which one was placed over each cheek. The muscles of the paralytic side were most affected. I repeated the experiment, with the same result. I now compared with these, two cases of injury of the facial nerve;—passing the galvanic shock in the same manner through the fibres of the "orbicularis": it was now the muscle of the healthy side which was affected by the galvanism;—the eye-lid of that side being closed, while that of the paralytic side gaped as before. I next compared the effect of galvanism in two cases of complete paralysis of the arm; one hemiplegic, the other the result of dislocation of the shoulder. The muscles of the former were more, those of the latter less, irritable than those of the healthy arm respectively; as were also those of the arm of a patient affected with the paralysis induced by lead. Lastly: I compared two cases of paralysis of the lower extremities; one arising after pertussis, and therefore cerebral; the other, I think, from disease within the lumbar vertebræ: in the former there was augmented, in the latter diminished, irritability.

[a] Dr. Marshall Hall.

By means of these experiments and observations, we are enabled (I believe) to explain all the apparent discrepancies between the statements of former authors, and between each of them and my own. We may conclude that, in cerebral paralysis, the irritability of the muscular fibre becomes augmented, from want of the application of the stimulus of volition; in paralysis arising from disease of the spinal marrow and its nerves, this irritability is diminished, and at length becomes extinct, from its source being cut off. We may further deduce, from the facts which have been detailed, that the spinal marrow, and not the cerebrum, is the special source of the power in the nerves of exciting muscular contraction, and of the irritability of the muscular fibre;—that the cerebrum is, on the contrary, the exhauster, through its acts of volition, of the muscular irritability.

As a further deduction from the same facts, we may infer the diagnosis between *cerebral* and *spinal* paralysis. Mere *cerebral* paralysis is attended by *augmented* irritability; whereas *spinal* paralysis is that which is attended by *diminished* irritability.

Influence of Volition.—Volition has a constant influence over some of the muscular actions; though we are almost unconscious of it, and only discover it by carefully observing the effects of its subtraction. The acts of respiration—originating, as they do, in the reflex function of the spinal marrow—are regulated and rendered equable by this silent, but constant, influence and agency of volition. Let this influence be withdrawn, as it is greatly during sleep, and in the moments of great attention, and the respiration immediately becomes audible, suspirious, and irregular. I have particularly noticed the condition of the respiration during deep sleep, and during the intense application of the mathematician in his studies, and of the engraver in the execution of the finer parts of his work; and I have uniformly observed the effect of this subtracted influence of volition. In coma, the same phenomena are still more remarkable; and the respiration becomes stertorous, variously irregular, and alternately suspended and sighing. The degree of this change marks the degree of the coma; but when the coma is deep, other causes are involved besides the subtraction of volition; namely, an impaired condition of the reflex function itself;—arising from counter pressure on the "medulla oblongata."

It is difficult to determine how far this regulating influence of volition is essential to life. The anencephalous human fœtus, in which the true spinal system is perfect, is, nevertheless, *not* viable; yet, in the experiments of M. Flourens, the common fowl lived for a considerable period after the removal of the cerebrum.[a] The effects of opium, and other narcotics, would doubtless prove fatal in many instances, if the patient were allowed to enjoy his overwhelming sleep; and were not constantly roused to continued acts of volition, with their attendant influence on the respiration. We keep the narcotized patient moving, that he may be kept breathing well. I need scarcely observe, that the position of the body, as well as every action of locomotion, involves the constant and the almost equally unconscious influence of volition. As the true rhythm of respiration is sustained by the constant agency of volition, so every act and every step are guided by the

[a] J'enlevai les deux lobes cérébraux à la fois sur une belle et vigoureuse poule. Cette poule, privée de ses deux lobes, a vécu dix mois entiers dans la plus parfaite santé; et vivrait sûrement encore, si, au moment de mon retour à Paris, je n'avais été obligé de l'abandonner. (I removed both the cerebral hemispheres of a young and vigorous fowl; which lived for ten whole months, in the most perfect health; and would no doubt have been living still, had I not, on my return to Paris, been obliged to abandon it.)—"*Du Système Nerveux*"; *par P. Flourens. Page* 87.

same power continually. In cases of anæsthesia, the patient cannot retain a cup between his fingers safely, unless he keep his eye steadily fixed upon the object and the grasp; so as to supply by vision the loss of the sense of touch,—the usual and essential prompter of the acts of volition.[a]

Influence of Emotion.—But if *volition* has frequently a silent and unsuspected influence on the muscular movements, this is still more true, for obvious reasons, of *emotion*. This assertion will not appear unguarded when I remind the reader, that the influence of emotion is the almost sole cause of *expression*;—whether observed in the countenance, the hand, the respiration, or in the action of other parts of the muscular system. Man lives a life of emotion; and every passing thought,—every care,—desire,—passion, is impressed as it were on the muscular system. Violent emotions, such as sudden and great surprise, induce spasm of the muscles, or the very contrary effect;—as is seen in the relaxation of the sphincters from fear. The internal organs equally feel the influence of emotion: the heart and some parts of the arterial system, the intestinal canal, &c., the cutaneous surface, the kidney, &c., are obviously amongst this number.

Every day's observation convinces me, that the effects of emotion, in inducing and complicating diseases of the nervous system, are greater than has hitherto been imagined. This is observed, more particularly, in chorea, tetanus, &c.

In healthy circumstances, the influence of emotion is contracted and frequently altogether counteracted by that of volition; but in circumstances in which this latter influence is withdrawn, that of the former becomes strongly manifested. Thus the agitation of Nelson's heroic mind could not have been seen in his countenance or actions, in ordinary circumstances; but the stump of his amputated arm, withdrawn from the habitual subjugation of volition, was violently agitated on many trying occasions of emotion; and I have seen similar effects in other instances. Thus, too, the hemiplegic arm, paralyzed to volition, is moved and agitated by every emotion; such as surprise, and especially such as are connected with respiration (and they are only *connected* with respiration and not really *respiratory*); as sighing, yawning, stretching, &c.[b]]

SECTION I.—HEMIPLEGIA.

Symptoms.—I shall now describe the *particular forms* of paralysis; and, in the first place, consider hemiplegia (which derives its name from ἡμισυς, *half*; and πλησσω, *to strike*). In this disease, one half of the body (divided *vertically*) is paralyzed. There is generally no loss of sight, smell, taste, or hearing. Indeed, there is one case to which I before alluded, put on record by Dr. Heberden, where an individual labouring under hemiplegia, had an extraordinary *acuteness* of smell.[c] But, in general, when paralysis occurs down

[a] The course and the flight of birds continue after decapitation; and, therefore, independently of volition; and, consequently, of *aim* or design. In such cases, flight depends on the "vis nervosa"; on the same principle, therefore, as the movements of respiration. In this manner we explain the circumstances of the long flight of the swallow, &c., in its migration, and the high flight of the lark during its love-song: excited by instinct and desire, these flights are *guided* by sense and volition; but they are sustained by a principle which, as in respiration, is incapable of fatigue. Our surprise at the immense flight of these birds is consequently greatly diminished. But this subject must not be pursued on the present occasion.—*Dr. Marshall Hall.*

[b] "Diseases and Derangements of the Nervous System. By Marshall Hall, M.D." Pages 207, 215, 216, 254, 255, and 256.

[c] See Page 739.

one half of the body, it is not *perfect* paralysis; in so far as the eye and ear of that side, half of the nose, and the tongue, have their senses acutely enough. This form of paralysis, very often, is united with more or less delirium and phrenitis. It frequently attacks those who are fatuitous; or who labour under mania. It may be a mere hysterical affection, and soon recovered from. The *other* forms of paralysis may be hysterical; but hysteria, when accompanied by paralysis, is perhaps more frequently accompanied by hemiplegia, than by any other form.

Most frequent on the Left Side.—With regard to the side affected, Sir Gilbert Blane says, from some comparative observations made by him when physician at St. Thomas's Hospital, that he found *three* cases of hemiplegia on the *left* side, for *two* on the *right*. I have not myself made any comparative observations. The pulse, in the paralytic side, is smaller than on the other.

A Sequel of Apoplexy.—Hemiplegia is, very commonly, a sequel of apoplexy. When a fit of apoplexy is over, and paralysis is left, the form is usually hemiplegic.[a] Generally, when hemiplegia occurs suddenly, there is a degree of apoplexy;—an imperfect apoplectic fit;—a degree of drowsiness and sleepiness. There may be no stertorous breathing; but the person generally loses himself for a time. I think hemiplegia more frequently commences in that way, than in any other; but where a person has a downright attack of fully formed apoplexy, the disease is very likely indeed to follow. Serres (to whom I formerly alluded[b]) says, that of one hundred cases of apoplexy which he examined, seventy-nine of them were complicated with palsy;—so frequently is apoplexy followed by palsy. Occasionally there is not only no real perfect apoplexy, but no sopor,—no loss of the individual to himself for a time; but merely vertigo,—a little confusion; and then, to his great astonishment, the patient finds an arm or a leg palsied.

More frequently Occurs in Bed.—An attack of this description I think, more frequently occurs in bed, than in any other place. Many persons who lose the use of one side suddenly, and who have no decided apoplectic attack, say that it happened in bed;—that they awoke in the morning, and found themselves in this situation; or that it occurred late at night, or very early in the morning.

May Commence Gradually.—Occasionally, however, this form of the disease begins very slowly; commencing in the fingers or in the toes, and creeping up; and occasionally, where it does begin suddenly, the person first loses the use of a leg or an arm, and then (an hour, a day, or a week afterwards) he loses the other member of the affected side.

General Effects.—From the voluntary muscles of half the body being more or less deprived of the influence of the will, the face is usually drawn to the opposite side. From the muscles losing the influence of the nerves connected with the brain and spinal marrow, they are more or less powerless: and the muscles of the opposite side, which are in due connexion with the brain, get the better of them, and master them completely; so that the face is drawn to the healthy side. The tongue, if it be drawn at all, is usually drawn to the same side;—on account of the operation of the muscles. From the impaired state of the muscles of the mouth and tongue, the person does not swallow his saliva as soon as it is formed. We are always getting rid of it in health more or less insensibly; but for want of this voluntary action, it collects to a certain amount, and then runs out of

[a] See Page 562. [b] See Page 592.

the corner of the mouth;—so that the patient slobbers. If the disease affect the mouth with any intensity, the voice is thick, from the affection of the muscles of the throat. The patient's utterance is altered; he "clips the king's English", as people say; and perhaps he can scarcely pronounce his words with sufficient distinctness to be understood. If the paralysis be perfect, the face and gait of the person at once shew the nature of the disease, without the necessity of asking a question. The mouth is drawn to one side; the saliva runs out; the arm hangs useless; and, if the patient attempt to walk, he drags the affected limb in a sort of semicircular manner; having the ball of the great toe, for the most part, in contact with the ground.

When the disease continues for any considerable time, the limbs waste;—they become flabby to the feel, and diminish in size. The mind, too, generally suffers a little. The patient does not find his attention so good as it was before; nor his memory. His feelings are much affected; so that he is disposed to burst into tears, without any evident external cause; and he is, for the most part, very peevish. I mentioned, when speaking of tetanus, that Sir Gilbert Blane informed me of a case, which was accompanied by pleasurable twitches[a]; and Dr. Cook, in his work on Nervous Disease, mentions the case of a person who had been very captious; but who, after a fit of palsy, became the most good-natured person possible. The symptoms which occurred at the time of the fit, or preceded it, (such as vertigo and headach,) may continue afterwards, and may increase. There is great variety, as to the effects of sense and motion, in the affected part. Sometimes the person retains his *feelings* perfectly; but loses all power of *motion*; and, in other cases, a person loses both; but it is a very rare thing indeed to see a loss of the sense of touch. Usually motion is impaired or destroyed; and sensation more or less so, or not at all.

Frequently followed by Apoplexy.—This disease, very frequently, does not *follow* apoplexy; but is itself *followed* by apoplexy.[b] We may easily imagine that, if the cause be in the brain, although at first it may be so inconsiderable as only to be just sufficient to produce hemiplegia, yet it may, if the morbid process go on, become more considerable; and, at last, it may be sufficient to produce apoplexy. While apoplexy sometimes leaves hemiplegia, hemiplegia is sometimes followed by apoplexy.

Progress of Amendment.—When the disease diminishes, I believe (for the most part) the arm mends last;—that, after the patient has begun to walk tolerably with the affected limb, his arm long remains useless at his side; and sometimes it never recovers. There is a variety in this. Some persons recover both limbs at once; but if there be any difference, it is in favour of the leg. While some persons completely recover, others do not recover at all; and while some will get worse, others will remain stationary. Some persons will live ten, or perhaps fifteen years, in the same state. Another difference occurs. They will mend up to a certain point;—perhaps for a year or two; and then never advance further.

Liable to Recur.—This is a disease which may occur again and again. Recurrences of it are frequently seen. It is a disease which I have seen, several times, in children; and I believe, more frequently than not, they recover from it.

Causes and Morbid Appearances.—The cause of this particular form of paralysis, is sometimes mere fulness about the head;—fulness which is often transient; and therefore the disease is transient. Frequently there

[a] See Page 700. [b] See Page 561.

is found, after death, serous effusion; and that, perhaps, in a very inconsiderable quantity, even where the paralysis is very great; and perhaps the effusion is rather the effect of the morbid cause which induces the paralysis, than the cause of the paralysis itself. Effusion, however, is often the cause of paralysis. The most frequent state of the brain which I see, (and therefore, I suppose, which other people see,) is a softened state of some one spot. It is curious how small a portion is sometimes sufficient, when softened, to give rise to this disease. Occasionally the softening is very great;—extending over a great part of one of the hemispheres, or the "corpus callosum." This softening, in many cases, is clearly the result of inflammation. A chronic inflammation of the brain, often precedes this softened state; and very frequently it follows an *acute* inflammation of the brain. Persons seized with acute inflammation of the brain become paralytic; and we afterwards find the brain more or less softened. Sometimes the disease will increase. The patient becomes delirious; perhaps he has epileptic fits; and the head is very hot. All the time he is delirious, he complains of great pain of the head; and, on opening the skull, we find a portion of the brain softened; and around the softened spot, and even running through it, are seen red vessels. There can be no doubt, in such a case as this, that the disease is the result of inflammation. I, as well as others, have frequently noticed, that after paralysis has begun, although there may previously have been no great affection of the head, the latter will sometimes become affected. Patients gradually complain of more and more pain; gradually have the head more and more hot; gradually become more and more delirious; and then they die. It appears as though, at first, there had only been softening enough to produce paralysis;—only enough to produce inflammation; and the latter has then gone on to a far greater extent. It is said, by Dr. Hooper and others, that when there is softness of the brain, it is analogous to the gangrene of other parts; but whether it really is the case, I do not know. A part may be softened, without there having been symptoms to lead us to conclude the existence of gangrene. There can be no question that this softening of the brain is, sometimes, not inflammatory; for it is accompanied by paleness, not only in one spot, but all around. If there be inflammation, it shews itself in a very odd way; for the part is white all around. I can suppose that the brain may be broken up, without inflammation;—just as the coats of the stomach may sometimes be found perfectly pulpy, and perfectly pale.

Sometimes Caused by a Coagulum.—Occasionally the paralysis, in hemiplegia, has been induced by a coagulum of blood; and this coagulum may be of all sizes. When paralysis comes on in a moment, without any previous inflammation, I imagine that in general there is an effusion of blood. Apoplexy may be the result of the effusion of blood; but when the apoplexy is over,—when, I presume, that general state of congestion of the blood-vessels, which was sufficient to produce apoplexy, has gone off,—then there remains a clot, just sufficient to produce hemiplegia. The blood becomes absorbed;—sometimes leaving a cavity, and sometimes not; the parts then all become contracted together; and a cicatrix is formed. Around this spot, the brain is generally softened. I mentioned this circumstance, as taking place in apoplexy[a]; and it also occurs in paralysis. The paralysis arises, I believe, from what remains after the clot has been absorbed. The brown, dark-coloured substance, which is sometimes taken from the brain of a hemiplegic patient, I should imagine to be the remains

[a] See Page 565.

of blood. The blood was nearly all absorbed; but the brown softened part left behind, was quite sufficient to produce paralysis.

Dr. Abercrombie says, a cyst will form round a clot of this kind, even in a fortnight. Whether extravasated blood can be absorbed from a ventricle, if effused in any quantity, I do not know; but I should think not. In most cases of that description, the blood has lacerated the brain, and forced its way from the substance of the hemisphere, into the ventricle. Four ounces of blood have been found, after paralysis, in a cavity formed in the brain. When the brain has been softened, and has produced hemiplegia, or fatuity, or only an aberration of the mental faculties, the vessels will sometimes suddenly give way; and then there is apoplexy;—an effusion of blood suddenly taking place into the softened part. Softening is supposed, by some, to resemble "gangrena *senilis*";—that gangrene which takes place in the toes of old people, from ossification[a] of the small vessels. Some will have it, that it is not the result of inflammation; but of disease of the vessels, affecting the circulation. I should imagine the truth to be, that (like most other diseases) it is the effect of different circumstances. That inflammation will soften the brain, there can be no doubt; and if the vessels be obstructed, so that the part is not nourished perfectly, then also it will become soft.

Pressure from Various Tumours.—Pressure from an abscess, or from various tumours formed upon the surface of the brain, (whether they be encysted, carcinomatous, melanotic, or of any other kind,) may have this effect. *White* tumours, *reddish* tumours, *scrofulous* tumours, tumours of all descriptions, and hydatids, have been seen (in this disease) pressing upon the brain, in different parts. It has sometimes been occasioned by the pressure of an exostosis;—from the bone growing too much in one particular spot, so as to compress the brain. Excessive thickening of the membranes has given rise to the disease.

The Cause is on the Opposite Side.—It is a well established fact, I think, that the disease occurs on the opposite side to that in which the cause of it resides. The observation of this fact is so general,—so many persons, who have extensive opportunities of examining patients, assert that they never met with an exception to it, that I cannot but think the few exceptions on record must have been mistakes. Serres says, that he opened one hundred and seventy cases of apoplexy united with hemiplegia; and that, in all those cases, the affection was on the opposite side. He opened forty-seven cases of mere hemiplegia; and there the affection was on the opposite side; and in about one hundred and fifty cases of paralysis detailed to him, the results were the same. I never saw an exception to it; and many authors say the same. There are a few instances to the contrary on record; some of which I have looked over; and to me they are any thing but satisfactory. In some of these, there could be no doubt, other morbid appearances were found at the same time; so that, in all probability, sufficient attention was not paid to the opposite side. In general, the brain is sliced very rapidly; and morbid appearances in the brain, I know, are every day passed over. On the other hand, when the *spinal marrow* suffers compression, or any cause sufficient to induce paralysis, the disease occurs on the *same* side.

Cause generally in the Substance of the Brain.—The cause of hemiplegia is *generally* within the substance of the brain; and pressure of the brain usually produces apoplexy; so that, I conceive, we have a reason for apo-

[a] From "os, ossis", *a bone*; and "facio", *to make*.

plexy occurring so often first, and leaving hemiplegia behind. Apoplexy generally arises from a mere temporary fullness of the vessels of the head. It goes off; and then some injury occurs at one particular spot, and is sufficient to produce hemiplegia. Local pressure on the surface of the brain, however, may likewise produce hemiplegia; and local pressure on any part of the brain, if it be very intense, will produce apoplexy, because pressure in any one spot of the brain, if it be intense, will necessarily compress the whole.

Loss of Verbal Memory.—A very curious symptom, sometimes observed in hemiplegia, is a loss of verbal memory. This is quite distinct from a loss of the power of utterance. In general, persons in this disease do not speak well; because they have not full power over the voluntary muscles of articulation[a]; but sometimes, if they *can* speak well, they have not a proper word in their mind; and they cannot make themselves understood. Some forget entirely the meaning of words; some forget entirely the meaning only of *names*[b]; and some do not forget these *entirely*; for the moment the proper word is mentioned, they say—"Right, thank you!" They know it directly. This affection of the mind occurs, sometimes, without any hemiplegia; and sometimes it lasts for a period, and then hemiplegia supervenes. Some have an abundance of *words*; but do not know their proper *meaning*. They distribute them about very incorrectly; so as not to express their wishes. Others have only a *few* words; and with these they endeavour to say every thing.

Dr. Prichard, in his work on Diseases of the Nervous System (to which I have so often referred[c]), mentions the case of a lady, who forgot the names of all persons; and of another who forgot the names of some things[d]; and who likewise forgot that she had ever been married. Dr. Currie mentions the case of a man, who forgot the Hebrew language alone,

[a] See Page 746.

[b] A singular instance has been related to me, of a gentleman who could not be made to understand the name of an object if it was *spoken* to him, but understood it perfectly when it was *written*. His mental faculties were so entire, that he was engaged in most extensive agricultural concerns; and he managed them with perfect correctness, by means of a remarkable contrivance. He kept before him, in the room where he transacted business, a list of the words which were most apt to occur in his intercourse with his workmen. When one of these wished to communicate with him on any subject, he first heard what the workmen had to say, but without understanding him further than simply to catch the words. He then turned to the words in his written list, and whenever they met his eye, he understood them perfectly. These particulars I heard from his son;—a gentleman of high intelligence. Another frequent modification consists in putting one name for another, but always using the words in the same sense. An example of this also occurred in the gentleman last mentioned. He uniformly called his snuff-box a "hogshead"; and the association which led to this appeared to be obvious. In the early part of his life, he had been in Virginia, and connected with the trade in tobacco; so that the transition from snuff to tobacco, and from tobacco to a hogshead, seemed to be natural. Another gentleman, affected in this manner, when he wanted coals put upon his fire, always called for paper; and when he wanted paper, called for coals; and these words he always used in the same manner. In other cases, the patient seems to invent names;—using words which, to a stranger, are quite unintelligible; but he always uses them in the same sense, and his immediate attendants come to understand what he means by them.—*Dr. Abercrombie's "Inquiries concerning the Intellectual Powers"; Part* 3; *Section* 1; *Subsection* 5. (*Ninth Edition; Page* 152.)

[c] See Page 663.

[d] The late Dr. Gregory used to mention a lady, who, after an apoplectic attack, recovered correctly her ideas of things, but could not name them. In giving directions concerning family-matters, she was quite distinct as to what she wished to be done; but could make herself understood only by going through the house, and pointing to the various articles.—*Dr. Abercrombie's "Inquiries concerning the Intellectual Powers"; Part* 3; *Section* 1; *Subsection* 5. (*Ninth Edition; Page* 150.)

out of several with which he was acquainted.[a] Mr. Abernethy used to mention the case of a man who, after an injury of the head, though he knew English very well, could speak nothing but French. He had been equally acquainted with both languages; but, after the injury he had sustained, he could only speak French. He also thought he was only sixteen years of age. Dr. Rush mentions the case of a lady, who forgot her English, and spoke nothing but French for a month.

A writer on hemiplegia, named Wepfer, mentions a case of this disease, in which, after the stupor ushering it in went off, the patient recollected neither persons nor words; and when he recovered the words again, he forgot their meaning. He lost all his language;—could not utter a single word; and at last, when he could, he forgot their meaning; and he preferred Latin to his own native language, which was German. He could read any thing, a few words at a time; and he wrote both Latin and English in elegant characters; but without knowing the meaning of a word. The end of the case was, that he died apoplectic.[b]

Some persons, however, forget only proper names.[c] Sir Alexander Crichton mentions the case of an attorney who, in his seventieth year, married a young lady; and, being very excitable, he also every evening saw his mistress. Under all this, as a consequence, from the excitement of his brain, he was seized with vertigo and insensibility; and these symptoms were followed by a loss of memory;—so that, instead of asking for *bread*, he asked for his *boots*; and if they were brought to him, he was very angry, because he wanted something to eat; but still he kept asking for *boots* or *shoes*, instead of for *bread*. Instead of asking for a *tumbler*, he inquired for a *chamber-pot*; and when he wanted a *chamber-pot*, he asked for a *tumbler* or *dish*: and yet he was conscious he was wrong; and recognised the right words when they were spoken by others, and then pronounced them by imitation.[d]

Dr. Abercrombie mentions having seen a case, in which the same wrong word was always used in the same wrong way. Whenever the patient missed the name of a particular object, he applied the same incorrect word (whatever it was) to the same thing. In the "Psychological Magazine", which is quoted by Sir Alexander Crichton (in his work on Disorders of

[a] Dr. Beattie mentions a gentleman who, after a blow on the head, lost his knowledge of Greek; and did not appear to have lost any thing else.—"*Dr. Abercrombie on the Intellectual Powers*"; *Part* 3; *Section* 1; *Subsection* 5. (*Ninth Edition*; *Page* 155.)

[b] After several weeks he began to know his friends, to remember words, to repeat "the Lord's prayer", and to read a few words of Latin, rather than German, which was his own language. When urged to read more than a few words at a time, he said that he formerly understood these things, but now did not. After some time, he began to pay more attention to what was passing around him; but, while thus making slight and gradual progress, he was (after a few months) suddenly cut off by an attack of apoplexy.—*Dr. Abercrombie's* "*Inquiries concerning the Intellectual Powers*"; *Part* 3; *Section* 1; *Subsection* 5. (*Ninth Edition*; *Page* 147.)

[c] A gentleman whom I attended some years ago, after recovering from an apoplectic attack, knew his friends perfectly, but could not name them. Walking one day in the street, he met a gentleman to whom he was very anxious to communicate something concerning a mutual friend. After various ineffectual attempts to make him understand whom he meant, he at last seized him by the arm, and dragged him through several streets, to the house of the gentleman of whom he was speaking, and pointed to the name-plate on the door.—*Dr. Abercrombie's* "*Inquiries concerning the Intellectual Powers*"; *Part* 3; *Section* 1; *Subsection* 5. (*Ninth Edition*; *Page* 150.)

[d] This gentleman was cured of the complaint, by large doses of valerian, and other cardiacs.—*Dr. Mason Good's* "*Study of Medicine*"; *Class* 4; *Order* 1; *Genus* 6; *Species* 1; *Variety* 2.

the Mind) a case is mentioned where a person, after much tiresome business, on attempting to write a receipt one morning, could not write more than the two first words. He wrote on slowly, letter after letter, in the most deliberate manner. He found that he spoke words different from what he meant. He saw that he was wrong; but he could not set himself right; but, instead of writing—"Received fifty dollars for half a year's rent", he wrote—"Received fifty dollars through the salvation of the Bible." This state lasted an hour or two, and then nothing of it remained.

I have seen two instances of this description. The one occurred in a lady, who was not hemiplegic, but who said she had a violent pain above each eye; and as long as that lasted, she could not tell the name of any thing; but when the name was mentioned, she knew it. This continued for some hours; and then the pain went off, and she knew every thing as well as before. After a short time, a second attack occurred. She had been taking digitalis. I know an instance of a medical man, who makes a dead pause, and says—"I cannot tell the word; I want to tell you what is the name of such a thing." It will occur every thirty or forty words.

Dr. Currie (formerly of Guy's Hospital) says that he knew a person who, during an attack of this description, began his words in English, and ended them in Latin. At St. Thomas's Hospital (before the time of my connexion with that institution), there was a Welchman who had forgotten his native language; but, while suffering from an injury of the head, he spoke nothing but Welch.[a] When he recovered, he forgot it entirely; and talked only English.[b] Dr. Rush mentions an instance of a student who, in consequence of a fever, lost his Latin, and began to learn it again; when, one day, it suddenly returned;—just as the power over paralyzed parts of the body will occasionally do. He also mentions, that a French countess, during the excitement of fever, spoke the language of Lower Brittany, which she had learned when young.[c] Dr. Abercrombie (one of the most recent writers on the subject) mentions the case of an American student; who, after fever, forgot all names[d]; and, after learning

[a] A few years ago, a man with brain-fever was taken into St. Thomas's Hospital; and, as he grew better, spoke to his attendants, but in a language they did not understand. A Welch milk-woman, going by accident into the ward, heard him, answered him, and conversed with him. It was then found, that the patient was by birth a Welchman; but had left his native land in his youth, forgotten his native dialect, and used English for the last thirty years. Yet, in consequence of this fever, he had now forgotten the English tongue, and suddenly recovered the Welch.—*Dr. Mason Good's "Study of Medicine"; Class* 4; *Order* 1; *Genus* 6; *Species* 1; *Variety* 2.

[b] Sir Astley Cooper mentions this case, as having occurred in *Guy's* Hospital. It is recorded in his "Treatise on Dislocations and Fractures of the Joints (abridged). With important Additions, from the Works of the most distinguished modern Surgeons. Edited by Alexander Cooper Lee." Published by Butler, Medical Bookseller, St. Thomas's Street, Southwark. Page 536.

[c] A lady, mentioned by Dr. Prichard, when in a state of delirium, spoke a language which nobody about her understood; but which also was discovered to be Welch. None of her friends could form any conception of the manner in which she had become acquainted with that language; but (after much inquiry) it was discovered that in her childhood she had a nurse, who was a native of a district on the coast of Brittany; the dialect of which is closely analogous to Welch. The lady had at that time learnt a good deal of this dialect; but had entirely forgotten it for many years before this attack of fever.—*Dr. Abercrombie's "Inquiries concerning the Intellectual Powers"; Part* 3; *Section* 1; *Subsection* 5; *Head* 4. (*Ninth Edition; Page* 141.)

[d] The late Bishop of Llandaff, Dr. Watson, gives a singular case of partial amnesia in his father;—the result of an apo-

the names, he was taught to read, and began his Latin. After a little progress, he had suddenly a strong sensation in his head. He applied his hand to it; and said, that he found all he had been learning he knew some time before.

[Dr. Rush mentions an Italian gentleman, who died of the yellow-fever in New York; and who, in the beginning of his illness spoke English, in the middle of it French, but on the day of his death only Italian.

A Lutheran clergyman, of Philadelphia, informed Dr. Rush, that Germans and Swedes, of whom he had a considerable number in his congregation, when near death, always prayed in their native languages; though some of them, he was confident, had not spoken these languages for fifty or sixty years.

A case has been related to me[a] of a boy who, at the age of four, received a fracture of the skull, for which he underwent the operation of trepan. He was, at the time, in a state of perfect stupor; and, after his recovery, retained no recollection either of the accident or the operation. At the age of fifteen, during the delirium of a fever, he gave his mother an account of the operation, and the persons who were present at it; with a correct description of their dress, and other minute particulars. He had never been observed to allude to it before; and no means were known by which he could have acquired the circumstances which he mentioned. An eminent medical friend informs me[a], that, during fever, without any delirium, he on one occasion repeated long passages from Homer, which he could not do when in health; and another friend has mentioned to me, that, in a similar situation, there were represented to his mind, in a most vivid manner, the circumstances of a journey to the Highlands, which he had performed long before;—including many minute particulars, which he had entirely forgotten. A gentleman, who was under the care of Dr. Johnston, of Kirkaldy, when in a state of slight delirium, connected with erysipelas of the head, sang with great precision some Gaelic songs. In health he had no kind of taste for music; and though in his youth he had some knowledge of the Gaelic language, he had been for many years entirely unaccustomed to it; and his knowledge of the language was supposed to be nearly or altogether lost. An ignorant servant girl, mentioned by Coleridge, during the delirium of fever, repeated passages from theological works in Latin, Greek, and Rabbinical Hebrew; which, being taken down and traced to the works from which they were derived, were found to be repeated with perfect accuracy. It turned out, that she had been servant to a clergyman,—a man of much learning and peculiar habits; who was in the practice of walking backwards and forwards, along a passage in his house which led to the kitchen, and there reading aloud his favourite authors. The late Dr. Gregory[b] was accustomed to mention, in his lectures, the case of a clergyman who, while labouring under a disease of the

plectic attack. "I have heard him ask twenty times a day", says Dr. Watson,—"'What is the name of the lad that is at college?' (my elder brother); and yet he was able to repeat, without a blunder, hundreds of lines out of classic authors." Hence, there is no reason for discrediting the story of a German statesman, a Mr. Von B., related in the seventh volume of the "Psychological Magazine"; who, having called at a gentleman's house, the servants of which did not know him, was under the necessity of giving his name; but unfortunately at that moment, he had forgotten it; and excited no small degree of laughter, by turning round to a friend who accompanied him, and saying, with great earnestness,—"Pray tell me who I am; for I cannot recollect!".—*Dr. Mason Good's "Study of Medicine"; Class* 4; *Order* 1; *Genus* 6; *Species* 1; *Variety* 2.

[a] Dr. Abercrombie.

[b] See Note to Page 270.

brain, spoke nothing but Hebrew; which was ascertained to be the last language he had acquired. An English lady, mentioned by Dr. Prichard, on recovering from an apoplectic attack, always spoke to her attendants in French; and had actually lost the knowledge of the English language. This continued about a month. A gentleman, whom I[a] attended in a state of perfect apoplexy (from which he did not recover), was frequently observed to adjust his nightcap with the utmost care, when it got into an uncomfortable state;—first pulling it down over his eyes, and then turning up the front of it, in the most exact manner. Another, whom I[a] saw in a state of profound apoplexy (from which he recovered), had a perfect recollection of what took place during the attack; and mentioned many things which had been said in his hearing, when he was supposed to be in a state of unconsciousness. A lady, on recovering from a similar state, said she had been asleep and dreaming.

A man, mentioned by Willis, on recovering from a putrid fever, was found to have so entirely lost his mental faculties, that he knew nobody, remembered nothing, and understood nothing. He continued in this state for two months, and then gradually recovered. Some years ago I[a] attended a young man who, on recovering from a tedious fever, was found to be in a state bordering upon idiotism; and this continued even after his bodily health was restored. In this state he was taken into the country; when, after several months, he gradually recovered.

Some years ago, I[a] saw a boy who had fallen from a wall, and struck his head against a stone which lay at the foot of it. He was carried home in a state of insensibility, from which he soon recovered, but without any recollection of the accident. He felt that his head was hurt; but he had no idea how he had received the injury. After a short time, he recollected that he had struck his head against a stone; but had no recollection how he had come to do so. After another interval, he recollected that he had been on the top of a wall, and had fallen from it, and struck against the stone; but could not remember where that wall was. After some time longer, he recovered the recollection of all the circumstances. Dr. Prichard mentions a gentleman, who suffered a severe injury by a fall from his horse, and on his recovery had no recollection of any thing of the accident, or for some time before it. A considerable time elapsed before his recollection of it began to return; and it was only as he repeatedly rode over the country where the accident had happened, that the sight of the various objects gradually recalled the circumstances of the journey in which it occurred, and the accident itself. A lady, whose case has been communicated to me[a], was seized with an apoplectic attack while engaged at cards. The seizure took place on a Thursday evening. She lay in a state of stupor on Friday and Saturday; and recovered her consciousness, rather suddenly, on Sunday. The first words she then uttered were—"What is trump?" A respectable surgeon was thrown from his horse, while riding in the country; and was carried into an adjoining house, in a state of insensibility. From this he very soon recovered, described the accident distinctly, and gave minute directions with regard to his own treatment. In particular, he requested that he might be immediately bled; the bleeding was repeated, at his own desire, after two hours; and he conversed correctly, regarding his feelings, and the state of his pulse, with the medical man who visited him. In the evening, he was so much recovered as to be able to be removed to his own house; and a medical friend accompanied him in the

[a] Dr. Abercrombie.

carriage. As they drew near home, the latter made some observation, respecting precautions calculated to prevent unnecessary alarm to the wife and family of the patient; when, to his astonishment, he discovered that his friend had lost all idea of having either wife or children. This continued during the following day; and it was only on the third day, and after further bleeding, that the circumstances of his past life began to recur to his mind.

A young clergyman, when on the point of being married, suffered an injury of the head, by which his understanding was entirely and permanently deranged. He lived in this condition to eighty; and, to the last, talked of nothing but his approaching wedding, and expressed impatience for the arrival of the happy day.[a]]

[Many persons can catch hold of an entire song, an entire sermon, or a series of speeches in parliament; and can recite them almost, if not altogether, verbatim immediately afterwards; but who lose all recollection of them in a day or two: while there are others, who are obliged to pause over the subject submitted to them, or have it repeated several times before they can get it by heart; yet who, when they have once fixed it in the memory, retain it as long as they live. Mr. W. Woodfall, the celebrated reporter of the parliamentary debates, was an instance of the former of these talents, with regard to his powers of apprehension; the well known Jedediah Buxton was an example of the latter: though it may be mentioned, that Mr. Woodfall retained with as much ease, as he first fixed speeches in his memory.

Failure of memory takes place in a variety of ways. It is sometimes general, and extends to every subject; but it is frequently far more manifest on some subjects than on others. Salmuth mentions a case, in which the affected person had forgotten to pronounce words, but could nevertheless write them. Mr. J. Hunter was suddenly attacked with a singular affection of this kind in December, 1789, when on a visit at the house of a friend in town. He did not know in what part of the house he was, nor even the name of the street when told it, nor where his own house was: he had not a conception of any thing existing beyond the room he was in; yet was perfectly conscious of the loss of memory. He was sensible of impressions of all kinds from the senses; and therefore looked out of the window, although rather dark, to see if he could be made sensible of the situation of the house. The loss of memory gradually went off; and, in less than half an hour, his memory was perfectly recovered. This might possibly be connected with a gouty habit, to which Mr. Hunter was subject; though not at this time labouring under a paroxysm.

Boerhaave, however, gives a still more extraordinary instance of oblivion; —in the case of a Spanish tragic author, who had composed many excellent pieces, but so completely lost his memory (in consequence of an acute fever), that he forgot, not only the languages he had formerly learned, but even the alphabet; and was hence under the necessity of beginning to read again. His own poems and compositions were shewn him; but he could not be persuaded that they were his productions. Afterwards, however, he began once more to compose verses; which had so striking a resemblance to his former writings, that he at length became convinced of his being the author of them.[b]]

[a] Dr. Abercrombie's "Inquiries concerning the Intellectual Powers"; Part 3; Section 1; Subsection 5. (Ninth Edition; Pages 142 to 150.)

[b] Dr. Mason Good's "Study of Medicine"; Class 4; Order 1; Genus 6; Species 1; Variety 2.

These things are very curious. They occur in different circumstances; but they are, no doubt, of the nature of paralysis; and very frequently they are united with it.

SECTION II.—PARAPLEGIA.

Symptoms.—In paraplegia (so called from παρα, *badly*, and πλησσω, *to strike*), or that form of palsy which affects one half of the body *horizontally* divided, both sense and motion are generally lost. There is, very frequently, constipation and retention of urine. At last, however, the sphincters become paralyzed; and there is neither retention of urine nor costiveness; but both fæces and urine pass involuntarily. In this form of paralysis, it is very common for the affected parts to experience spasmodic twitches and catches. This is an occurrence comparatively rare in *hemiplegia*. Very frequently, too, there is violent pain. In *hemiplegia* there is *sometimes* pain; but by no means so frequently as in *paraplegia*. The urine, in this disease, is sometimes altered in quality. It is not sufficiently acid. It is perhaps alkalescent; but when it is not, still there is a deficiency of acid; and, soon after it is passed, it becomes strongly alkalescent. This is more particularly the case, when the paralysis has arisen from an injury to the spine.

Progress.—When paraplegia does not come on suddenly, it usually commences in the lowest part,—the toes; and extends upwards. Its extent is various; but it generally reaches a little higher than the hips.

Causes.—It is very frequently produced by a fracture of the vertebræ; and the higher the vertebræ in which the fracture takes place, the higher is the paralysis; and the sooner does death take place,—if death do occur. Caries of the vertebræ, also, frequently produces this affection. Any disease of the spinal marrow, and many diseases of the membranes, produce paraplegia. In some instances, the spinal marrow is softened into a pulp, at one particular spot. Sometimes it is exceedingly hardened; and sometimes the membranes, also, are exceedingly diseased. Sometimes there is suppuration,—producing compression; and sometimes an effusion of serum, or of blood.

All the diseases which I mentioned on the subject as occurring in the brain, and producing hemiplegia, and other forms of paralysis [a], may occur in the spinal marrow, and produce paraplegia. Sometimes a clot of blood has been found; sometimes considerable hæmorrhage,—compressing the spinal marrow;—tumours of various descriptions;—exostosis of bone; as well as a mechanically altered position of the parts, diminishing the canal locally. I had a very striking case of this, in a boy who died of peritonæal disease. His peritonæum was filled with tubercles; and, besides symptoms of mesenteric [b] disease, he had lost the use of the lower extremities. The paraplegia was at once explained, by finding a scrofulous tubercle, as large as a nut, in the centre of the spinal marrow. The disease has frequently arisen from mechanical injury, when the bones appear to have sustained no violence; and in such instances I have seen recovery take place. In all probability, an effusion of blood had occurred, which was afterwards absorbed; or the parts received such a shock, as was equivalent to concussion of the brain. I can conceive that,—as an affection of the brain may be induced by mere concussion, and may last for a day, or a month, or months,

[a] See Pages 746 to 748.

[b] From μισος, *the middle*; and εντερον, *an intestine*.

—so a mere concussion of the spinal marrow may unfit it for its functions for a time; and the person may eventually recover;—at least, patients frequently recover from paraplegia, produced by a fall or a blow upon the spine. The softening which we observe, is sometimes the result of acute or chronic inflammation; and sometimes it is not the result of inflammation at all; but a morbid change not well understood.[a]

Sometimes arises from Cold.—Paraplegia sometimes arises from cold. I had under my care a man, who had lost the use of his lower extremities from working in cold water in a ditch;—digging the foundation of a wall, or something of that description. He was continually hard at work in damp, cold places. We rarely see *hemiplegia* produced in this way; the reason of which is evident. Cold is continually applied to the *lower* extremities *horizontally*, but it is very seldom indeed applied to the *upper* extremities *vertically*. The lower extremities are frequently in water, while the upper are not.

Can it arise from Cerebral Affection?—But besides all these causes in the spinal marrow, there can be no doubt that paraplegia arises, sometimes, from an affection of the head; because, occasionally, we find no uneasiness whatever in the spinal marrow; but there are symptoms of great uneasiness in the head; such as giddiness and drowsiness. Dr. Baillie wrote a paper in the "Transactions of the College of Physicians"[b], to show that, in the greater number of cases of paraplegia occurring in adults, the cause was situated in the head. However, he did not prove the point at all. He gave but one dissection[c]; and that was not seen by himself.[d] Whoever reflects on all the cases which he has seen of this kind, will find that, in the greater number of instances, the cause was evidently situated in the spinal marrow. He will arrive at this conclusion, from the cause having been applied to that part; from the uneasiness being felt there; or from the morbid appearances presented there on dissection; but occasionally there can be no question, that the disease arises from an affection of the head. I have seen a case of this description. The gentleman was a little poorly, and confined to his bed; but he had no great ailment. It was discovered, one day, that he had lost the use of his lower extremities; though no cause whatever could be assigned for it. He could not stand on his lower extremities. His urine had not passed; nor his fæces. No violence, that he was aware of, had been applied to the spine, or to any other part; and he bore striking all down the spine. Pressure of the most violent kind gave him no pain. He told me, however, that he had had symptoms of giddiness a day or two after he was first seized; and delirium came on. The cause in this case was evidently situated in the head; but I am satisfied, that for one case where the cause of paraplegia is situated in the *head*,

[a] See Page 565.

[b] Volume 6; Page 16.

[c] The bones of the skull, more especially at the sutures, were more vascular than usual. The "*dura* mater" presented nearly its natural appearance, but the vessels of the "*pia* mater" were very much loaded with blood; and there were effusions of serum between the different membranes of the brain, on both sides of it. The "tunica arachnoides" was opaque, and much thickened. The substance of the cerebrum was considerably firmer, and that of the cerebellum was considerably softer, than is natural. About four ounces of water were found in the lateral ventricles of the brain; and a considerable quantity of water was discharged from within the theca of the spinal marrow.—"*Medical Transactions, published by the College of Physicians in London*"; *Volume* 6; *Page* 22.

[d] The account of this examination, was communicated to me [Dr. Baillie] by Mr. Pennington, of Montague Place; who had attended the patient for many years.—"*Medico-Chirurgical Transactions*"; *Volume* 6; *Page* 23.

there are eight, or ten, or perhaps a dozen, where it is situated in the *spinal marrow*.

Morbid Appearances.—Sometimes, after paraplegia, no morbid appearance is to be found;—exactly as is the case after apoplexy and hemiplegia. In the two latter diseases, I stated, frequently nothing wrong is found in the brain [a]; and in the former, occasionally, nothing wrong is found in the spinal marrow.

Cause of the Spasms.—The reason why we have spasms, twitchings, and considerable pain in this disease, is that it is so frequently produced by a certain degree of inflammation of the spinal marrow;—an inflammation that softens it; or by something pressing on the spinal marrow, or at any rate producing great irritability. The cause which compresses the spinal marrow, also irritates it at the same time; and the irritation produces such an affection of the roots of the nerves, that a sense of pain is felt; and if it be a nerve of motion, a spasm occurs. When the part is found compressed by a bone, and this compression is only partially established, then we have considerable twitchings.

SECTION III.—GENERAL TREATMENT OF PARALYSIS.

Surgical Treatment.—I will now consider the treatment of paralysis in general; or, at least, the treatment of hemiplegia and paraplegia. If there be a local cause evident and removable, our first plan is to attempt its removal. If the cause be a fracture of the cranial bones, of course surgical means should be immediately adopted, for removing such a source of irritation. If there be suppuration from a carious bone, or injury of a bone, measures should be taken (so far as accordant with the best surgical discoveries) for letting out the pus. I have seen pus let out by trephining the head, and opening the "dura mater"; but success, in such a case, must be very doubtful. The removal of a portion of fractured, or carious bone, is always to be attended to, when such serious effects take place as paralysis. If the cause be any thing taken into the stomach, we should endeavour to remove it.

Antiphlogistics.—Suppose the disease appear to be of an inflammatory nature;—if the head be hot, and there be violent pain; together with delirium, and things of that description; then, of course, common antiphlogistic treatment should be put in practice;—such as bleeding, purging, leeching, mercurializing as quickly as possible, applying cold, and starving the patient. This is the proper treatment of many cases of paralysis. In the first instance, we must treat the complaint according to the symptoms of congestion or fulness; but (as in the case of apoplexy) we must be on our guard not to go too far [b]; for if we do not attend carefully to the patient's pulse, every time we visit him, and do not visit him frequently, we may be surprised some day to find the pulse low, and the patient sunk irrecoverably.

In the Chronic Stage.—It is possible that paralysis may remain long after the inflammation is over; when the *effects* of inflammation only continue; when there is mere effusion left, or suppuration; or when the brain is softened, and there is no inflammation or congestion. At any rate all the patient's strength is gone; so that we should not be justified in severe measures, even if inflammation or congestion did exist. Great care is ne-

[a] See Pages 563, 746, and 747.

[b] See Page 573.

cessary, in this disease, not to push matters too far; and when there appears no danger of life, but the disease still continues, we have, in general, to carry on a certain degree of antiphlogistic treatment;—to make the patient abstain from wine, and from distilled liquors, and frequently from animal food. But we must not starve the patient too much; nor bring him too low in this chronic treatment.

Mercury and Iodine.—Mercury is very useful at first; but, after a time, it would only impair the powers of the patient; and after having given it a fair trial, it is a pity to have recourse to it again. Iodine has been strongly recommended, and will act as well as mercury; but it is only proper when rubbed in, in the form of ointment; and given internally, in combination with potassa. It is said to do good, and I have occasionally seen it useful; but when we consider that the disease may arise from so many different causes, it cannot be expected that any one thing can be of general use.

The plan most generally useful, is antiphlogistic treatment; because it removes congestion and inflammation; and prevents the parts from being pressed upon, by an excessive quantity of blood. If by chance any thing that ought to be absorbed supervene, antiphlogistic treatment will cause absorption, better than any thing else; and should there be some morbid growth, this may also be diminished by the same treatment.

Local Applications.—Local means, and counter-irritation near the part affected, are very proper;—that is to say, counter-irritation in the nape of the neck, where the *head* is affected; and down the *spine*, where the cause is situated there (as in paraplegia).

Tonics.—But, while adopting these measures, it is often very necessary (although we would not give *wine*) to give good food; and occasionally even tonics; and, after a time, they are often to be given rather freely. If there be great debility, we must not be afraid of giving wine. Patients will sink without it; and it will do no harm.

Opium.—To lessen the twitches and violent pain, opium is sometimes proper. If we keep the bowels open, and restrict the patient from improper stimuli, we may give opium; for it is a great advantage to lessen the pain and spasms. I have often administered opium, and never saw it do any harm; but, of course, I have always given it very cautiously. Though I am not habitually fearful with respect to medicine,—when I know my way, and know what the medicine is,—yet I am, at the same time, very careful in watching the effect of every dose; that I may stop before any harm takes place. There is no occasion to be *rash*, because we are *bold*.

Strychnine.—Where there are no signs of inflammation left, and the patient is languid, then stimulants may be given. On this account, strychnine has been particularly recommended; for although it is a narcotic, that will destroy life, it is a powerful stimulant to the nervous system. It will cause parts to twitch; and, while it stimulates the nerves of *sensation*, and the central parts of the nervous system connected with them, it at the same time stimulates those of *motion*;—producing spasm, twitching, and a tingling sensation. It must, however, be obvious, that strychnia cannot be of universal, or even general use. If a part of the nervous system be softened, and disease is induced by it, how can strychnine, or all the stimulants in the world, cure the affection? We cannot, by such means, make a *soft* part *hard*. We may stimulate the part for a time; but that will not cure the disease. If the disease arise from pressure, how can any stimulant whatever remove it? It cannot have the effect of removing an exostosis, or a tumour. I cannot say that I ever saw a case cured by it, unless the disease arose from mere torpor. Where it arises from cold, then we may

suppose, beforehand, that stimuli will do good; and I think I have seen strychnine serviceable in such cases. In common cases of paralysis,—arising (as they often do) from disease of the brain, where the parts have been softened in consequence,—we might give strychnine till the patient jumped out of bed; but it would only be to lie on the floor. I have given it freely; but I am not satisfied with it.

Other Stimulants.—Nux vomica, camphor, cayenne-pepper, musk, and ammonia, have been had recourse to; and have failed. Electricity and galvanism, I should say, stand upon the same level, in point of utility, with strychnine and other stimulants. They may do good if the disease arise from mere torpor; but if it arise from an organic cause, or from compression, or obstruction, or alteration of structure, it cannot be supposed they will do good;—according to the extravagant idea which some persons have formed of them. There can be no doubt of the occasional efficacy of strychnine; but if we look at the pathological state of the disease, we must perceive how futile it must often be.

Sometimes Ceases Spontaneously.—Paralysis will sometimes cease spontaneously when the cause is in the brain. If it arise from effusion, the fluid may be absorbed; and by proper treatment we may expedite the absorption; but after a time, if we do nothing, it will be absorbed;—just as congestion will cease after a time. A clot of blood may be absorbed; and whatever had been used,—whether electricity or strychnine,—of course it would have the credit of it; but if we try a series of cases, and treat them with one particular remedy, we shall find the latter fail in a great number of instances. After all, the antiphlogistic treatment is evidently more successful than any other; only it is necessary to remember that, after a time, it must not be pushed too far.

SECTION IV.—LOCAL PALSIES.

I now proceed to more limited palsies than the foregoing;—to what are called "*local* palsies." The most common local palsies affect the four organs of sense;—the eyes, the ears, the nose, and the tongue; the side of the face as to motion only; the upper eyelid as to motion only; a leg or an arm as to sense or motion; and the hands as to motion only. The cause of these local palsies is more frequently situated in the course of the nerves, after they have quitted the cerebral mass, or at the ends, than anywhere else. If the cause of palsy be in the brain itself, or in the spinal marrow, then we generally have more than local palsy;—either hemiplegia or paraplegia. But if the nerves be affected in their course after leaving the brain, or only at their extremities, then we generally have local palsy.

Amaurosis.—The first of these of which I will speak, is one of those affecting an organ of sense. It affects the optical nerves; and is called "amaurosis."

Symptoms of Amaurosis.—In this affection (which is also denominated "gutta serena") there is dimness or loss of sight, without any fault of the humours, or the capsules, or the cornea, or the conjunctiva. Frequently, on looking into the eye, we see that, at the bottom, it is lighter coloured than it should be; or that it is rather greenish. The iris is sluggish or immoveable; and generally the pupil is dilated. Sometimes, however, it is very much contracted; which arises from irritation of the third pair of nerves. Indeed, from an affection of the third pair, the iris is sometimes not obedient to the light. The cause of this disease is in the expansion of the optic nerve (the retina), or in the course of the nerve itself; perhaps at

the very origin (or termination),—the "corpora quadrigemina." Sometimes it arises from *softness* of the nerve; sometimes from extreme *induration*; sometimes from tumours pressing upon it. I knew a young lady who was amaurotic, from seven years of age till the time she died; which was between twenty and thirty. A tumour was found pressing on the optic nerve. Disease of the "corpora quadrigemina" frequently produces this affection; and so also does disease of the "thalami nervorum opticorum." The latter is often softened, however, without any affection of the eyes.

Causes of Amaurosis.—In this disease, there is very frequently headach, vertigo, and evident signs of cerebral congestion; but a very curious point in this disease is, that it will sometimes arise from an injury of another nerve than the optic. It has been known to arise from a wound of the supra-orbital nerve, and various nerves of the face. There are on record many cases, where amaurosis arose from an injury of some other nerve. Mr. Wardrop mentions several cases.[a] It there appears, that where the nerves of the face (the supra-orbital, for example) have been only half divided, the complete division of the nerve has restored the sight; so that *imperfect* division *produced* amaurosis, and *complete* division *cured* it. It happened to me, in 1815, to see an instance of this description;—in the case of a woman, aged twenty-seven, who could only see one portion of objects. In her it had arisen from arteriotomy in the temple. There could be no doubt that, in performing the operation, a twig of the nerve was injured; and, from that moment, she partially lost the sight of the corresponding eye. This is a very curious circumstance;—one with which I was not acquainted when I began practice; and one with which many persons, I believe, are still unacquainted. I presume it is from sympathy. Diseases will frequently arise from sympathy of the head with the stomach; and so I believe that, in this case, the circumstance arises from sympathy; and not from any connexion of function between the parts.

[The causes of amaurosis may be divided into three groups:—1. Those which affect the retina or optic nerve. 2. Those affecting the brain, or that part of it from which the optic nerves arise;—the "thalami nervorum opticorum." 3. Those affecting the body at large, or some particular organ, and thus sympathetically affecting the eye.

As causes of the first and second, we may enumerate:—1. Lesion, extravasation of blood, inflammatory deposition upon either of its surfaces, and loss of transparency of the retina. 2. Morbid growths within the eyeball, dropsy, atrophy, and all such disorganizations as directly oppress or derange the texture of the retina. 3. The state of apoplexy, hydrocephalus, tumour, or abscesses in or upon the brain, the optic nerve or its sheath; and thickening, extenuation, absorption, or ossification of the latter.

As causes of the third:—1. Temporary determination; vascular congestion or vacuity,—as from visceral and cerebral irritation; suppressed or deranged, or excessive secretions,—as of the liver, kidneys, uterus, mammæ, and testes; various forms of injury and disease; and sudden translations of remote morbid actions. 2. Idiopathic paralysis, suspension or exhaustion of sensorial power from various constitutional and local causes; from undue excitement or exertion of the visual faculty; and from the deleterious action of poisons on the nervous system,—as lead, mercury, &c.

The third division, or *functional* amaurosis, admits of the following sub-

[a] In his "Essay on the Morbid Anatomy of the Human Eye." Second Edition; Volume 2; Page 192.

ivisions:—1. The *symptomatic*, or that which is only a symptom of some eneral disease or disorder of the system; as, for example, general plethora, eneral debility, &c. 2. The *metastatic*, or that produced by the sudden ransference of the morbid action from another organ of the body; as, for xample, from the skin, the testicle, &c. 3. The *proper*, or that which mmediately depends upon a peculiar condition of the retina; as, for example, the visus nebulosus, muscæ volitantes, &c.[a]]

Hemeralopia.[b]—Amaurosis is singular in another respect. It is very requently a *temporary* or *periodical* paralysis. Some persons become amaurotic at night, though they can see well during the day; and this is called night-blindness", or " hemeralopia" (from ἡμέρα, *day*; and ὠψ, *the eye*)[c]; r (incorrectly) " nyctalopia" (from νυξ, *night*; and ὠψ, the *eye*).[d] It is ommon in hot climates; and especially occurs in new-comers. It is said o be produced there, in that particular instance, from the great glare of the un;—just as sheep are sometimes amaurotic in the spring, from being exosed to the glare of snow during winter; for it is observed that, in some nountainous parts, the sheep do not see till the commencement of summer;—till the snow has disappeared for some time. None of us can see at rst, when we enter from the light into a dark room; and that is the same ecurrence, on a small scale, which takes place in sheep that have been exosed to the glare of the snow. This has been observed, by some persons, o take place on board a ship. It has been noticed on the sea-coast, in the Vest Indies, in negroes, and in sailors near the equator. It is described y Mr. Bampfield, who wrote on Dysentery, as very common; and Sir ilbert Blane mentions having seen it, in connexion with scurvy. In eneral, it will yield with the other symptoms of scurvy; and when it will ot, Mr. Bampfield says that, in all cases, it yielded to blisters applied to he temples. Dr. Heberden mentions an instance of night-blindness, in a erson who never had it except on board ship.[e]

Nyctalopia.[f]—On the other hand, *day*-blindness is mentioned, by various

[a] " The Principles and Practice of Ophalmic Surgery. Comprising the Anatomy, hysiology, and Pathology of the Eye, with he Treatment of its Diseases. By Benjamin ravers, and Joseph Henry Green. Edited y Alexander Cooper Lee." Published by utler, Medical Bookseller, St. Thomas's treet, Southwark. Pages 200 and 201.

[b] Dr. Mason Good has proposed *Paopsis* (from παρὰ, *bad*, and ὤψις, *sight*), s the generic name of this affection; and P. *Lucifuga* (night-sight), and *P. Noctiuga* (day-sight), instead of Nyctalopia and Hemeralopia. The Greeks employed the erm " Nyctalopia" in the *literal* sense,—*ight-sight*; " in consequence of the person abouring under it being only able to see at ight, or in a deep shade; while it has been sed by most modern writers in the opposite sense of *night-sight-ache*;—agreeably to he *technical* or implied meaning of " *opia*", hen employed pathologically; in which ase it always imports diseased vision, as hough a contraction of the term " paropia" r " paropsis": whence " nyctalopia" has necessarily been made to import " *day*-sight", nstead of " *night*-sight"; or that imperfecion of vision in which the eye can only see in the day, or whenever there is a strong light. And hence " *hemeralo*pia", the opopposite to " *nyctalo*pia", has been used, with the same confusion and contradiction of terms;—by the Greeks importing *day-sight*, being taken naturally or literally; by the moderns *day-sight-ache*, and consequently *night-sight*, being taken technically or by implication.—" *Study of Medicine*"; *Chapter* 4; *Order* 2; *Genus* 1; *Species* 1.

[c] A defect in the sight; consisting in being able to see in broad *daylight*, but not in the *evening*.—*Dr. Hooper's* " *Medical Dictionary*."

[d] A defect in vision, by which the person sees *little* or *nothing* in the *day*, but in the *evening* and *night* sees tolerably *well*.—*Dr. Hooper's* " *Medical Dictionary*."

[e] " Commentaries"; Chapter 66.

[f] " Nyctalopia" and " hemeralopia" change meaning, in the hands of different authors. Nyctalopia, if understood as " day-blindness", may arise from dilated pupil, thin " pigmentum nigrum"; or a too sensible state of the retina. The contrary of either of these states causes hemeralopia. Nyctalopia is sometimes epidemic; especially if

writers, as occasioned by a dilated pupil, and occurring in Italian peasants. Regularly, at sun-set, persons in this situation become either perfectly blind, or very nearly so;—the light which occurs then not being sufficient for them. I had a case of this kind in a woman, who had been suckling four months: she said that she had always dimness of sight at five o'clock in the afternoon. This was in the neighbourhood of London. After lying down and putting out the light, she gradually saw more clearly as the night proceeded; but when midnight arrived it became duller; and remained so till nine the next morning. She had nausea in the morning. I never saw her again. This woman was suckling; which might be too much for her. At five o'clock her sight began to be impaired; and she went to bed early. She had what is called "ptosis"[a];—a dropping of the upper eye-lid.

Dysecœa.—The hearing is often lost; but more frequently from other causes than paralysis. The affection is called "dysecœa."

[It may be caused by compression or structural disease of the auditory nerve, obliteration or obstruction of the canals and passages of the auditory apparatus, &c.

Anosmia.—Anosmia, or insensibility to odours, is sometimes congenital. Cases of this kind have been met with by Good[b], Todd, Pressat, and others. When it is the result of disease, it is occasioned by pressure on, or organic alterations of, the brain; involving the olfactory nerves and ethmoid[c] bone. More commonly it follows alterations in the Schneiderian membrane, of an inflammatory or congestive nature; as in coryza.

Ageustia.—Ageustia, or loss of taste, is occasioned by insensibility of the nerve or nerves, which have been termed "gustatory"; but what those nervous branches so endowed really are, is a point still disputed by physiologists. Chewing tobacco or other narcotics, smoking, a thick fur on the tongue (as in the various forms of acute as well as chronic diseases), may more or less impede or destroy the taste.[d]]

[It has long been disputed, whether the sense of taste be situated at the *tip* or at the *root* of the tongue. On this question depends another; namely, whether the nerve of taste be a branch of the "trifacial" (long termed "the gustatory"), or of the "glosso-pharyngeal";—the former being distributed upon the tip, the latter upon the root, of the tongue. The celebrated Scarpa, in his splendid work on the Nerves[e], has detailed some novel and interesting experiments; from which he concludes, that the sense of taste is situated at the *tip* of the tongue. Dupuytren deduces the opposite conclusion, from experiments made by himself, with the view of an immediate application to a case of pathology.

Both these authors conclude that the "trifacial" is the nerve of taste! Dupuytren proves, by experiment, that the sense of taste resides at the

the ground be covered with snow.—*Dr. Fletcher.*

[a] From πτωω, *to fall.*

[b] The author [Dr. Good] once knew a very beautiful and elegant young lady, who had from birth so total a want of smell, as not only to be incapable of perceiving any difference in the odours of different perfumes or flowers, but of sweet and corrupt meats; and who could inhale very powerful errhines without sneezing. Though this affection seemed to have been connate, and dependent upon a natural imperfection of the nerves of smell, the Schneiderian membrane had something of the thickening which is always produced by catarrhs; and the lady always spoke as though under the influence of a slight cold.—*Dr. Mason Good's "Study of Medicine"; Class* 4; *Order* 2; *Genus* 3; *Species* 3; *Variety* 1.

[c] From ἐθμος, *a sieve*; and εἶδος, *likeness.*

[d] "Library of Medicine"; Volume 2; Page 281.

[e] Pages 16 and 17.

posterior part of the tongue; it is well known to him that the trifacial is distributed to the *anterior* part of that organ; still he concludes that this is the nerve of taste! So difficult is it to free ourselves from preconceived opinions.

These opinions have been very recently taken up by Professor Panizza. The interesting paper of that physiologist, is given entire in a late number of the "Edinburgh Medical and Surgical Journal"[a]; and to it I must refer;—briefly stating the conclusions to which its author is led:—1. The sense of *taste* resides towards the *base* of the tongue, in the filaments of the *ninth* or "glosso-pharyngeal" nerve. 2. The sense of *touch* in the tongue resides near its *point*, in the filaments of the "trifacial." 3. The *twelfth* is the true "myo-glossal" or motor of the tongue. The experiments of Professor Panizza appear to have been made with great care. Nor with less were those of Dr. J. Reid; who mentions, however, as the results of his experiments, that "the glosso-pharyngeal may participate with other nerves in the performance of the function of taste; but it certainly is not the spinal nerve of that sense."[b] M. Valentine, again, agrees with Signor Panizza.[c] An animal in which portions of both glosso-pharyngeals had been removed, would be of constant physiological interest.

It will be difficult to confirm or correct, by clinical observations, these views drawn from experiment. The "glosso-pharyngeal" is double; and if one part were compressed by a tumour, or destroyed by disease, the other might still partially supply the sense of taste to the tongue.

There is an interesting case in point, however, in a note to the translation of Dr. Abercrombie's work, by M. Gendrin[d]; which is given in great detail, and which will be read with great interest. The nerve was atrophied by the pressure of a cyst. "La sensibilité du tact de la langue était conservée dans toute son étendue; la douleur produite par une piqûre d'aiguille était sentie sur toute la surface de sa moitié atrophiée, comme sur celle de l'autre moitié. Le froid et le chaud produisaient aussi la même sensation sur chaque moitié de cet organe. Des substances sapides, de l'hydrochlorate de soude, de l'acide acétique, de l'extrait de coloquinte, furent appliqués successivement sur chaque moitié de la langue; ils n'occasionèrent sur la moitié atrophiée qu'une impression de saveur fort obscure, qui ne se manifesta que sept à huit minutes après leur application; tandis que la sensation produite par l'application de ces corps se fit sentir vivement, au bout d'une minute à une minute et demie, sur la moitié non-atrophiée."[e] [f]

But it is not uncommon for smell, hearing, and taste to be paralyzed, when there is paralysis of another kind. Sometimes in *hemi*plegia, sometimes in *para*plegia, we see a person lose smell and taste, or smell and hearing. It is rare that smell and taste are paralyzed; except in con-

[a] January, 1836; Volume 14; Page 70.

[b] "Edinburgh Medical and Surgical Journal"; Volume 49; Page 129.

[c] "De Functionibus Nervorum." Page 44. (1839.)

[d] Second Edition; Page 627.

[e] "The sense of touch was preserved throughout the whole extent of the tongue; —the pain from the prick of a needle being felt over all the surface of the atrophied half, as well as over the other half. Cold and heat, also, produced the same sensation over both halves of the organ. Sapid substances—hydrochlorate of soda, acetic acid, and extract of colocynth—were successively placed on each half of the tongue. On the atrophied portion, they occasioned only a very obscure impression, which did not manifest itself till seven or eight minutes after their application; while the application of these bodies to the non-atrophied portion, was vividly perceived at the end of a minute, or a minute and a half." (Pages 629 and 630.) Compare with this passage Mayo's "Commentaries", No. 2; Page 14.

[f] "Diseases and Derangements of the Nervous System; by Marshall Hall, M.D." Pages 307 to 310.

junction with other kinds of paralysis. When the cerebrum is diseased, several kinds of paralysis occur; as well as epilepsy, and other nervous diseases.

Paralysis of the Portio Dura.—The most common partial paralysis, which affects motion only, is that of the face; and this chiefly arises from an affection of the "portio dura." When this partial paralysis occurs, it cannot be mistaken for a moment. The face is drawn to the opposite side; and the eye of the affected side remains wide open, while the other is shut. The consequence of this is, that the tears are not directed towards the inner canthus of the eye, but fall over on to the cheek. There is an inability to laugh; so that if the patient attempt it, he laughs "on the wrong side of the mouth." There is an inability to distend the cheek; and an inability to whistle or frown. If he frowns, he does it with only one "corrugator supercilii"; and as to whistling, he makes all sorts of noises out of the other corner of the mouth. Sensation is, in this case, unimpaired. The "portio dura" being a nerve of *motion*, and not of *sensation*, motion only is paralyzed.

Causes.—This affection generally arises from cold, but not always. Very often the patient is deaf at the same time; and he has a discharge from the ear. This may be conceived, from the situation of the "portio dura"; indeed, it often occurs in persons who have been exceedingly deaf. Sometimes it arises from caries of the bones; and sometimes it has appeared to arise from an enlargement of the gland behind the ear, compressing the nerve. Sometimes this paralysis is evanescent; and if we apply a stimulating liniment, it soon disappears. It will disappear spontaneously; but I dare say it disappears much sooner on stimulating the part. Occasionally, however, it is tedious and incurable. I have seen cases in which it has been much improved; but I hardly recollect a case where the cure was quite perfect. It would be very wrong to suppose (as has been intimated too frequently) that this kind of paralysis has no connexion with an affection of the head. It *may* have no connexion, because it may be external to the brain,—external to the "foramen ovale"; but, in many cases, patients have fulness of the head, giddiness, sleepiness, and other symptoms; which clearly shew that there is an affection of the head, as well as of the nerves. The "portio dura" may suffer compression, and become softened, within the head; as well as in the bones of the cranium, and after it has left those bones. It is by no means a trifling complaint; and very often *is* connected with a more serious affection.

The proper mode of treatment would be, to ascertain how far there is an internal affection or not. If we find symptoms of drowsiness, they must be treated in the same way as in other cases; but even if we find nothing of that description, still there may be a propriety in applying leeches over the "portio dura" (about the mastoid process), rubbing in mercury and iodine, stimulating the parts well, and applying blisters. I have done all this, and with a certain degree of success; but (as I just now said) I hardly recollect a case which, after continuing some time, was perfectly cured. Repeated leeches, blisters, mercury, stimulating applications, and frictions, I believe, are the best things we can employ.

Treatment.—Some have thoughtlessly proposed to divide the "portio dura" of the opposite side,—in order to paralyze the other muscle. This would do very well, if it were antagonized; but, unfortunately, the "orbicularis palpebrarum" is a distinct muscle; and therefore the effect of cutting it would be, to prevent the patient from shutting either eye. It

would prevent the affected muscles from being drawn to the healthy side, but both eyes would remain staring wide open; and the patient would henceforward be unable to make use of the muscles at all. He could neither whistle nor laugh.

Paralysis of the Fifth Pair.—It sometimes happens, that the nerve of *sensation* of the face is affected. The "portio dura" is a nerve only of *motion*; but there is another nerve which gives *sensation*; and not only to the face, but (as it would appear) to the nose and the other organs of sensation in the head. Paralysis, in this case, is much more rare than in the other.

A very interesting case is recorded by Sir C. Bell, in which the following appearances were presented:—"The left side of his face is relaxed, and the natural balance of the features is gone,—so that the countenance has a distorted, wry appearance. The left eye stares widely and unnaturally open, while the right is only moderately disclosed. When he makes an attempt to close the eyelids, the left remains unmoved; but the eyeball is elevated upwards; and it is raised to so great an extent, that the pupil is quite concealed beneath the upper lid;—the white of the eye only being exposed. He is unconscious of the eyeball thus revolving upwards; the objects around him in the ward, are not seen while it takes place. He was told to direct his eyes, so as to look as straight above him at the ceiling as he could; when he did this, it was observed that he could not raise the pupil by his utmost efforts so high, by some degrees, as during the involuntary act. When turned up in the effort to wink, the cornea rose so as to be presented towards the roof of the bony orbit, and so as to be quite concealed by the eyelid; and, on the other hand, when he looked upwards at the ceiling, more than one half of the pupil was disclosed. During sleep, the eyelids remain wide open; and the pupil is concealed;—just as is observed at the time he winks. It is remarked, that the globe of the eye protrudes considerably more than the other; the conjunctiva is inflamed, and is loaded with numerous blood-vessels. He says, that he suffers pain from his eye being constantly open; especially when he is sitting before the fire, at night. When he is told to frown, there is no motion perceived on the left side of his forehead; but all the expression seems drawn to the right side. When made to laugh, the features are curled up, in the expression of laughter, only on the right side of the face; which presents a singular contrast with the sad, or rather lifeless appearance of the left or paralyzed side. When a spoon was put into the left angle of his mouth, he could not grasp it: he said that, in eating, he put the morsel into the right side. The left nostril is not dilated in a corresponding degree with the right; and the difference between them was most distinctly seen, when he attempted to snuff up the air, or to breathe hard; for then, while the right nostril expanded more widely, this one became quite collapsed, and shut up against the air. The sensibility of the skin, over the whole of the head, is perfect; and the muscles of the jaws act powerfully. He can move his tongue about in all directions. There is a greater fulness over the left temple and jugum, than over the right; there is also a blueness of the integuments, consequent on the injury he had received; but he does not even wince if this part be pressed severely. There is an enlarged gland in the hollow under the left angle of the jaw; and it gives him pain when pressed. The whole chain of the 'glandulæ concatenatæ' on the left side of the neck, are enlarged and tender. His hearing is not affected, and there has been no discharge from the ear. He says

that, for some days, his head has been drawn towards the right side; but this is now gone, and he can hold his head erect."[a]

In an affection of the "portio dura", the patient *feels* as before; but as, in this case, there was disease of the *fifth* pair, there was no sensation in the face. It might be pinched and scorched, the eye might be rubbed, and the internal part of the nose might have substances introduced; but yet no sensation was experienced. There was, however, no distortion of the face,—no want of power over the muscles of the face; which clearly shewed the distinct uses of the "portio dura", and of the fifth pair. I must mention, however, that the "temporalis" and "masseter" muscles were paralyzed; because the fifth pair is not altogether a nerve of *sensation*; —there are branches in it of *motion* likewise. This particular case arose from mechanical injury.

If this particular nerve be divided intentionally within the cranium (which may be done by practice and dexterity), the external parts which it supplies lose their sensation; and, after a time, the eye becomes muddy, and the cornea opaque. This result I saw, when Magendie made his experiments; and many others have witnessed it.

The treatment of a case of this kind, can only be conducted on the general treatment of paralysis;—exactly as in the case of disease of the "portio dura."

Anæsthesia.—Paralysis of the sense of touch, which is called "anæsthesia", is also very rare. It is common enough for persons to lose *sensation* and *motion* in hemiplegia; but to lose the sense of *feeling only* is very rare. A case, which arose from cold, is described in the third volume of the "Medico-Chirurgical Transactions", by Dr. Yelloly.

[The following are the principal circumstances which I[b] have had occasion to observe relative to this case. The hands, up to the wrists, and the feet, half way up the leg, are perfectly insensible to any species of injury; as cutting, pinching, scratching, or burning. The insensibility, however, does not suddenly terminate; but it exists (to a certain degree), nearly up to the elbow, and for some distance above the knee. He accidentally put one of his feet, some time ago, into boiling water; but was no otherwise aware of the high temperature, than by finding the whole surface a complete blister on removing it. No species of injury to a vesicated part of either hands or feet, is felt by him. The extremities are insensible to electrical sparks taken in every variety of mode. The cubital nerve, where it passes the elbow, communicates the sensation produced by pressure or a blow only half way down the fore-arm. He perspires much on the left side, just about the hip; but nowhere else. He is generally rather chilly; and the extremities are cold, except when he is in a comfortable room; in which case they are of the usual temperature of the body. The thermometer, however, rises to 101° in the mouth. The hands are somewhat of a purple colour. If he wishes to ascertain the temperature of any body, he is under the necessity of putting it to his face or neck, or the upper part of his arm. His skin seems to be more than usually sensible to the effects of heat. On putting his hand, at the desire of a friend, into a pail of hot grains,—which his friend assured him were not too hot, and (to convince him of it) previously thrust his hand and arm into them,—there was a very extensive vesication produced. His hands are never free from blisters,

[a] Extracted from a Clinical Lecture by Sir Charles Bell; published in the "London Medical Gazette"; Volume 3; Page 341. (No. 63; February 14, 1829.)

[b] Dr. Yelloly.

which he gets by inadvertently putting them too near the fire; and he has met with several severe burns, without being aware of them; no degree of pressure is felt by him, but a blow produces a slight degree of tingling. He has a general uneasy sensation in the extremities, which warmth rather relieves. His skin, in general, heals very readily, after being burnt or scalded in the most severe way; and there is no fever, (as far as he has been able to determine,) nor any increased heat or throbbing during the process of healing. This seems to be also the case with some other parts of the body, which are not altogether insensible; for, a little time ago, he got burnt in the front of the patella; and, though there was a considerable slough separated in consequence, he suffered no pain, and little inconvenience during the cure. If the heat to which the insensible parts are exposed is moderate, vesication is not immediately produced. The part becomes red; and in a few minutes, but sometimes not till the lapse of an hour or two, is blistered. That a smaller than ordinary temperature produces vesication in this individual, seems to be ascertained by the circumstance, that exposure to the heat of a common fire gave rise to a blister on the knee, which was followed by the slough above mentioned; though the clothes which covered the part were not at all injured. Immersion in water at 120°, produces no change in the affected parts; but exposure to the same temperature, at a common fire, speedily blisters. That degree of heat, is (as far as I can judge by myself) about the utmost which can be long borne by the hand, in ordinary circumstances, without pain.

Cold water, and warm water of every temperature, invariably appear lukewarm to him. Water at the freezing point produces no degree of sensation whatever; but when his hand is kept in it for some time, he feels a slight coldness at the end of the thumb. After his hand had been immersed in water of the common temperature, and was introduced into water of 32°, he had some sensation of warmth. The cold produced by means of a mixture of snow, or ice and salt, communicates no sensation, except a slight chilliness in the thumb; and when this freezing mixture follows the use of water of the common temperature, it produces a slight degree of warmth. A solid body produces no sensation, whatever the temperature may be. The power of motion exists in the muscles of both hands and feet. With the former he can grasp pretty firmly; but, in holding any thing, he is apt to drop it, if his attention is called away. There has been of late a slight loss of substance in the hands. He can lift a chair; but cannot raise himself from the ground, by taking hold of any thing placed above him. The susceptibility of impression generally, as well as the muscular power, appear to be somewhat diminished. The functions are natural, and the pulse regular and moderate.

In the treatment of these symptoms, no advantage has been derived from any plan which has been adopted either by others or myself. The warm-bath, electricity, galvanism, tonics, the rhus toxicodendron, and mercury (given with a view to its action on the bowels, and on the system at large), have been equally unavailing; though it must be owned, that the patient has never shewn a sufficient degree of perseverance, in the prosecution of any means which have been adopted for his relief.[a]]

A case is recorded in the fourth volume of the "American Repository", where the hands and feet were affected in the same way. The man was looking another way, and cut off his thumb without knowing it; and when he looked at his hand again, it was gone. This man frequently met with

[a] "Medico-Chirurgical Transactions"; Volume 3; Pages 92 to 95.

accidents, from treading on things which he ought to have avoided. He had burns and wounds in his hands and feet. He continued in this state for two years. There is an instance mentioned by Laennec, in his second volume, where the right arm was broken; but the patient knew nothing about it, till he found he could not use it as before. All these persons were in the middle period of life, between forty and sixty years of age. I have never seen an instance of it.

Paralysis of a Limb.—There are some interesting and curious cases of partial paralysis of sense and motion, which occur rather suddenly, and in only one extremity. It is well to know these cases. I have never seen one; but they occur from time to time. The extremity has been the arm, in almost every case. It has become suddenly cold, motionless, and senseless; and it has then mortified. This has not been from inflammation; but, becoming paralytic first, the limb has presently mortified; so that frequently the whole case has not lasted more than a few days. One of the earliest instances with which I am acquainted, is mentioned by Dr. Wells.[a] In that case it took place in the left arm; but the arm was not examined. Another case occurred in the *right* arm; and was followed by death in a few hours. It was observed, before death, that the arm was only pale; and it is said that nothing morbid was seen at the autopsy. There is another case mentioned, where both the arm and leg, in hemiplegia, lost the pulse entirely; and there death took place in five days. But the nature of such cases has now been pretty well cleared up. It appears that some have taken place after external violence. The external violence has lacerated the inner coat of the artery, and an effusion of lymph has blocked up the vessel;—so that the part has been deprived, almost immediately, of all blood; and the consequence of it, in the first place, was a loss of sensation and motion, and afterwards mortification. In the "Edinburgh Medico-Chirurgical Transactions"[b], there is a paper well worth reading, communicated by Mr. Turner, a surgeon; who found a laceration of the internal coats, and complete obstruction. In other cases there appears to have been no external violence; but the artery has been previously diseased, and has sudddenly given way in the inner coat; so that inflammation has been set up, lymph effused, and obstruction produced in that way. Occasionally the obstruction takes place from an accumulation of pus. These cases were mysterious before the arteries were examined.

These, I believe, are almost the only cases of partial paralysis, in which the pulse is lost in the paralyzed part. In most paralyzed limbs, it is weaker than in other parts of the body; but where it ceases altogether, it arises from a disease of the artery;—such as I have now mentioned. Magendie mentions a case of diseased nerves, producing such symptoms as I have stated; and, after death, the fifth pair was found swollen, with a greyish yellow-coloured matter.

Diseases of the Nerves, a Cause of Local Paralysis.—The diseases of the nerves which give rise to this partial paralysis, are precisely the same, though different in *situation*, as those which give rise to hemiplegia and paraplegia.[c] In some instances it is entirely mechanical compression. *Hemiplegia* may arise from the compression caused by a tumour on the *brain*; *paraplegia* from the compression caused by a tumour in the *spinal canal*; or the pressure of a bone that is fractured; and so may amaurosis (which is

[a] In the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge";—a work which only consists of a few volumes; but which contains papers of the highest importance by Dr. Baillie, John Hunter, and others.

[b] Volume 3; Part 1.

[c] See Pages 746 and 755.

partial paralysis) arise from the pressure of a tumour on the optic nerve. ny cause that will produce paraplegia or hemiplegia, will produce local ralysis when differently situated. Occasionally this local paralysis arises m local inflammation of a particular nerve; and the inflammation may be so intense a character, as to be seen after death; and, indeed, we may e ecchymoses. Sometimes there is softening of a particular nerve,—even ceration of it; and a decided effusion into its sheath. These are precisely e same things that I mentioned, as causes of hemiplegia and paraplegia.[a] mours have frequently been found resting on particular nerves; and when ere are these circumstances (inflammation, softening, ulceration, and mours), there are often paralysis, violent pain, and spasmodic convulsive tion of the muscles which these nerves supply.

[a] See Pages 746 and 755.

BOOK III.

DISEASES OF THE RESPIRATORY ORGANS.

CHAPTER I.

BRONCHOCELE.[a]

Definition.—The disease to which I shall next direct your attention, is situated in the neck, outside the air-tubes;—in the gland called "thyroid." This disease is called "bronchocele"; from βρογχος, *the windpipe*; and the substantive of which we make so much use,—κηλη, *a tumour*. The French call it "goitre"; and it is supposed that this is a corruption of the Latin word "guttur", *the throat*.

Characters of the Tumour.—The disease occasions a swelling in the front of the neck, in the situation of the thyroid gland;—a swelling produced, in fact, by an enlargement of that gland. No disease would be called "bronchocele", although a swelling in the neck, unless it were the result of an enlargement of the thyroid gland. This tumour is, for the most part, soft; and neither painful when left to itself, nor when touched; and therefore it is not tender. Although it is usually soft in almost every part, yet occasionally we find it hard in some one part;—of a cartilaginous, and (indeed) sometimes of a bony hardness. It may attain a large size, or it may be very small;—it may, in fact, be merely a general fulness of the gland, or a slight general enlargement. Very frequently it is enlarged chiefly, or almost entirely, in the centre, or on one side; and from being, at the beginning, a slight fulness of only one lobe of the thyroid gland, it may attain so enormous a size, as to hang down to the knees. Foderé, in his treatise on the disease, mentions an instance of a tumour which weighed seven or eight pounds; and Alibert mentions a tumour, occurring in a man thirty-eight years of age, which reached to the middle of the chest, was as large as a pumpkin, and looked like a pelican's pouch. There is also one mentioned, as existing in a female upwards of sixty years of age. It extended from ear to ear; descended below the mammæ; impeded deglutition and respiration; and pressed on the "meatus auditorius", so as to close it up.

[a] In conformity with Dr. Elliotson's plan,—to describe the diseases as they occur, *a capite ad calcem* (Page 63),—bronchocele, and certain affections of the mouth, stand next upon the list. And although some of them scarcely admit of being classed among diseases of the *respiratory organs*; yet their proximity to those parts will probably serve as a sufficient apology for their introduction under this head.

A German author mentions an instance of a goitre descending to the knees.

Internal Structure.—Its external appearance is sometimes uniform and sometimes knotty; and on cutting into the tumour, we find cells of all sizes, with contents of various consistency. Sometimes the contents are found gelatinous, and sometimes soft. Sometimes one particular part is cartilaginous, or even ossified; containing a quantity of calcareous matter. A variety of appearances are presented in different parts of the same tumour. Occasionally the tumour suppurates; and sometimes disappears spontaneously. The blood-vessels of the part are found very much enlarged.[a]

Progress and Effects.—When the disease has begun, it usually increases; but occasionally it makes a stop;—does not, at a certain period of life, increase any more; and I have fancied that it has sometimes appeared to shrink in old age. Bronchocele may destroy life, by pressure on the neighbouring parts; and Dr. Baillie says he saw one or two cases, in which death took place from pressure on the œsophagus and trachea. I have frequently seen it affect the voice; so that a person spoke in a hoarse, croaking tone, and with a sort of hissing sound;—such as is produced when the trachea is pressed. The disease is not entirely confined to the human subject; but cattle, also, and dogs have it. It is very common for it to be less during the winter, and to increase again during the summer. It is said usually to begin in one lobe only of the thyroid gland.

Influence of Age and Sex.—This disease affects females more frequently than males; and usually it does not begin before the individual has attained eight or ten years of age. There are, however, exceptions to this. In the "London Medical Repository", a physician mentions a child (in Derbyshire) who was born with a goitre of considerable size. At different times, when in Switzerland, I have made inquiry of the country people and of my guides; and one old peasant told me, that he knew an infant who was born with a goitre; and I saw one myself in a little boy only four years of age. However, the answer I usually received was, that the disease seldom appeared before six years of age;—nearly agreeing with what is usually stated by authors; who say that, in general, it does not begin before the eighth or tenth year. Indeed, I was told that not only bronchocele, but even cretinism (the idiocy of the country, which I formerly spoke of[b]) did not begin in early childhood. Some of these people have a notion that a child has a goitre, or is a cretin, if either of the parents was drunk at the time of conception. They ascribe these diseases to that cause; though not in every case.

Hereditary in its Nature.—As the disease is certainly seen in children, and they are sometimes born with it, and frequently the parents have goitres, it may be hereditary[c]; but although both parents may have goitres, yet (just as we observe with respect to other diseases) it does not follow that the progeny must have them too. A case has been mentioned to me of a goitrous father and mother, who had produced five children, all of whom were goitrous, and cretins; and of another pair (both goitrous) who had four children with goitre; and one, twenty-two years of age, who was neither goitrous nor idiotic. In fact, she was said to be "tall and genteel."

Frequently accompanies Cretinism.—This disease very frequently accompanies cretinism. When we see an individual with a large head, an "ace-

[a] There is a representation of the disease in Dr. Baillie's work.

[b] See Page 598.

[c] See Page 599.

of-spades" nose[a], the eyes a mere slit, perhaps deaf and dumb, and imbecile, it is very common to find the thyroid gland enlarged; and it is asserted that if people, both having goitres, marry, and one of their children (having a goitre) marry another with a goitre, that their offspring (constituting the third generation) are sure to be something worse than goitrous,—to be cretins,—to be idiotic. This is asserted; but I do not know its truth from any observations of my own.

Occurs in various Parts of the Globe.—We meet with this disease in various parts of the globe; and in all latitudes,—hot and cold. It is seen in England, France, Spain, Switzerland, Germany, China, Tartary, Bengal, the Island of Sumatra, Spanish America, and North America. Mungo Park says, that he saw it in the negroes of Barbary.[b] Some have ascribed it to the cold; but as it occurs among the negroes in Barbary, and also at Bengal, it cannot be owing to the cold. Some have ascribed it to snow-water; but there is no snow either in Barbary or Bengal; and, on the other hand, the disease is unknown in Greenland and Lapland, where there is little else than snow-water, and where the weather is very sharp.

Dependent on the Quality of the Water.—It appears, however, to be dependent in some measure upon the water; for the waters in the rivers and lakes of Switzerland are always bad, and are drunk only by the poor and ignorant; and those who drink them heartily are, for the most part, sure to have the disease. Those who are above the very lowest,—the most abject class, do not drink the waters either of the rivers or lakes; but the most ignorant people do. I have seen them drinking water the colour of ink, in Switzerland, in 1826. I had an intelligent guide, who told me that, beyond all doubt, this water produced it; but those who drank spring or snow-water, which did not run along a bed of lime, escaped; and nearly all escaped who drank cascade-water. He said, that the bad water usually took about a year to produce the disease; but the instant the bad water in his neighbourhood was drunk by those unaccustomed to it, they found unpleasant effects. Sometimes, he said, these effects were prevented by putting a bit of ice or snow into it.

Dr. Richardson, in Captain Franklin's "Journal of a Voyage to the Polar Sea", makes an observation perfectly agreeing with the account which this man gave me. The captain says that at Edmonton, on the banks of the Saskatchawan river, goitre is very common; that it is certain goitre affects only the drinkers of this water; and that, in its worst state, the disease is confined almost entirely to the half-bred women and children, who are always resident in the Fort, and make use of the river-water; which is drawn, in the winter, through a hole made in the ice; whereas the men, from being often from home on journeys, and using snow-water, are less affected with goitre; and when they are at home in the winter, if signs of goitre come on, their annual summer visit to the coast presently cures them. He says the natives, who confine themselves to snow-water in the winter, or some of the small rivulets which flow through the plains in the summer, are exempt from the disease. A residence of one year at Edmonton, where the water is so bad, is sufficient to render a family bronchocelous. He says, that many of the goitres acquire a large size; and that burnt sponge has

[a] See Page 599.

[b] The negroes attribute this disease [the "Guinea-worm"] to bad water; and allege, that the people who drink from wells are more subject to it than those who drink from streams. To the same cause they attribute the swelling of the glands of the neck ("goitre"), which is very common in some parts of Bambarra.—"*Travels in the Interior of Africa; by Mungo Park.*" *Chapter* 21. (*Page* 59 *of Chambers's "People's Edition.*")

een tried, and found to remove the disease; but that drinking the water gain, renews it. A great proportion of the children who have goitres (he ays) are born idiots, with large heads and other distinguishing marks of retins [a]; but he could not learn whether it was necessary that *both* parents ould have goitres, in order to produce cretin children.[b]

Another year that I was in Switzerland, passing along a valley near the ke of Valteline, the guide told me that, in one of the populous villages, ere was no spring; and the inhabitants are therefore obliged to drink e water of the river; which is so bad, that goitre is very prevalent ere. But, in another village, there are plenty of springs; and nobody ere drinks any water, except that from the springs; and no one has itre. He also added, that where there is much goitre, they are all Ca-olics; whereas in the village where there are plenty of springs, the inha-tants are Protestants. This is rather an important remark; because it is very striking circumstance that, on many parts of the Continent, the Pro-stant districts are much cleaner and more healthy than the Catholic dis-icts. More frequently than otherwise we can tell the Catholic districts, merely looking round, and observing the state of the peasantry, without king a single question. The Catholics spend so very much time in pray-g, that they are dirty in their persons, and not at all industrious; whereas e Protestants are very clean;—not spending so much time in church-ex-cises; and they are better off altogether. No one who has travelled, can oubt the truth of this remark; and it is important to be aware of the ct; because (as I shall have to mention [c]) the worse people are off, the ore subject are they to the disease, when the causes of it are applied.

[These facts seem to favour the notion (which is a popular one in goitrous istricts), that bronchocele originates in some deleterious quality of the ater. Indeed, it is impossible to examine the filthy beverage of some of ese districts, without being convinced that pernicious consequences must nsue from its habitual use. Bally [d]—a native of a district in Switzerland, here bronchocele is endemic—states that, in his country, those who drink e waters of certain fountains are almost always attacked; whilst others of e same village who avoid these waters are not liable to the complaint. ambuteau, also, considers that water impregnated with calcareous salts ontributes to its development. Dr. Coindet observed, that almost every dividual of a regiment who drank the calcareous water of the pumps at eneva, was attacked with goitre; which disappeared rapidly upon their moval to other quarters. Its prevalence in Nottingham is ascribed, by r. Manson, to the same cause.[e]

Mr. M'Clelland has lately made extensive researches into the causes of ronchocele among the Himalaya mountains. His inquiries extended over ne thousand square miles; and he invariably found limestone-rocks in the mmediate neighbourhood of goitrous districts; while in villages where this tratification was not observed, the disease was rarely met with. When it vas found in the latter places, Mr. M'Clelland could generally trace it to he use of water having its source in the limestone-rocks; and where these vaters were avoided, the complaint seldom appeared. Unfortunately, how-ver, there are facts which prevent the universal application of this theory especting the origin of the disease:—1. Bronchocele is met with abund-ntly in districts where there are no limestone-rocks; as, for instance, in the

[a] See Page 599.

[b] "Narrative of a Journey to the Shores of the Polar Sea; in the years 1819 to 1822. By John Franklin." Chapter 4. (Third Edition; Volume 1; Pages 183 to 186.)

[c] See Page 774.

[d] "Dictionnaire des Sciences Médicales."

[e] "On the Effects of Iodine."

Vallais. 2. It is absent in many places abounding in limestone-formations. 3. It prevails in districts where the water is pure, and free from calcareous impregnations.[a] 4. A strict adherence to distilled water, is not sufficient to ward off the disease in affected places.[b]]

Nature of the Water.—The nature of the water which produces this disease, is not well known; but, in all probability, it is mineral. I *presume* it to be so, as the water contains so much lime; but I will not *assert* it. Captain Franklin states, that those inhabitants who reside sixty miles nearer the source of the river[c] than Edmonton, are said to be more severely affected than those at Edmonton; and he says goitre is unknown at a distance from the river, where nothing but snow-water is drunk for nine months in the year. He adds that, still farther from the source than Edmonton, where the water is still turbid, the disease is unknown. It certainly appears to be connected with the water; and seems to arise from some impregnation which the water has near its source, and which it loses as it goes along. At Edmonton, Captain Franklin tells us, the river is clear, except from the month of May to that of July; and that the distance from the Rocky Mountains is one hundred and thirty miles. The neighbouring plain is alluvial, and the soil calcareous; with many fragments of limestone.[d] In Switzerland the cause of the disease would not appear to be in the water at its source; for the springs and cascades do not produce it. On the contrary, it is the water that runs along beds, and is found in lakes, that appears to give rise to it. Persons on the mountains are rarely affected; and those who remove from the valleys and places where it prevails, to the mountains, find the tumour in some degree alleviated; and, after a great length of time, the disease has been known to cease altogether. The disease prevails much more in valleys with high mountains around them (such as abound in Switzerland) than elsewhere; and perhaps in those which are most exposed to the east and south winds.

General Character of Goitrous Districts.—Whatever may be the cause of the affection, it is found to prevail most where the air is worst;—where the mountains cause the air to be pent up, and where the persons are badly off.[e] It prevails in a particular valley in Switzerland (the *Vallais*) most frightfully; and there the people are worst off; for there more poverty and wretchedness exist, than in almost any other part. The inhabitants are dirty, and badly fed. In the countries where it is prevalent, the people have a dirty brown look, and appear withered;—as if they were in premature old age. It seems that the causes which produce the disease, are those which poison the habit generally, and render it more liable to be affected by the causes of this particular disease. They have an aguish, or *malaria-kind* of look; yet we sometimes have it where there is no ague; and we have ague where this disease does not exist. Any circumstance which throws the body out of health, may predispose to this disease. The particular circumstance of the patient having a withered look, may not be immediately connected with bronchocele; but the causes of the withered look may impair the constitution, and render the person constantly liable to become goitrous. My own guide told me, that where the inhabitants were dirtiest, and the worst fed, they were most subject to the disease. Dr. Good says that, in Derbyshire, "He found a much larger number of the poor affected with this disease than he had ever seen before, while the rich

[a] Humboldt.

[b] "Library of Medicine"; Volume 5; Page 186.

[c] Saskatchawan.

[d] Franklin's "Journey to the Polar Sea"; Chapter 4. (Third Edition; Volume 1; Pages 184 and 185.)

[e] See Page 599.

escaped; he found also that by far the greater part of those who were labouring under it, were not only exposed to all the ordinary evils of poverty, but derived their chief diet from that indigestible and innutritive substance, the Derbyshire *oaten cake*; which is probably the chief cause of all the glandular and parabysmic [a] enlargements which are so common to that quarter."[b] But this oat-cake is eaten in other parts of England, with no such effect.

Diagnosis.—[Although the tumour of bronchocele is in general sufficiently characteristic, it may sometimes be confounded with other affections. The thyroid gland is liable to inflammation; but this disease may be distinguished from goitre, by the hard unyielding character of the swelling; by its being accompanied with redness of surface, increased heat, and pain on pressure; by the suddenness of its appearance; by its not attaining the size of a goitrous tumour; and by its tendency to suppurate. The gland is sometimes affected with scirrhus.[c] In this case, however, only a small portion is usually affected; and differs from bronchocele in its extreme hardness, and in being generally the seat of severe lancinating pain. In scirrhus, also, the swelling seldom attains a large size. Encysted tumours sometimes form in the course of the trachea; and may be distinguished from bronchocele by their situation, by their compact form, and by their giving a sense of fluctuation. Aneurism of the thyroid arteries may be known from goitre by the pulsation which accompanies the former affection, by the situation of the swelling, and by its diminishing or disappearing under firm pressure.[d]]

Treatment.—The patient should certainly desist from drinking any water which may be suspected to be the cause of it. Burnt sponge is unquestionably useful in it; and many practitioners say that they have seen cases cured by it. It has been supposed that the good effects of burnt sponge, are to be ascribed to the iodine which sponge contains. I presume there can be no doubt, that it possesses a remedial power over the disease; and some unite it with sulphur.

Iodine.—By far the most efficient remedy, however, is iodine[e]; and it may be employed externally or internally. I have cured many cases of bronchocele,—some of them where the tumour was rather large,—with this remedy. It may be employed in the form of iodine itself; or it may be united with hydriodate of potassa; and that, perhaps, is the best way of administering it. With regard to the quantity, there is no rule for the dose; for it produces two effects,—constitutional and local. The constitutional effects are emaciation, morbid irritability of body, quickness of pulse, palpitation, and absorption of particular parts; more especially, it is said, the mammæ of women, and the testes of men. It likewise takes away the appetite; and is more or less injurious to the body at large. But besides that, it is a very acrid substance; and therefore, like any other acrid substance taken into the stomach, it will produce vomiting and gastritis, and even ulceration; and when it passes the stomach, it may produce diarrhœa, and more or less inflammation of the mucous membrane of the intestines. It affects the stomach and intestines immediately,—simply as a corrosive agent; and this may arise in one person from a small quantity, though it will not occur in another from a *large* quantity. We never know, before-

[a] Congestive.

[b] Dr. Mason Good's "Study of Medicine"; Class 6; Order 1; Genus 2; Species 1.

[c] From σκιῤῥόω, *to harden.*

[d] "Library of Medicine"; Volume 5; Page 187.

[e] From ἰώδης, *a violet-colour.*

hand, the disposition of the patient with regard to it; and therefore it is always best to begin with a small dose. There can be no impropriety, as the disease is chronic, in delaying an efficient dose for some time. We may therefore begin with five minims of the saturated tincture; and if no unpleasant effect be produced, it may be increased a drop every dose, or every *other* dose. I have gone so far as to give one hundred minims for every dose; but a great number of persons will not bear above twenty or thirty minims. Patients complain of heat of the stomach; but if we begin gradually, and inquire of the patient whether there is any burning sensation, or heat of the stomach, or any griping, we never need run the risk of doing mischief from its local effects. When a person begins to feel a dose (such as fifteen or twenty minims), I have been told that diarrhœa took place even with griping and bleeding;—owing to its being such a corrosive substance; and if a large quantity be taken into the stomach, the mucous membrane will soon be in a state of erosion.

Hydriodate of Potassa.—As to the hydriodate of potassa, there is scarcely any rule for the dose; but it may be given in larger doses than the tincture of iodine. If we dissolve a drachm in an ounce of distilled water, we may begin with ten or fifteen minims, and increase the dose to a great amount. There were two or three men whom some gentlemen of my class saw at St. Thomas's Hospital, and who took two drachms of the salt at a time. There can be no doubt that the medicine was good; for Dr. Burton[a] analyzed it very carefully. The article is often adulterated; and lime has been found in it; but care was taken to have a good article; and that which these men took was known to be a pure salt. I also recollect a woman, who took one drachm for a dose, three times a day, diluted with ten or fifteen ounces of distilled water. There is no rule for any medicine, as to the dose applicable to all cases. Some persons always find fault with others who are energetic, or employ remedies in an efficient manner; but it does not follow, because we are energetic, and employ medicines *efficiently*, that we should employ them *rashly*. There is no occasion to do a patient harm; and no occasion to run any risk. It has been thought by some, that it would be better to give iodine and this salt together.

With respect to the length of time during which the remedy may be taken, I have been obliged, in bronchocele, to give iodine a whole year, before the disease was cured. Seeing the disease was lessened, I persevered; and have gone on for twelve months; and, indeed, for more than that time. I think, in one case, I continued the remedy fourteen or sixteen months, before the disease went away. That was the longest case of bronchocele I ever cured. I never saw any unpleasant constitutional effect; though no doubt such effects will occur, for they have been mentioned by authors; but I think if we see the patient frequently, and make proper inquiries at every visit, such unpleasant effects can hardly take place. Now and then, it may take us by surprise; as is the case with every remedy. It may act suddenly. But in general, when a remedy *appears* to act suddenly, it has been continued some time after its effects have begun; and if it had been watched carefully, and left off the moment it commenced its action on the body, no such effects would have ensued. In cases where a remedy has seemed to act suddenly, I cannot but think that, with the exception of digitalis, it has generally begun to act mo-

[a] At that time, the Lecturer on Chemistry at St. Thomas's Hospital.

derately, and has then been continued without diminution. Had it been omitted the moment the effect began, the slight effect would gradually have ceased. I am not aware of ever having done mischief with iodine.

External Use of Iodine.—It is well to apply the remedy *externally*, as well as *internally*. We make an ointment by putting a drachm, or even two drachms of the hydriodate of potassa, to an ounce of lard. The skin differs like the mucous membrane, and the constitution at large; and what produces merely an irritation in one part, will produce a diffused rash in another. It is well to use half a drachm, or a drachm at first, if the person have a fine skin; and then, if no ill effect be produced, we can increase it. It is absurd to apply it so as to irritate the skin. The patient cannot bear rubbing then; and if inflammation begin, it must cease before we can apply it again; and we lose so much time. We shall see, when I speak of diseases of the abdomen, how much good is effected in the same way as in bronchocele, by the exhibition of this medicine.

Other Remedies.—Besides burnt sponge and iodine, some recommend carbonate of soda; some, conium; and some, leeches. If the part fall into an inflammatory state, leeches may be useful; and if inflammation occur, the iodine should be suspended, and common antiphlogistic remedies resorted to, till the effect has ceased; and then it should be had recourse to again. Mercury, internally and externally, has been useful; and the two may be combined. I have seen the disease give way to the two; but I can hardly say how much good was ascribable to each. Pressure has been said to be useful; but it is awkward to make pressure, on account of the trachea and œsophagus. There can be no doubt that a seton, in this disease, is an efficient remedy. There are on record, very many cases of this disease, which have yielded to a seton placed in the skin over the tumour.

Ligatures on the Vessels.—The disease has been treated *surgically*, as well as *medically*. Some surgeons have tied the vessels of the tumour, with good effect; but this is a point on which I must not dwell. I have only to do with this disease as it is to be treated by medicine; but I may mention, that Sir William Blizzard (formerly an able surgeon at the London Hospital) tied the vessels; but death took place from secondary hæmorrhage. However, in one week the tumour decreased in size one-third. Walther tied the left inferior thyroideal artery; and the tumour diminished so much, that at the end of fourteen days he took up the right superior thyroideal artery. No inconvenience was felt; and the tumour speedily disappeared almost entirely. A surgeon in this country (Mr. Coates) tied the artery on the left side only; and cured the complaint.

Extirpation of the Gland.—Some surgeons have been bolder still. Dr. Hedenus, of Dresden, (with whose son I was acquainted,) extirpated the gland in six cases; in one of which it was as large as a skittle-ball. The whole of the cases were successful. Foderé mentions the case of a barber, who cut one away from his wife. This was a lucky hit; for he would probably kill the next woman on whom he operated. Two unsuccessful cases of extirpation, are said to have occurred to Mr. Gooch. Dupuytren (the celebrated French surgeon) removed a tumour, after having first tied the arteries. Only a few spoonfuls of blood were lost; but the operation was very long. Much suffering took place; and the patient died in thirty hours. In several cases, the operation has been found so hazardous, and altogether so difficult, that the surgeon has been obliged to desist in the midst. Desault is said to have removed half the gland with success. I find a note in "Frazer's Journal", stating, that in no part of the

world has the whole tumour been extirpated. There can, however, be no doubt of the fact; for persons have shewn that the tumour has been extirpated, by the scars in the neck left after the operation.

The chief treatment, however, is by means of iodine internally, and a seton. Neither of these will cure every case. I have seen the tumour so hard, that it was quite absurd to suppose any thing was capable of removing it. When it is cartilaginous, or ossified to a great extent, I should think it vain to give iodine, or apply a seton.

CHAPTER II.

AFFECTIONS OF THE MOUTH AND THROAT.

SECTION I.—PAROTITIS.

The next disease which I shall describe, is an affection of one of the glands in the neighbourhood of the thyroid; but a little higher. This is entirely a medical disease; and I believe the surgeon never applies his art to it. The last-mentioned disease is disputed territory;—surgeons take it, and physicians take it; but this ("the mumps") is, I believe, strictly medical.

Definition.—As this is an inflammation of the parotid glands, it is called "parotitis"; or, in the language of Cullen, "cynanche *parotidea*." Dr. Cullen describes five kinds of cynanche.[a] The definition of the whole is—"pyrexia, frequently of the typhoid type; redness and pain of the fauces; deglutition and respiration difficult, with a sense of constriction; narrowness in the throat." The first of the five kinds here mentioned, is inflammation of the parotid glands. I think it better to drop the word "*cynanche*"; and not consider the different species of cynanche as varieties of one general affection; but I shall speak particularly of inflammation of the *parotids*, inflammation of the *tonsils*, and so on; and I presume that, in a few years, the word "*cynanche*" will be discontinued; and that we shall speak only of diseases of *one* part, or of *another*.

Symptoms.—Parotitis, or (in plain language) "the mumps", is a swelling of one or both parotid glands; attended with an increase of heat in the part; extending to the submaxillary and sublingual glands; and affecting the rest of the salivary glands. The disease is attended by slight feverishness; and lasts, in general, three or four days;—sometimes longer. It is sometimes followed by inflammation of the testicles, or breasts; and sometimes by phrenitis. When a testicle has been so inflamed, it frequently becomes atrophied; and nothing is left but the membranes;—the "tunica albuginea", and "tunica vaginalis."

Is it Contagious?—Parotitis occurs, usually, but once during life; and is said, I know not how truly, to be contagious. It certainly is sometimes sporadic; but frequently it is epidemic. It prevails, in a boy's school, all at once throughout; and it prevails in several schools in the same neighbourhood. I really do not know whether it is so or not.

Age at which it Occurs.—It occurs most frequently from seven to fifteen years of age;—sometimes later. Now and then, we see it in young men; but most frequently it occurs at the time I have stated.

Treatment.—There is nothing particular required for it. We ought to apply moderate warmth, keep the patient quiet, make him abstain from ordinary nourishment and stimuli, give him a mild aperient; and the disease, for

[a] Dr. Cullen's five species are:—1. Tonsillaris. 2. Maligna. 3. Trachealis. 4. Pharyngea. 5. Parotidea.

the most part, goes away after a time. It is very rarely that suppuration takes place. I have seen suppuration; but I presume it was an accidental circumstance,—from the inflammation extending to the cellular membrane. I should not recommend cold to be applied; because the disease has a tendency to metastasis. At least, when it ceases, the testicles and breasts are apt to be affected; and one would suppose that if we cause it to cease suddenly, there is a greater probability of such inflammation occurring. As to inflammation of a testicle, that is not in itself dangerous. It is only sharp and painful; yet it is thought to be a serious matter. I believe, that if one testicle should be lost, the other will do double work. But there is something more dangerous; and that is the liability to phrenitis. Phrenitis sometimes takes place, when inflammation of the testicle ceases. Sometimes the inflammation in the brain may occur at once, when the mumps cease; but, more frequently than not, inflammation of the breast or testicle occurs *first*, and *then* phrenitis supervenes.

If the case be severe, we must treat it still more actively,—by means of leeches and purgatives.

SECTION II.—TONSILLITIS.

We now enter the air-passages; and the first disease I shall describe, is inflammation of the tonsils; called by Cullen "cynanche *tonsillaris*", but frequently called by others "tonsillitis."[a]

Symptoms.—The disease to which these names are given, is not an inflammation of the tonsils simply; for the surrounding parts are more or less affected. The "velum pendulum palati" and the uvula, as well as the tonsils,—one or both,—are red and swollen. The uvula is elongated, and its margins are translucent;—it becomes œdematous and swollen. If both tonsils be inflamed, on opening the patient's mouth two large red balls are seen, one on each side of the throat; which impede deglutition and speech. They may also be felt externally. When the tonsils are enlarged, people say "the almonds of the ears are down"; for the tonsils are called, in common language, "the almonds of the ears." Besides this swelling and redness, the secretion of the parts is altered; so that the mucus of the mouth is very tenacious,—slimy, as people say. There is frequently very great pain; for the inflammation affecting the tonsils is of a phlegmonous character; and the pain is sometimes very severe,—stabbing and shooting to the ear. Besides the shooting pain, there is necessarily great tenderness felt—particularly on swallowing. Even the effort to swallow the saliva—that is to say, the mere effort of swallowing, without the presence of any firm substance to swallow—gives pain; the motion of the part is painful. The disease sometimes occurs on one side only; and it is said that the disease will shift from one tonsil to the other;—as in inflammation of the eye. When one eye gets better, the other may become inflamed; and a similar occurrence often takes place in the case of the tonsils; when one ceases to be inflamed, the other becomes so.

Sometimes, in addition to the redness, heat, swelling, and hardness, there are specks of ulceration. Some persons, as soon as they have a sore-throat, have specks of ulceration here and there, on the tonsils and uvula; with very little subjacent inflammation. Some persons have the mucous membrane inflamed alone; without any inflammation of the subjacent

[a] From "tonsillæ", *the tonsils*; and "itis", *inflammation*.

cellular membrane, hardness, or enlargement. If the case be severe, there is a good deal of pyrexia. The pulse will become very quick in this disease, (as it sometimes will in acute rheumatism,) without any danger whatever; and the tongue is frequently excessively foul;—I presume from the inflammation affecting it, as well as other parts. The foulness of the tongue is not at all in proportion to the danger of the disease; but I presume it arises, in a great measure, from the irritation being situated in that quarter of the body.

Terminations.—The disease may terminate in "resolution", as it is called; or it may terminate in suppuration. It is decidedly phlegmonous inflammation, so far as the parts are concerned: and they very frequently suppurate; and when they do, the matter is found to be very offensive;—as offensive as if it were coming from a diseased bone.

Causes.—The *predisposing* causes of the disease are, in the first place, a peculiar constitution, and disposition to it. There are some people who, in whatever way they may be exposed to the general causes of inflammation, continually get a sore-throat. Whenever they are exposed to the vicissitudes of temperature, coldness, and moisture, they are sure to have inflammation of the throat; and this will run in families,—so as to be constitutional. It certainly is predisposed to by mercury. When persons have been much under the influence of mercury, they are very liable (as I mentioned when speaking of inflammation in general [a]) to take cold from the vicissitudes of temperature; and the throat is certainly particularly liable to inflammation from this cause. The youthful period of life appears more liable to tonsillitis than old age; for we see far more cases of inflammatory sore-throat in the young, than in the old. Perhaps, among the predisposing causes, I might mention the season of the year;—Spring. Cases of this description certainly occur (from cold and wet) more frequently in the Spring, than at any other period.

The *exciting* causes of the disease are, especially, cold and wet;—whether applied to the body at large, or to the feet only. Cold applied in any way, is sufficient to produce the disease.

Treatment.—It is rarely necessary to take blood from the arm; but leeches around the throat are particularly useful. I do not know that it is necessary to apply them internally to the fauces. I think that, applied *externally*, they answer every purpose they can effect; and that a free application of leeches, is far superior to blistering. As a general rule, in the treatment of inflammation, we must be upon our guard never to let blistering take the place of the removal of blood. If the inflammation be at all severe, and requires the abstraction of blood, we only harass a patient (in any disease whatever) by blistering; which, in this disease, is a very painful remedy, and does not, by any means, answer so good a purpose as the frequent application of leeches externally, under the lower jaw, followed by poultices. The latter not only tend to encourage the bleeding, but act as a constant fomentation;—relaxing the parts, and causing perspiration there. If the patient be too weak for the application of leeches, a blister then will be proper; or, if we have applied leeches as far as it appears advisable, and still it is requisite to do more before the disease can be controlled, then blisters may be used with advantage. It must be remembered, however, that when a patient can bear leeches, they are the most useful remedy.

Incision of the Tonsils.—I have found great benefit, in this disease, from

[a] See Page 118.

a mode of treatment perfectly analogous to what is practised, with so much success, in some cases of inflammation of the surface of the body, and subjacent cellular membrane. In "erysipelas phlegmonodes", or any kind of erysipelas where there is extreme tension and hardness of the surface, incisions do great good. They set the surface at liberty; so that the tension is removed, and great benefit always ensues.[a] Now I have adopted similar treatment, frequently, in inflammation of the tonsils; and with very great effect. It is sometimes very difficult to know, in the case of the tonsils, whether matter is formed or not; and I dare say many practitioners (I am sure it has occurred to me) have plunged a lancet into the tonsils, in the expectation of finding matter, when there was none. They sometimes become so exceedingly large, that it warrants a person in trying whether there is any matter or not. Sometimes, when there is matter, instead of being softened, the parts are so tense that we do not find any fluctuation; and sometimes they are swollen so much, that we might fancy there was fluid when there is not. Thus mistakes are made on both sides. But whether matter comes or not, great relief is experienced by plunging a lancet into one or two places. The part is always very tense, and if incised by a lancet, gapes; and when there is a little bleeding, the patient (in most cases) is better for it. I have seen it afford far more relief than leeches; and I know, therefore, that it is a very good practice. If there be any matter there, its escape is desirable; but even if there be none, we generally find very great benefit. It is wrong to delay this operation; for it is quite harmless, and productive only of momentary pain.

Purging and Vomiting.—For the purpose of purging, there is nothing so good as a large dose of calomel; because it may be mixed with sugar, and put on the tongue; when it slips down easily. It is wrong to give acrid purgatives, such as salts, which stimulate the parts as they go down; and it is wrong to give any thing bulky. Castor-oil easily slips down. Some persons recommend vomiting, in this disease; and it certainly causes a great discharge of mucus from the pharynx and larynx, and all the surrounding parts; and frequently does good; but, frequently, it is a severe remedy.

Gargles.—Gargles are pleasant to the patient, on account of the tenacity of the mucus. A sour gargle is very grateful; and so, sometimes, is the inhalation of the steam of hot water. This relaxes the parts, and is found very agreeable; but I have often seen patients derive the greatest comfort from ices.

I believe the free application of leeches externally, an incision or two in the tonsils, and a good dose of calomel will, for the most part, cure the disease. As to starving and low diet, we need not *inculcate* that; for the patient cannot swallow any thing.

Tonsillitis with Debility.—Although the above described form of the disease is that which we see every day, yet we occasionally find this affection occurring with debility. It is chiefly in old people that it occurs in this latter form; and chiefly in people who have had frequent sore-throats. When the throat has been sore very often, the inflammation is not of an active kind, but follows the course of gonorrhœa. When people have had the latter affection very often, the active symptoms are less severe; and so it is in the throat. When persons have had many attacks of tonsillitis, the inflammation is generally less active; the parts are not of so bright a red; they are of a more

[a] See Page 428.

dingy red; there is less pain; and the swelling is greater in proportion to the other symptoms. In such a case as this,—with such debility of constitution, the shortest way is to give stimulating gargles;—for instance, the decoction of seneka, with Cayenne pepper and brandy in it. If the patient be weak, we must give good food; and sometimes allow a little wine. The case may be (like any other inflammation) *active*, and to be treated as first pointed out; or it may be *passive*, and require only local astringents and stimulants. But sometimes the whole constitution is weak; and we have to support the patient with good food, and perhaps even wine.[a]

Ulceration and Gangrene.—Sometimes, when the disease occurs with ulceration, there is a great tendency to mortification. This is a case that must be treated on the principles I before mentioned[b];—good food, more wine, and perhaps quinine. But good food and wine, are among the best things; and we must also employ stimulating applications, together with stimulating gargles. In this case, too, the chlorides of soda and lime answer very well;—that is, when the patient simply requires a stimulating gargle.

We are not, however, in every case of inflammation, to presume the existence of ulceration; but (as I mentioned when speaking of ulceration of other parts of the body) where there is ulceration, we must adopt the antiphlogistic regimen.[c] Many cases of ulcers of the leg yield to antiphlogistic treatment, after all other means have failed; and so it is in ulceration of other parts of the body. The parts are red, and there are signs of strength; and the shortest way to cure the ulceration is to bleed locally and generally, and put the antiphlogistic plan in force. Ulceration occurring in the throat, however, is most frequently of an opposite character. This ulceration of the throat is most frequently seen in scarlet-fever; where it is called "cynanche *maligna*"[d]; but ulceration of the throat frequently occurs without scarlet-fever at all. In these circumstances, it is frequently necessary to inject stimulating gargles, several times a-day. There are many good applications, but one of the best is the acetate of copper, made into a gargle.

Chronic Ulceration.—Chronic ulceration of the tonsils is also very common; being one of the common effects of syphilis.

Enlargement of the Tonsils.—Inflammation of the tonsils is sometimes chronic; and is then attended with permanent enlargement of the tonsils. This is more frequently seen in children than others. The tonsils, after they have been inflamed, remain hard,—fall into a state of chronic inflammation, induration, and enlargement;—from lymph, I presume, having been effused into the cellular membrane. There is no difficulty, in cases of this description, in making a diagnosis. If we fail to make it externally, we have only to make the patient open his mouth, and the disease is apparent. The best treatment is the moderate exhibition of calomel, so as slightly to affect the mouth; the use of iodine, internally or externally; and of hydriodate of potassa. Iodine, in both forms, has great power in dissolving and dissipating induration and enlargement. There can be no impropriety in combining both plans. If there be much tenderness, leeches are very proper.

Occasionally this enlargement is not the result of *active* inflammation, but takes place *slowly*; and friction with iodine, or hydriodate of potassa, or both, is a very good thing. Sometimes there are cases, in which it is judged right to have recourse to surgery;—to extirpate the tonsils, or tie a

[a] See Page 140.
[b] See Pages 139 and 140, and 143.
[c] See Page 143.
[d] See Page 416.

ligature; but the greater number of cases do not require this, provided they are treated early and perseveringly by mercury, or iodine and hydriodate of potassa, both internally and externally.

Pharyngitis.—Cullen also speaks of inflammation, very far back in the throat; and I therefore legitimately touch upon it. I allude to "pharyngitis",—inflammation of the pharynx; or, as it is called by Cullen, "cynanche *pharyngea.*"

Symptoms.—Pharyngitis usually takes place from the mere spread of inflammation from the tonsils. When the tonsils are inflamed, it is very common for the inflammation to go farther back. Inflammation knows nothing of our artificial division of organs, and division of diseases; but spreads along the mucous membrane; and the pharynx is continually becoming inflamed. Now and then, however, it occurs in an *idiopathic* form;—that is to say, it occurs as a distinct separate disease. I have seen one or two instances of it. When this inflammation exists, there is redness at the back of the throat. On looking into the mouth, we see the posterior part exceedingly red. Deglutition is very much impeded; but respiration is not at all difficult. At any rate, if there be any difficulty of respiration, it is slight. The voice is not affected, any more than respiration. It is the gullet that is affected; and therefore persons can speak and respire very well.

The *treatment* of this affection is the same as that for inflammation of the tonsils[a]; and therefore I shall not dwell upon it.

SECTION III.—STRICTURE OF THE ŒSOPHAGUS.

We are frequently consulted upon a disease, which occurs rather lower down than the pharynx. I refer to stricture in the œsophagus,—producing obstruction.

Symptoms.—In this disease there is, as in inflammation, a difficulty of deglutition; but then there is no sensation of heat in the part,—no soreness; and, for the most part, no pain. The difficulty of deglutition is chronic; and, for the most part, has come on very slowly. It is easily ascertained by the application of a bougie or probang; and this, I may say, is the only remedy; for medicine can do no good in stricture of the œsophagus. When patients come to us with a difficulty of swallowing, if we ascertain it is not in the throat, but a little lower down, and that stricture has come on slowly, it is right to pass an instrument down a certain distance. This being the case, we employ surgery, and surgery only.

Spasmodic Stricture.—But this disease appears sometimes in a different form; and it is then entirely of a *spasmodic* nature. Frequently, when persons have not a *permanent* stricture of the œsophagus, they have occasionally a *spasmodic* stricture in the part;—just as they have in the urethra; so that it will be much worse at *one* time, than at *another*. This occurs more frequently in women, than in other persons; and frequently it is connected with hysterical symptoms.

Treatment.—The best mode of treating it, is to use the shower-bath; to purge the patient well; and to use oil of turpentine, and other remedies of that kind. I have read of cases where it appeared to give way to mercury; but I have not seen them myself. It has always appeared to me, that they would do better with the common remedies of hysteria;—by purging, on the one hand; and by lessening the irritability of the body at large, (by

[a] See Page 781.

neans of the shower-bath, the administration of iron, and putting the health generally into good order,) on the other. We must carefully remember his form of the disease, and its freedom from danger.

SECTION IV.—INFLAMMATION OF THE MOUTH (STOMATITIS).

a. Pustules of the Mouth.

Characters.—Repeatedly are children brought to us by their mothers, with pustules on the tongue and lips, and inside the cheeks. I do not know that the disease has any specific name; but the parts I have mentioned, are elevated in consequence of the pustules; and the tongue is frequently much swollen, and just the colour that it is, when persons are much under the influence of mercury. From the swelling of the tongue, the quantity of mucus secreted, the saliva running out of the mouth, and the fetid state of the breath, one would imagine, at first sight, that the child had taken mercury; but if we give calomel in such a state, it does not increase the mischief, but answers well as a purgative. It is one of the best to give children.

Treatment.—I have found great benefit, in these cases, from the use of washes containing some astringent; but the best mode of giving it to the child, is to put a grain or two of sulphate of zinc (for example) into an ounce of syrup. The child has no objection to it; and it exercises a beneficial influence. The disease sometimes occurs to many children in one family; but whether it is contagious I do not know. The disease is described as common ulcers in the mouths of children; and they may last some time without any danger; but purgatives and local astringents are very useful. Whenever we have to apply an astringent to the mouth of a child, it is best to give it in syrup, instead of water.

b. Aphthæ.

There is a disease that frequently affects the mouth, and neighbouring parts; and usually in the period of infancy. It is called "the thrush"; or, in medical language, "*aphthæ*."[a] It is always mentioned under diseases of the skin; but as it occurs in the mouth and throat, it is perhaps hardly right to call it "a *cutaneous* disease";—it is a disease of the mucous membrane.

Characters.—It consists in the formation of vesicles within the mouth and lips, and all the way along the cheeks, the tongue, and the velum pendulum palati; and even on the mucous membrane of the hard palate, the tonsils, and pharynx. On opening the mouth, it presents an appearance just as if the patient had been taking milk, curds and whey, or some chalk mixture;—all the vesicles are exceedingly white. This is produced by innumerable elevations of the cuticle, by a fluid, and a large number of minute vesicles. There is sometimes a good deal of inflammation with it; and sometimes there is scarcely any thing more than this white appearance,—as if the parts were filled with curd.

Age at which it Occurs.—This disease certainly is most common in infants; but we shall frequently see it in adults, at the end of chronic diseases;—at the end of phthisis, for instance. It is very common then for persons to complain much of the throat;—to complain of a difficulty of swallowing;

[a] From $\alpha\pi\tau\omega$, *to set on fire.*

and even when persons die of diseases of the abdomen, of various sorts, it is very usual indeed to see aphthæ before death. It will occur in old people from very trifling causes.

Not Necessarily Fatal in Old Age.—It is supposed to be a fatal disease, when it occurs in old people; or in those in whom a chronic disease has existed for a long time; but it is not an invariable rule. I recollect an old lady of ninety, who, at that advanced age, suffered an attack of bronchitis, and got well; and afterwards attained the age of one hundred;—how much more I cannot tell; but I know she lived ten years after the attack, notwithstanding it was united with aphthæ; and therefore aphthæ is not necessarily a fatal sign in old people. We see the disease every day, however, in persons who are dying of chronic diseases. I believe old women say, that if we do not have it when we are *young*, we must have it when we are *old*. I only mention this to shew how common the disease is.

Treatment.—When the disease occurs in infants, it may be so slight as to require scarcely any treatment; but if it do, we find it useful to employ the warm-bath, and attend to the bowels. There is frequently irritation of the mucous membrane lower down in the alimentary canal;—frequently sickness and diarrhœa; and therefore it is sometimes useful, besides the warm-bath, to have recourse to purgatives; and besides that, it is sometimes necessary to employ Hydrargyrum cum Cretâ, and opium. There is often tenderness on pressure; and then it is necessary to apply poultices over the abdomen, as a constant warm-bath; and to apply a leech or two; but often a mustard-poultice answers best. A small portion of ipecacuanha, or camphor, is often serviceable; but nothing is better than a mild astringent in syrup;—such as I have mentioned already[a] (made with a minute quantity of sulphate of zinc). Many people employ borax and honey; and injudicious nurses tie a rag to a stick, and mop out the child's mouth; and thus make things worse. They had better use a camel's-hair-pencil; or leave the disease to pursue its course. I have no doubt that the chlorides are useful; but in the case of children, they must be given very much diluted. In adults, I do not know any means so useful as the chlorides. They will frequently change the appearance of the mouth almost immediately; but the common solution must be diluted with six or eight times its weight of water. When the intestines have been in a state of irritation only, a few specks will appear at the rectum; and then old women consider that the disease has had a long journey, and has shewn itself at the other end. If, however, we examine the intestines, we find no inflammation,—only specks; and it is only towards the anus that these specks appear. Nevertheless, the irritation which produced the vesicles, certainly does frequently extend all through the alimentary canal.

c. Stomatitis Mercurialis.

[The inflammation of the mouth excited by the specific action of mercury, is a serious adjunct to the *ptyalism* produced by this metal. "Ptyalism" strictly signifies increased secretion from the salivary glands; and it may occur quite independently of mercurial action, as an accompaniment of hysteria, hypochondriasis, and dyspepsia; but it is then very rarely attended with stomatitis.

Symptoms.—The affection is generally preceded by an unpleasant taste, compared to that of copper or brass; soon after which the patient complains

[a] See Page 785.

hat his teeth feel soft and tender when brought together, and he fancies hey are loosened in their sockets. Soon after this, shooting pains are felt n the face, and a stiffness in the movement of the lower jaw, caused by umefaction of the submaxillary and parotid glands. The gums are of a eep red colour, and their margins projected (as it were) from the teeth. Here and there we may perceive spots of a dull whiteness, caused by pacity of the epithelium. The tongue is swollen, indented at the edges y the pressure of the teeth, and coated with a thick yellow or brownish ur: the breath has a peculiar fœtor, and often before the stomatitis is very nanifest. In severe cases there is ulceration of the gums; commencing at he margins, and extending to the interior of the cheeks. Occasionally he tumefaction of the salivary glands is so great, as to prevent the mouth rom being opened: this, together with the engorgement of the tongue, nay become so considerable as to induce suffocation. But without attain-ng so serious a degree, the stomatitis is productive of great distress, by the mpediment to speaking, mastication, and deglutition, as well as by the pro-use secretion of saliva. The patient often complains of it more bitterly nan of the internal inflammation, for the removal of which the mercury vas administered; and he can scarcely refrain from inveighing against his hysician, for substituting so loathsome an affection even for a malady hich threatened his existence. The local symptoms are generally accom-anied by feverishness, and general irritation.

Duration.—The duration of ptyalism varies with the extent and severity f the inflammation. If ulceration has taken place, the parts seldom ecover themselves till several weeks have elapsed; and even without this, may be almost as long before the spongy state of the gums, and the in-reased flow of saliva, entirely subside. Ordinarily, however, when there as been only turgescence and soreness of the gums, the affection disappears n a few days.

Modifying Circumstances.—The severity of stomatitis holds no direct atio with the amount of the mercury introduced into the system. The normous quantities requisite for inducing the specific effects of this metal n some subjects, are no less surprising than the sudden appearance of the ffection, when only the most trifling doses have been taken. Some persons ave, by idiosyncrasy, a remarkable susceptibility of mercurial influence; hile others are as strikingly capable of resisting it. The constitutional ability, however, cannot be fairly estimated when inflammatory disease is resent; for the most general fact with which we are acquainted as to the pecific action of mercury, is, that the readiness with which it takes place is n an inverse ratio with the intensity of the existing disease. Other circum-ances, also, very materially affect the result; such as the mode of adminis-ration, the state of the bowels, and of the function of the skin, previous loodletting, &c.; but this is not the place for their consideration.

Treatment.—In slight cases, very little more is necessary than to enjoin requent ablution of the mouth, at first with tepid water, and afterwards ith a mild astringent gargle; and to secure a free action of the bowels by aline aperients, and of the skin by warm clothing. When the inflammation s more severe,—as indicated by a white line of suppuration along the edges f the gums,—we must, in addition to the measures just mentioned, em-loy others of greater activity. If the tumefaction is general, leeches ap-lied under the lower jaw, with fomentations, will afford relief. The best ocal application (in our experience[a]) is the nitrate of silver, either in sub-

[a] That of Dr. Symonds.

stance, or in a strong solution (two scruples to an ounce of distilled water), by means of a small sponge fastened to a proper handle, or a camel-hair-pencil. A lotion of chloride of soda will be very useful for correcting the fœtor, as well as for its stimulant property. An alum-gargle containing laudanum is of service, when the active period of the inflammation has passed by. We[a] have very little confidence in internal medicines exhibited as antidotes; such as sulphur and iodine. The supposed efficacy of the former depends, we[a] believe, on its laxative operation. Opium in repeated doses has proved useful by quieting the erethism[b]; and also, perhaps, by lessening the secretion from the salivary glands. But it must be confessed, that the affection is very slightly amenable to treatment, excepting as to the progress of ulceration; which may be arrested, with tolerable certainty, by the nitrate of silver. The practitioner should never neglect to enjoin free ventilation of the patient's apartment; which, indeed, ought to be kept not only airy, but cool.

d. Stomatitis Ulcerosa.

Symptoms.—Under this term we shall notice a form of inflammation of the gums, which appears in children between the first and second dentition. It is sometimes called "cancrum oris", or a milder variety of that frightful disease which we[a] shall describe presently, under the appellation—"*gangræna* oris."[c] It would be better to confine both these terms to the latter disease; which is not merely more intense in degree, but distinct in its pathological nature, from "stomatitis ulcerosa." This affection begins with inflammation of the outer surface of the gum, and more commonly in the lower jaw; sometimes limited to one side, but more frequently extending to both sides. The inflamed part is extremely swollen, and soon surmounted by a line of ulceration at the margin adjoining the teeth. The cheeks and lips become hard and œdematous,—so as to impede the opening of the mouth; and this, together with the quantity of mucus and saliva collected between the gum and the cheek, renders it difficult to procure a satisfactory inspection of the diseased parts. The breath has a peculiar fœtor, allied to the taste called "brassy" or "coppery", and quite distinguishable from the odour of gangrene.[d] There is often considerable flushing of the face and conjunctivæ, with heat and tenderness; and the glands below the jaw are enlarged and painful. If the disease be not speedily checked, the ulceration may proceed so far as to lay bare the alveolar processes; but, occasionally, we have known it continue in an indolent state for several days, neither advancing nor disposed to heal. In some subjects, the ulcerated surface is very prone to bleed. More or less fever, for the most part, accompanies the affection; but is sometimes absent. The bowels are costive, and there is no inclination to food.

Causes.—The disease prevails chiefly among the poorer classes of the community; and indicates debility of habit, as a predisposing cause. The attack may be often referred to the immediate agency of cold, damp, or disorder of the stomach and bowels. When seen early, the prognosis is favourable; unless the disease has supervened upon some other acute malady;—such as fever or scarlatina.

Treatment.—Though the disease is inflammatory, it is not to be combated by the ordinary antiphlogistic measures. Leeches and cold lotions may be useful in reducing the glandular enlargements; but they cannot be

[a] Dr. Symonds.
[b] From ἐρεθίζω, *to excite.*
[c] See Page 789.
[d] See Page 102.

depended upon for stopping the internal ulceration. The best applications for this purpose, are of the same kind as we have recommended in the other species of stomatitis[a];—such as the strong solution of nitrate of silver, and the mixture of syrup and sulphate of zinc. A linctus made with a drachm of strong muriatic acid, added to an ounce of honey, is an excellent remedy. We can also speak highly of a gargle composed of alum, decoction of cinchona, and tincture of myrrh. The only objection to this (as to certain other gargles) is, that the age of the child often prevents it from being used in sufficient quantity, or with sufficient frequency, to render it efficient.

The internal treatment may be commenced by an emetic; unless the lips and cheeks are so swollen and tender, as to render vomiting too distressing an action. After the emetic, a brisk purgative of scammony or jalap, with calomel or Hydrargyrum cum Cretâ, should be administered. If there is much fever, we may exhibit salines and antimonials; but it is seldom necessary to continue them longer than a day or two. The action of the bowels may be maintained by castor-oil, or rhubarb and soda. Should the ulceration, after the above treatment, shew a tendency to spread, we must exhibit the sulphate of quinina, or decoction of bark, in doses suited to the age of the patient;—continuing, at the same time, the local treatment with undiminished energy.

SECTION V.—GANGRÆNA ORIS.

Synonymes.—Gangrene of the mouth may be the consequence of any of the forms of stomatitis; but the disease we are about to consider is idiopathic, or gangrene proper;—beginning with that loss of vitality which, in inflammatory mortification, is the last of a series of morbid changes. The synonymes of "gangræna oris" are—"*cancrum oris*", "*sloughing phagedæna of the mouth*", "*water-canker*", "*stomacace maligna*", "*norma*", "*necrosis infantilis.*"

Symptoms.—The existence of this disease is generally first intimated by an indolent swelling of one cheek, without heat or redness. It is hard to the touch; and so little tender or painful, that the patient seems all but unconscious of it; and, but for the enlargement being obvious to the eye, the mischief would probably escape notice altogether in its early stage. Indeed, as it is, the tumefaction is occasionally mistaken for affections of a much less serious description. The skin of the cheek has a peculiar glossy or waxy appearance. On examination of the mouth, we detect a whitish or ash-coloured eschar, without any inflammatory redness of the surrounding membrane; generally in the centre of the cheek, or in the commissure of this part and the lower jaw. The gums look pale and spongy. There may be a certain degree of languor, dulness, or slight feverishness; but, not less frequently, there is nothing to call particular attention to the general health. Such are the principal phenomena of the first stage of the disease. As it advances, the slough spreads rapidly over the interior of the cheek and lip, and invades the gums. Saliva escapes in great quantity; at first clear, afterwards mixed with a dirty sanious matter, which has a horrible fœtor. About the same time, the outside of the cheek presents a pale ashy spot; which soon becomes livid, and sphacelates. The extension of the disease to the bony structures, is evidenced by the loosening of the

[a] See Page 787.

teeth; which are soon thrown off, with portions of the alveolar processes. The fluid discharged appears to have a corrosive quality; for the angles of the mouth and the lower lip sometimes become new centres of mortification. We [a] have known both sides of the face attacked in the same individual; and there are cases on record in which all the soft parts of the face, as well as the upper maxillary bones, the palatal, the nasal, and even the ethmoid, were involved in the destruction. Usually, however, death prevents the lesion from extending so widely.

The constitutional disturbance is, in many cases, far from being proportionate to the severity of the local affection. The pulse is frequent, but weak; the bowels, at first confined, become, towards the close of the malady, extremely relaxed; and the heat of the extremities is much depressed.

Causes.—The subjects of "gangræna oris" are children, usually between two and five years of age; but we [a] once met with it in a girl who had attained her eighth year. It is confined to children of debilitated habit, and is very rarely observed among the richer classes; low marshy situations, and rainy seasons, appear to increase the predisposition. Not unfrequently, "gangræna oris" is one of the sequelæ of exanthematous fevers. There is no good reason for attributing the disease to the specific action of mercury, though it may have sometimes supervened upon the latter; which, like any other cause of derangement, may have given the first impulse to the morbid process. It has often occurred when not a particle of mercury had been administered.

Pathology.—As to the pathology, we [a] have already expressed our belief [b], that the disease is gangrenous *ab origine*. Any inflammation that may be found about the part is secondary only;—bearing no causative relation to the gangrene. It has been stated, that the commencement is often unattended by pain, heat, or redness. The swelling is the effect of the retarded circulation in the capillaries, and the infiltration of the tissues with serum, or "liquor sanguinis." The pressure thus produced, is sufficient to explain why the vitality of the central portion is destroyed. The mortification extends by contiguity; because the capillary circulation in the adjacent parts, is necessarily affected by the pressure of the diseased tissue. If they have sufficient vital action, they may only suffer inflammation and suppuration; but it too often happens, that the lesion assumes the same character as in the neighbouring part;—being influenced by the same state of the general habit. It can scarcely be doubted, that this depraved habit consists mainly in deficient plasticity of the blood. The worst case that ever fell under our [a] notice, occurred in a girl recovering from mild fever, who had been leeched on the forehead. There had been extreme difficulty in restraining the hæmorrhage from the leech-bites;—in consequence of the incoagulable quality of the blood.

Prognosis.—The *prognosis* is, from the first, unfavourable. Though the child may escape with life, it cannot be saved from disfiguration, when the gangrene is once established. If however œdema has been discovered very early, and a vigorous treatment adopted, the danger may sometimes be warded off.

Treatment.—On the first appearance of the swelling, the cheek should be frequently rubbed with a stimulating embrocation, consisting of camphorated oil and ammonia; and in the intervals, should be kept moist with a tepid lotion, containing muriate of ammonia and spirit of wine. A care-

[a] Dr. Symonds.

[b] See Page 789.

ul examination of the interior should be made; so that, on the detection f the slightest appearance of an eschar, the part may be touched with the olid nitrate of silver, or strong muriatic acid. If sloughing has already ommenced, the lotion of nitrate of silver[a] will be the best application. The mouth should be frequently washed out, or syringed, with a solution f chloride of soda;—if only to moderate the fœtor. M. Billard recommends, that as soon as the livid spot on the exterior of the cheek shews tself, a crucial incision should be made into the centre of the swelling, and utter of antimony introduced, or (still better) the actual cautery at a white eat.[b] This remedy had been previously much insisted on by M. Baron. When the gangrene is complete, we must endeavour to stop its extension y fermenting poultices.

The medicines to be exhibited are tonics and stimulants; of which carbonate of ammonia in decoction of bark, or quinina combined with camphor, are the most efficient. Wine or brandy may be liberally administered, with beef-tea. Opium is strongly indicated;—not merely for allaying general irritation, but for the sake of the stimulating influence which t is known to exercise upon diseases of the capillary system characterized y debility. Constipation or diarrhœa must be met by the remedies appropriate to either state. The patient should, if possible, be placed in a large iry apartment.[c]]

SECTION VI.—FETID BREATH.

I may mention that persons sometimes consult us, on account of having a fetid breath; called, in vulgar language, "a smoky chimney." It must be very annoying if people are married, or in the way of being married; and I have no doubt that it has frequently prevented that interesting ceremony from taking place.

Causes.—Fetid breath may arise from many causes. It may be accidental, from a person eating something disagreeable; which enters into the blood, and is poured forth from the vessels of the bronchia, till the blood gets rid of it all. If a person eat onions, it is not while they are in the *stomach* that the breath is fetid; but when the odorous principle of the onions gets into the blood, it is poured forth from the bronchial membrane. The bronchial membrane is found, by physiological experiment, to be one of the great outlets by which the body gets rid of things foreign to the blood. Carious teeth, or a diseased bone, is likewise a cause of fetid breath; but one very common cause is a depraved secretion of the tonsils. On looking into the mouths of these patients, we frequently see the tonsils enlarged, or at any rate containing a cheesy matter. If this be pressed out with the handle of a spoon, the person's breath (for the time) is rendered less offensive. I should imagine, that stimulating the follicles to secrete more abundantly, would favour the escape of this disagreeable matter; and not allow it to accumulate there, and form these nauseous concretions; but the individual's breath itself may be fetid, independently of this offensive secretion.

SECTION VII.—EAR-ACHE.

Before I quit these parts, as we are so near the ear, (which communicates with them by the eustachian tube,) it may be well to notice what is

[a] See Page 787 and 788.
[b] "Maladies des Enfans." Page 247.
[c] "Library of Medicine"; Volume 4; Pages 36 to 40.

commonly called "ear-ache." It is not, in general, an important disease; but sometimes it is of very great consequence. I mentioned, when speaking of inflammation of the brain, that the latter will spread from the ears and eyes.[a] I have seen several cases of phrenitis, which have spread from the ear. Common ear-ache is not a thing so free from danger as tooth-ache. We see ear-ache very frequently, and are apt to disregard it; but, in any case, it may be dangerous.

Ear-ache always arises from more or less inflammation in the "meatus auditorius"; and ought always to be attended to. Leeches should be applied externally, and blisters; and, in some cases, the patient should be bled in the arm. After it has lasted a long time, the bones frequently become carious; and, when the bones are carious within, inflammation of the "dura mater", lying upon the petrous portion of the temporal bone, is likely to come on; and then it is all over. After death, matter is found within the ear itself; but sometimes also upon the bone, under the "dura mater"; and perhaps *above* the "dura mater",—in the arachnoid, on the "pia mater", and on various other parts of the head. Encephaloid disease, and other affections, take place; the patient becomes delirious, and is soon gone. Therefore, when intense ear-ache occurs, and the patient complains of pain in some other part besides the ear, and there is a wandering of the eyes, it is well to tell the friends that he is in the greatest danger.

Such a case (like other varieties of phrenitis) ought to be treated actively; but I believe, in almost every case, treatment will be found unavailing. There is a local cause (that is to say, disease of the ear) keeping up inflammation of the part; and therefore we cannot expect to be successful.[b]

[a] See Page 536.

[b] Full details of the nature and treatment of this and its kindred affections, will be found in a work with which our medical literature has recently been enriched:—"The Nature and Treatment of Disease of the Ear. By Dr. William Kramer. Translated by James Risdon Bennett, M.D."

CHAPTER III.

DIAGNOSIS OF PULMONARY DISEASES.

A KNOWLEDGE of the condition of the chest and its organs, in health and in disease, is to be obtained by the study of those properties which are signs or indications of this condition. These properties are divided into two classes:—the *physical properties*, which are those capable of directly impressing our senses; and the *vital phenomena*, or those which arise out of the vital endowments of the parts; and which, in combination with physical structure, constitute function. The "physical properties" are necessarily confined to the chest, its contents, and those parts mechanically related with it; but the "vital properties" of the chest and its organs affect, and may become evident in, various other parts of the body, through the connecting vital influences of the nervous and vascular systems.

Physical Examination of the Chest.—We examine the chest physically by those properties of form, size, proportions, relative position and density of its parts, at rest or in motion, which are within the reach of our senses. Thus we see and feel the shape and motions of the chest; we listen to the sounds which these motions cause, or which may be otherwise produced in the chest,—as by the voice, percussion, &c.; and we judge of the results of these examinations, by comparing them with healthy standards. Now it is obvious, that a good knowledge of the anatomy and physiology of the chest, must greatly assist us in this examination; and this knowledge should be especially *topographic*;—teaching where each organ lies and reaches, in relation to the exterior; so that when we view, feel, and listen to the chest, we may be able to map out the general outlines of the organs within. This knowledge is to be obtained, not only from the common study of anatomy, but also from the frequent comparison of the interior with the exterior, when bodies are opened in the dead-room of hospitals, and from the habit of physical examination itself.

SECTION I.—EXAMINATION BY SIGHT AND BY TOUCH.

Mode of Examination.—The patient being in a standing, sitting, or lying posture, with his arms, legs, and trunk symmetrically placed, and the chest, if possible, entirely uncovered and exposed to a good light, we view it in front, behind, and from above;—carefully marking its form and proportions, and the corresponding prominences and depressions of the two sides. The chest may be viewed from *above*, when the patient is seated on a low seat, with the head a little inclined forward;—the observer standing behind or beside him, and looking down on his shoulders. A view is thus obtained of the depth of the chest from front to back; and in this way may often be detected between the two sides a want of correspondence,

that is not perceptible by the ordinary modes of inspection. If the patient's strength do not permit him to stand or sit, the chest may be inspected when he lies on his back, by the observer standing at the foot or at the head of the bed; from which points the corresponding parts of the two sides can be best seen.

Symmetry of the Chest.—Most healthy chests are nearly symmetrical, the two sides corresponding in shape and size. There is, however, in almost all instances, a slight superiority in the measured dimensions of the right side; and this is not unfrequently perceptible to the eye, in the lower part of the chest, especially in the back. I[a] have also remarked, in a great many healthy chests, that the left side of the chest, at the upper ribs in front, is somewhat higher than the right. But in spite of the occasional and even frequent occurrence of these anomalous formations, there is sufficient general regularity in the shape and motions of the chest, to render the changes caused by disease available as signs.

Indications afforded by Sight and Touch.—By inspection we judge, not only of the statical condition of the chest, but also of its motions. Feeling by the hands will assist the sight; and when we inspect the chest, desiring the patient to breathe in various degrees, with our hands and eyes fixed on corresponding points of the two sides, we watch and feel the amount and equality of the motions. If the chest is healthy, the motions are as uniform as the chest is symmetrical. At each inspiration, the clavicles, scapulæ, and upper ribs rise; the lower ribs rise and spread; and the abdomen swells, as the diaphragm descends. By attentively watching and feeling the chest, we may often likewise so trace the limits of some of the movements, as to indicate the boundaries of the chest. The intercostal spaces and the hollows above the clavicles, are also fit marks for comparison between the two sides. They are strongly marked during full inspiration; and are *more* than usually so, when the entry of air into the lungs is rendered difficult by obstruction of the *tubes*; and *less* than usually so, when the obstruction is more in the *tissue* of the lung, from internal effusion, or external pressure.

There are some general varieties of disordered respiration, which may be distinguished by watching and feeling the motions of the chest. Healthy or perfect respiration is diaphragmatic and costal; but disease may limit the motions to the ribs or to the diaphragm. Thus, when the diaphragm is prevented from descending,—by acute pain in it or below it, or by pressure from below,—the respiration is wholly performed by the raising of the ribs; and is called "heaving", "thoracic", or "costal." When, on the other hand, the ribs are immoveable,—in consequeuce of pain, ossification of the cartilages and ligaments, or paralysis of the intercostal muscles,—the breathing is wholly "diaphragmatic" or "abdominal." When one side of the chest moves much less than the other, or when a part of one side moves imperfectly, the respiration is "partial"; and this partiality of movement may have its cause in the walls of the chest, or (as is more usual) it may proceed from impermeability of the corresponding portions of the lung, in consequence of various diseases.

Mensuration of the Chest.—Mensuration of the chest is a more exact method of detecting inequalities between the two sides. It is generally practised by fixing (with the finger) the end of a piece of tape, or string, at the mesial line of the sternum; and passing the tape horizontally round the chest, to meet at the same spot; when, by taking it off at the point

[a] Dr. C. J. B. Williams.

where it crosses the spinous process of the dorsal vertebra, the measure of the two sides may be at once compared. Great care must be taken to pass the tape horizontally around corresponding parts; and attention should also be paid to the degrees of the respiratory act. The most accurate mode is, to compare the measurements of the two sides on a full inspiration and expiration, as well as in the intermediate state; or, without the troublesome process of removing and measuring the tape, it may be sufficient to remark how it is tightened and slackened on the two sides by the motions of respiration. These expedients, together with the practice of inspection downwards on the shoulders, for the antero-posterior diameter of the two sides, are generally sufficient to furnish the comparative dimensions of the sides of the chest.

Mensuration of its Internal Capacity.—Besides external measurement, which is essentially *comparative between the two sides*, there have been various attempts to measure the internal capacity of the chest, by noting the quantity of air that can be exhaled or inhaled at a breath, into or from a glass jar over water. The great objection to these as means of diagnosis is, that they depend on the strength of the patient, as much as on the capacity of the chest; and a weak nervous person, with sound lungs, thus tested, would rank lower than a pleuritic or phthisical patient, whose muscular energies are still considerable.

So much for the modes of examining the chest by sight, touch, and measurement. They may often discover to us extensive disease, but they will not inform us of its nature; and they cannot detect the slighter degrees and forms of disease. The chest may be motionless, distended, or contracted, in parts; but whether from diseased lung, obstructed air-tubes, liquid or air in the pleura, or other cause, sight and touch will rarely inform us.[a]]

SECTION II.—PERCUSSION.

History.—[The chest of a healthy person, when slightly struck, ought to yield over its whole extent, more particularly in its anterior and lateral parts, a clear and distinct sound;—owing to the presence of the air, which constantly fills the lungs, and consequently a great portion of the cavity of the thorax. This fact was, no doubt, known to the ancients; and, even in our own times, there are few persons who have not seen the common people striking their chests, and congratulating themselves on possessing what they call "a good *hollow* or *bass*." From the knowledge of this fact, to the conclusion that the same sound cannot exist in cases where the lung is obstructed, or the cavity of the pleura filled with fluid, seems but a step; and yet this reflection appears never to have been made, until made by Avenbrugger, about the middle of last century. After seven years' silent investigation, and (as he himself tells us) amid laborious and disgusting researches[b], he gave his discovery to the world, in a small pamphlet. The only reward he seems to have obtained for his fine discovery, was a slight notice of it by Van Swieten and Stoll: this, however, failed to attract the attention of his contemporaries; and he died, without ever perhaps dreaming of the celebrity, which his discovery was destined to obtain. Corvisart is entitled to the honor of withdrawing this method from the oblivion into

[a] "Pathology and Diagnosis of Diseases of the Chest. By Charles J. B. Williams, M.D." Fourth Edition; Pages 1 to 9.

[b] "Inter labores et tædia."

which it had fallen, after a period of thirty years; and of making all Europe, and even the native country of its author, acquainted with its merits.[a]

Mode of Percussion.—The patient ought, if practicable, to be either seated or standing; if in bed, the mattrass, still more the pillows, and also thick curtains, always render the sound less. The chest ought to be covered with a thin dress; or the physician should have a glove on. This precaution, originally recommended by Avenbrugger, is particularly necessary; inasmuch as the contact of the naked hand and skin occasions a sort of clatter, which renders the pectoral sound less perfect and distinct.[b] It is better that the chest should be covered, and the hand naked; since the glove necessarily diminishes the sensibility of the touch; and because the sensation of elasticity perceived by the operator, frequently confirms his judgment, in cases where the difference of sound is only doubtful. In every case the perception of the sense of fulness or emptiness, conveyed by percussion, is much stronger to the operator than to the mere bystander. Percussion ought to be made with the four fingers united in one line;—the thumb being placed, in opposition to them, at the junction of the second and third phalanges of the index; and used merely in maintaining the fingers in close and strong apposition. We must strike with the *ends*, and not the *face* or *pulpy portion* of the fingers; not obliquely, but perpendicularly; gently, and quickly;—that is, raising the hand immediately from the skin.

When we percuss comparatively the two sides of the chest, we must be careful to strike successively on parts that are similar, with a like force, and under an equal angle. The omission of these precautions frequently leads to errors of consequence. We ought, in general, to apply percussion to the bones, and not to the intercostal spaces; and to strike the anterior and lateral parts of the chest, in a direction parallel to the ribs. If, however, the intercostal spaces are not very sensible,—as frequently happens in fat or phlegmatic persons,—it is better to strike across the ribs. In any point where the muscles covering the ribs are thick, flabby, or relaxed, we should endeavour to procure their tension. If the muscles are very much relaxed,

[a] Leopold Auenbrug, or Auenbrugger, was born at Graetz in Styria, in 1722. He graduated at Vienna; and afterwards became physician in ordinary to the *Spanish Nation*, in the imperial hospital in that city. In Ersh and Puchhelt's "Literatur der Medicin", besides the treatise on percussion, he is recorded as the author of two works on subjects relating to *madness*; and in the "Biographie Medicale" he is farther said to be the author of a *Drama*, and to have published on *Dysentery*. The work on Percussion was first published in 1761, under the title of "Inventum Novum ex Percussione Thoracis Humani, ut Signo, Abstrusos Interni Pectoris Morbos Detegendi" ("A New Discovery, for Detecting the Internal Diseases of the Chest, by Percussing the Thorax"); and the author is said to have died so late as 1809. For a complete view of the subject of Percussion, as introduced by Auenbrug and improved by Corvisart, I beg to refer to the translation of the treatise, in my work entitled—"Original Cases, illustrating the Use of the Stethoscope and Percussion." (Pages 3 to 64.)—*Dr. Forbes.*

[b] This injunction of having the chest covered, so strongly insisted on by the original proposer of the practice and by our author, seems to me of inferior consequence, as far as the accuracy of diagnosis is concerned. In my own practice, I have often followed the interdicted method; and without any inconvenience, as far as I am aware. A much greater authority, Corvisart, did the same; and he gives it as his opinion, that percussion may be equally well performed in one way as the other. (See his "Translation of Avenbrugger"; Page 20.) He says, however, that it may be well for beginners to attend to the precaution recommended by Avenbrugger. I would further add, that if the operation can be equally well performed over a garment (as, no doubt, it can), there are very obvious reasons for giving this mode the preference. Our author omits to state the additional and very necessary precaution, given by Avenbrugger, of drawing the shirt or other covering, *tight* over the place.—*Dr. Forbes.*

or if there is œdema or a flabby fatness, it is often useful to stretch and compress the integuments with two fingers of the left hand, and to strike between. In the case of children and lean persons, it is found sufficient to percuss with the extremity of one finger.

When we obtain from percussion only a slight difference of sound on the two sides,—leaving the result doubtful,—it is advisable to repeat the operation;—changing our position to the other side of the patient: in this manner we frequently obtain a result entirely different;—the side most sonorous in the former trial, yielding now a sound inferior to the other. This precaution is never to be omitted in doubtful cases; for percussion yields exact results in the hands of those only who bring to its exercise experience, dexterity, and much attention.

Character of the Sound derived from Percussion.—This is different in the different parts of the chest; on which account I shall divide its surface into fifteen "regions", twelve of which are double:—1. *Subclavian.* This includes merely the portion of the chest covered by the clavicle. When struck about the middle or sternal extremity, this bone yields a very clear sound; its humeral extremity, on the contrary, yields a rather dull sound. A knowledge of the natural and morbid sound of the chest in this region is very important; inasmuch as from it is usually derived the first signs of the development of tubercles in the lungs. When the clavicle is more distant from, or closer to, the chest than usual,—in consequence of the more arched or straighter form of this bone,—the sound is less distinct: this is especially the case in the latter condition of the clavicle. 2. *Anterior-Superior.* This is bounded by the clavicle above, and the fourth rib (inclusive) below. The sound is here naturally very clear; though somewhat less so than over the sternal end of the clavicle. 3. *Mammary.* This begins below the fourth rib, and terminates with the eighth. It can rarely be percussed in females; and in the male it seldom yields so good a sound as the anterior-superior region;—on account of the thickness of the inferior edge of the "pectoralis major." 4. *Submammary.* This extends from the eighth rib to the cartilaginous border of the false ribs. On the right side, it almost always yields a dull sound;—on account of the size of the liver: while on the left side, it frequently yields a sound clearer than natural, and which may be called almost tympanitic;—owing to the presence of the stomach distended with gas. In very rare instances, the unusual size of the spleen may occasion the dull sound.[a] 5. *Sternal—Superior*, *Middle*, and *Inferior.* Over the whole extent of the sternum, the sound is as clear as on the sternal end of the clavicle. In certain cases, however, particularly in very fat persons, the lower portion of the sternum yields a duller sound;—on account of the great quantity of fat about the heart.[b] 6. *Axillary.* This extends from the upper part of the axilla, to the fourth rib (inclusive): it yields naturally a clear sound. 7. *Lateral.* This is bounded superiorly by the fourth rib, and terminates with the eighth. The sound in this region is always good on the left side; on the right, it is frequently much less;—owing to the liver rising higher than usual; and thereby compressing the lung upwards, and rendering it more dense and

[a] Andral is of opinion that the dulness of this region on the left, owing to the presence of the spleen, is of more frequent occurrence than is commonly imagined. (Tome 2; Page 338.)—*Dr. Forbes.*

[b] Avenbrugger considers this diminution of sound, under a part of the sternum, as general. He says that "the whole sternum, on percussion, sounds as clearly as the sides of the thorax; except at that part behind which lies a portion of the heart; for there the sound is a little duller." The opinion of Corvisart coincides with that of our author. I have myself frequently found the sound dull in this point, when there was no reason to suspect disease of the heart.—*Dr. Forbes.*

less charged with air. The liver, when sound, never extends above the level of the sixth or fifth rib. 8. *Inferior Lateral.* This is bounded above by the eighth rib, and terminates with the border of the false ribs. For the reasons just mentioned, this region on the right side yields a completely dull sound, and is almost always much less sonorous than the left. This last, on the contrary,—for reasons already stated,—frequently yields a clearer sound than natural; and this even when the inferior portion of the lung is obstructed, or there exists an effusion of fluid in the pleura. 9. *Acromion.* This is comprehended between the clavicle, the upper edge of the "trapezius" muscle, the head of the humerus, and the lower part of the neck. Here there is no sound whatever;—the soft parts in this place yielding passively to the percussion. 10. *Upper Scapular.* This corresponds to the supra-spinal fossa of the scapula, and hardly yields any sound;—on account of the muscle that fills it. The spine of the scapula, which bounds this region below, sometimes yields a slight sound, but never considerable; and this only when the arms are very forcibly crossed. 11. *Lower Scapular.* This corresponds to the portion of the scapula below its spine; and, on account of its muscles, yields no sound. 12. *Inter-Scapular.* This includes the space between the inner margin of the scapula and the spine, when the arms are crossed on the breast. It is not easy to elicit any sound from it; on account of its muscles. Sometimes, however, it yields a middling but sufficiently distinct sound; especially in thin persons; and when the arms are strongly crossed, and the head bent;—so that the "rhomboid" and "trapezius" muscles are made quite tense. The spine in this region gives a good sound; as does also that portion of the chest included between the inner and upper angle of the scapula, and the first dorsal vertebra. 13. *Inferior Dorsal.* This begins at the level of the lower angle of the scapula, and terminates at the twelfth dorsal vertebra. To elicit from this region all the sound it is capable of yielding, we ought, especially in fat subjects, to endeavour to find the angle of the ribs, and to percuss on that point in a transverse direction. In the upper part of the region, the sound is pretty good; a little lower, it is often slight or none; and on the right side, it is almost always obscure;—on account of the presence of the liver. On the left side, it frequently yields the factitious sound so often mentioned as owing to the presence of the stomach.

Percussion of the chest has great advantages; because it enables us to detect the existence of an obstruction of the lungs, or an effusion into the pleura, of moderate extent; but it cannot discriminate these from each other. Many causes, moreover, conspire to circumscribe the number of cases in which it is of use. We have just seen, that in many places of the chest it gives no satisfactory result; and its chief indication (that of *fulness*) is not obtained, in pulmonary diseases, until the organic change is already far advanced. Its indications are very equivocal when the disease occupies the centre or roots of the lungs, or when both lungs are simultaneously affected; they are deceptive when the chest is deformed, even in a slight degree; and they are extremely uncertain, or cease entirely, when the integuments are œdematous or loaded with fat; or when they have become flabby, from the removal of this excessive degree of obesity.[a]]

Mediate Percussion.—[As the walls of the chest give the sound which we hear on striking the chest, so it is plain that they must be sufficiently tense and elastic to vibrate on being struck. The chests of some persons are so

[a] "A Treatise on the Diseases of the Chest; by R. T. H. Laennec, M.D. Translated by John Forbes, M.D." Third Edition. Pages 15 to 22.

oosely put together, and so flaccid, that they give but little sound; although ne organs within are quite healthy. In others, again, there is such a mass f fat and loose integument on the chest, that the walls are completely nuffled by it, and they sound but little on percussion. The same difficulty ccurs in other cases, in certain regions where muscles of considerable nickness, or the mammæ in females, lie on the walls. In other instances, gain, the walls of the chest are so drawn in by contracted adhesions of the leura, that they are too tight to vibrate, and give a hard or dull sound; lthough the lungs within them may be comparatively healthy. In all these ases, we must give to the part struck the equal tension which is wanting, y pressing on it a small piece of some firmly elastic body; such as wood, ory, whalebone, stiff india-rubber, or some such substance. This, when truck, gives sound enough; and if it be firmly applied to the chest, the ensity of the contents within will modify this sound;—just as it modifies nat of percussion on the naked walls of the chest. The sound obtained y striking a little plate of ivory or wood thus pressed on the chest, is the me in character as that of striking the chest itself; but it is louder; and s percussion on it gives no pain, the stroke can be applied with such force, s to make the vibrations reach the interior through any thickness of fat or nuscle. By these means, we can test the sonorous qualities of the thoacic viscera, through the scapulæ and muscles of the back; and through t or œdematous integuments, of any thickness. In this way, too, we can y the resonance or sonorous quality of any part of the abdomen.

We owe this method of *mediate* percussion to M. Piorry; who calls this ercussion-plate "a pleximeter." Mediate percussion is so much better an the immediate kind, that it is now generally preferred. There is, however, an improvement on it, which was (I believe) first proposed by Dr. kerrett; it is to substitute for a pleximeter the fingers of the left hand. his mode of percussion has the advantage of convenience, as well as of ielding distinct results. Its adaptations are soon found out by a little experience;—in fitting the fingers to the inequalities of the chest, sometimes ingle, sometimes together, sometimes with their palmar surface outwards; ut generally with this surface applied to the chest, and the back to strike n;—with other varieties of manipulation.[a]]

SECTION III.—AUSCULTATION.

For the purpose of listening to the chest, in order to hear these sounds, ome employ the naked ear; but it appears to me that it would be better to mploy the intervention of a foreign substance,—a piece of wood. I think f we only employ the ear, we cannot examine every part of the chest so requently as may be desirable; and it is not so convenient. If the patient e a young lady, and the physician a young gentleman, perhaps mamma vill not be pleased at his laying his ear on her daughter's bosom; and if he patient be a greasy old fellow in the hospital, we shall not like it. Upon the whole, therefore, I think it much better to employ a piece of vood. I do not think that persons who use the ear only, do so well as others. I have known such persons give extraordinary opinions; and a great many of them are not capable of saying which instrument is the best.

The Stethoscope.—[We want an instrument, then, to transfer the sounds

[a] Dr. Williams, on "Diseases of the Chest"; Pages 14 and 15.

from the chest to our ear. This instrument must be a good conductor of sound; and as the power of bodies to conduct sounds depends on the strength and uniformity of their elasticity, and their capacity to vibrate like the body that produces the sound, we must have an elastic material, of density resembling that of sources of sound within the chest, and of the walls of the chest through which they are transmitted. But the sources of the pectoral sounds vary. Some, as the voice and respiration (or at least the hollower sounds of respiration), are produced in air; while, in others,—such as the sonorous rhonchus, the rubbing sound, and the sounds of the heart,—the solids are chiefly concerned. We shall, therefore, need a varied capacity in our instrument, to receive these sounds.

To transmit the sounds originating in the solids within the chest, we must have a uniform solid; and the lighter it is the better, provided it be thoroughly rigid. Nothing answers to this description so well as wood; and in the light kinds of wood, with a stiff, longitudinal fibre,—such as pine-wood, deal, cedar, and the like,—we find these qualities in perfection. Through a cylinder of such wood,—about eight inches long, and an inch and a half in diameter, adapted to the ear at one end,—most of the pectoral sounds may be heard, but those best which originate in solids; such as the sounds of the heart, of friction, and sonorous rhonchi. The sounds of respiration and of the voice are also heard through it; but not nearly so distinctly as with the naked ear.

We need, therefore, an aërial conductor for these sounds; because they originate in air, and can best be transferred through air. By perforating the cylinder with a bore, a quarter of an inch in diameter, it becomes a tube; through the columns of air in which, the respiration and voice may be heard with increased distinctness. But as this column of air is in contact with only a small spot of the chest, it can transmit only the sounds produced under or very near that spot; and the instrument thus prepared is better adapted to explore small parts of the chest, than the ear can be. But we want the instrument also to transfer the sounds of larger spaces. The sounds of so limited a space, are often too weak to be heard alone; and, besides, it would be very tedious to go over the whole chest, *dotting* in this way a quarter of an inch at a time. Now, if the column of air be enlarged at the base, where it is in contact with the chest, by hollowing out the wooden cylinder into a funnel-shape, it will conduct the sounds produced on this greater extent of surface; for they are reflected by the funnel into this central bore, and conveyed concentrated to the ear. This also gives the instrument the power of concentrating or magnifying the sounds; which are thus heard as strong at the distance of several inches, or even a foot or two from the chest, as they are to the ear in close contact with it; nay, in some cases they are even stronger. The best shape for the excavated end, is that of a long funnel or cone, with its apex terminating in the central bore; for this directs the sound at once to the ear, without repeated reflections, which may modify it. As we still sometimes want to explore small spots of the chest, by means of a perforated plug the excavated end can be filled, and the instrument reconverted into a simply perforated cylinder. To make the instrument more portable, the upper part of the cylinder may be reduced to a stem half an inch or less in diameter, leaving only at the top a sufficient width for the ear; or this top may be made of a harder wood. Wood is so excellent a conductor of sound, that when once the vibrations are in it, they can be conveyed by a very small body of fibres.

Uses of the Stethoscope.—Thus the stethoscope, although a simple instru-

ment, performs several offices in relation to sound; the chief of which may be enumerated as follows:—1. To conduct sound by its solid walls. 2. To conduct and concentrate sound by its closed column of air. 3. To transfer sounds from its column of air to its solid walls, or the converse, when circumstances impede their transmission by one of these ways. 4. To diminish this power of transfer, and contract the field of hearing when small spots are to be explored.[a]]

Mode of Using the Stethoscope.—[The general precautions which the practice of auscultation requires, are the following:—1. The stethoscope must be applied very exactly and perpendicularly to the surface on which it rests; so as to leave no interval between the skin, and any part of the extremity applied. 2. We must be careful not to produce pain by too strong pressure: this precaution is most necessary when the instrument is used without the stopper, and when the person is lean. 3. Although it is not necessary that the chest should be uncovered,—as all the positive stethoscopic signs, and frequently also the negative ones, may be perceived through clothes of considerable thickness, provided they are applied closely to the body,—still it is better that the clothing should only be light;—for example, a flannel waistcoat and shirt. Silks, and also woollen stuffs, are often inadmissible, on account of the noise occasioned by their friction against the instrument. The examiner ought to be careful, above all things, not to place himself in an uncomfortable posture, or to stoop too much, or turn his head backwards by a forced extension of the neck. These positions determine the blood to the head, and thus obscure the sense of hearing: they may sometimes be properly avoided by kneeling on one knee. In examining the fore parts of the chest, we ought to place the patient on his back, in a recumbent position; or in a chair, and gently reclining backwards. When we examine the back, we cause the patient to lean forwards, and to keep his arms forcibly crossed in front; and when we examine the side, we cause him to lean gently to the opposite one, and to place the fore-arm on the head.[b]]

a. Auscultation of the Respiration.

Respiratory Murmur.—The penetration of the air into the organs of respiration, is accompanied by a slight murmur, which is distinctly perceived by the aid of mediate auscultation, and is called "the respiratory murmur." This sound of the passage of the air in the pulmonary tissue, the larynx, the trachea, and the great bronchial branches, presents a different character in each locality. *In the first case*, the sound is somewhat soft and silky; and the ear recognises the penetration of the air into a multitude of little cells, which are dilated to receive it: this is the true pulmonic respiratory murmur, which is also called "vesicular respiration." *In the other cases*, the sound is more rough, and is deprived of that crepitation which accompanies the expansion of the air-cells; the passage of air through tubes of various dimensions is thus perceived: this is the bronchial respiratory sound; or, more simply, "bronchial respiration."

Pulmonary or Vesicular Respiration.—In health, the "vesicular respiration" is heard almost equally at all points of the chest; yet it is more plainly heard at those parts where the lungs are nearest to the surface; as at the arm-pits, the space between the clavicle and the "trapezius"

[a] Dr. C. J. B. Williams, on "Diseases of the Chest"; Pages 39 to 41.

[b] Laennec on the Chest; translated by Forbes. Third Edition; Pages 27 and 28.

muscle, and between the same bone and the mammæ. The "respiratory murmur" is loud in proportion to the rapidity of the respirations: a slow and deep breathing scarcely, but a short breathing (though incomplete) plainly, develops the respiratory murmur. Hence the inspiration is louder than the expiration; which is not performed, in ordinary circumstances, so rapidly as inspiration; and the elasticity of the lungs assists the exit of the air. "Vesicular respiration" is more energetic and blustering in children than in adults; and still more so than in old persons. The younger the infant, the more marked is this energy; and it continues until, and a little beyond, the age of puberty.

The *intensity* of the "respiratory murmur", differs in different individuals. With some it is heard with difficulty, unless in a strong respiration; with some it is heard with facility, even though the breathing be gentle; while others retain, during their whole life, the energetic murmur of infantile vesicular respiration; and it is then called "*puerile* respiration." This last species of breathing sound (the "puerile") is, for the most part, heard in females and men of a very nervous constitution; and, with the exception of these two classes, respiration never becomes puerile in the adult, except when a considerable portion of the lungs becomes, from some cause or other, impermeable to the air. When "vesicular respiration" is heard with equal force in all points of the chest, the lungs are in a healthy state; when, on the contrary, this respiratory murmur is diminished or annihilated at any part of the thoracic surface, we may conclude that the corresponding part of the lungs has become impermeable to the air, in a greater or lesser degree.

Bronchial Respiration.—"Bronchial respiration", in a state of health, is only heard on the anterior and lateral parts of the neck. But in some very thin persons, it may be heard towards the upper extremity of the sternum, and in the interscapular space. In all other parts, the respiratory sound in the small bronchial branches, is confounded with the "*vesicular* respiration." When, from any cause, the pulmonary tissue becomes hardened or condensed, the "bronchial respiration" replaces the "vesicular"; and thus it becomes one of the first signs of hepatization of the lungs, of the accumulation of tubercles in this organ, of an effusion, &c. "Bronchial respiration" becomes a sign of greater importance, in proportion to the distance at which it is heard from the interscapular spaces: therefore, it is a matter of the highest necessity, to practise the ear in distinguishing "bronchial" from "vesicular" respiration.

Cavernous Respiration.—[When, from any cause, an excavation is formed in the lungs, the penetration of air into such cavity produces a sound similar to "bronchial respiration", when heard at the anterior part of the neck: this is "*cavernous* respiration." "Cavernous" and "bronchial" respiration are sometimes so modified, that in inspiration the air seems as if drawn *from* the ear, and in expiration as if driven back into the ear, of the auscultator: this is the "*blowing* respiration";—a decidedly morbid phenomenon; demonstrating the near approach of the excavation, or of the bronchia which pass into it, to the surface of the lungs. This "blowing respiration" sometimes resembles the agitation of a moveable veil (or sail), placed between the ear of the auscultator and the pulmonary excavation. This veiled blowing appears to arise from an unequal density of the sides of the excavation it which it takes place.[a]]

[a] "A Manual of Auscultation and Percussion; compiled from Laennec's Great Work." By James B. Sharpe. Second Edition. Page 16.

Modified Breath-Sounds: Rhonchi.—[We[a] have now to describe a class of novel sounds, which arise from *partial obstructions* to the passage of the air;—obstructions which permit the air to pass, but not without such a resistance as causes an increased and modified sound. Thus, if a bronchial tube be narrowed by the swelling of its membrane, or by mucus secreted by it, the air will pass through the narrowed portion with increased velocity and increased resistance; and hence the sound is changed from a simple breathing or blowing, to a louder wheezing, bubbling, whistling, or snoring,—according to the nature of the obstruction. These new sounds Laennec called *râles*, or *rattles*. If we must use a separate word, I[a] should prefer the Latin term *rhonchus*, (which is from the Greek ῥογχος,) as more expressive, and it has been adopted by many English writers. If there were one, it would be desirable to use an English word; for nothing injures the purity of a language more than the introduction of foreign words. The rhonchi may be produced in inspiration, in expiration, or in both. They may be divided into the "dry" and the "humid";—according as the impediment that produces them is solid or liquid.

Dry Rhonchi:—1. *Sibilant.*—Of the "dry" rhonchi, there is the "sibilant", or "whistling" rhonchus; which is sufficiently described by its name, and may generally be imitated by whistling between the teeth. It is produced by the passage of air through a small and somewhat circular aperture; and this aperture may be formed by a slight obstruction of a small tube, or by a greater obstruction in tubes of larger size. It generally occurs in tubes narrowed by swelling of their mucous and submucous coats;—such as occurs in the early stage of acute bronchitis; but it is heard also in asthma, where the tubes are congested and constricted by the spasmodic contraction of their circular fibres; and it may happen, also, when viscid mucus clings to and diminishes the calibre of the tubes.

2. *Sonorous.*—The "sonorous" rhonchus is a snoring, humming, or droning sound; and may vary in loudness or key from an acute note, like the hum of a gnat, down to the grave tone of a violoncello or bassoon. It must be produced by an obstruction leaving a flattened aperture; the lips of which, or the moisture on them, yield to the passing air with a vibrating resistance. Partial swelling of the sides of a tube, particularly at its bifurcation, a pellet of tough mucus in it, or external pressure on it, may cause such a flattened opening within the tube; and the sound in question, therefore, occurs in various forms of bronchitis, and often accompanies tumours, which press on the bronchial tubes. When caused by tough phlegm, coughing generally changes or removes it; when from the other causes, it is generally more permanent. When quite permanent, it usually depends on the pressure of a tumour, or some deposit outside the tube.

3. *Dry Mucous.*—There is another rhonchus, which may be called the 'dry mucous"; because it is produced by a pellet of tough mucus obstructing the tube, and yielding to the air only in successive jerks; which cause a ticking sound, like that of a click-wheel. When the air is driven very fast, these click-sounds pass into a continuous note, and constitute the "sonorous" rhonchus. Sometimes, again, particularly in inspiration, the click-sound suddenly stops;—the tough mucus being forced into a smaller tube, which it completely closes, and may not be dislodged again but by dint of forcible coughing.

Humid Rhonchi.—The "humid" rhonchi depend on the passage of air, in bubbles, through a liquid in the lungs; and their varieties are produced

[a] Dr. C. J. B. Williams.

by differences in the size of the tubes, and in the nature and quantity of the liquid; which cause differences in the bubbling sound.

1. *Mucous.*—The "mucous" rhonchus may be heard in large and smaller bronchi, down to the size of a crow's quill; and, in these tubes, its gurgling or crackling presents different degrees of coarseness. It is an irregular and varying sound; composed of unequal bubbles, and often interspersed with some whistling, chirping, or hissing notes. Its most common cause is acute bronchitis; which, after its onset, is attended with a secretion of liquid mucus into the bronchial tubes; and the passing of the "sibilant" and "sonorous" rhonchi of the first or dry stage, into the "bubbling" of the second or secreting stage, is often marked by a curious combination of chirping and cooing notes, like those of birds in a bush.

2. *Cavernous.*—When the bronchial tubes become enlarged by disease, or when morbid cavities are formed by the destruction of portions of the lung, the bubbling of air through liquid in these is of the coarsest kind. It is quite gurgling; and if the liquid be scanty, has a hollow character, and is called "cavernous" rhonchus.

3. *Submucous.*—When there is a little liquid in the smaller bronchi, the bubbling or crackling is more regular; although the sound is weak, and is sometimes only a roughness added to the ordinary respiratory murmur. This is the "submucous" rhonchus. It may result from slight degrees of bronchitis; and owes its importance only to its being permanently present, when such slight inflammation is constantly kept up by the irritation of adjacent tubercles in an incipient state.

4. *Subcrepitant.*—When there is more liquid, not viscid, in the smallest tubes and terminal cells, the rhonchus has a still more crepitating character; and resembles that heard on applying the ear near the surface of a liquid slightly effervescing;—such as champagne, or bottled cider. This is the "subcrepital" rhonchus; which is heard in œdema of the lungs, humid bronchitis, and other affections, in which liquid and air occupy the extreme tubes, and are forced through each other in the motions of breathing.

5. *Crepitant.*—But the most perfect and equal crackling, is that of peripneumony: it is therefore called the "crepitant" ("crackling") rhonchus. It exactly resembles the sound produced by rubbing slowly and firmly, between the finger and thumb, a lock of one's hair near the ear. I [a] believe this sound to depend on the forcible passage of air through a little viscid mucus in the finest tubes, narrowed by congestion and deposit around them.

All these different rhonchi may occupy the whole of the respiratory movements, or be confined to part of them. Thus, an obstruction which is sufficient at the commencement of inspiration to cause a rhonchus, may be insufficient when the tubes are dilated by the distension of a full breath; or there may be the converse;—an obstruction which is total in low degrees of respiration, and stops all sound, occasions a rhonchus in forced or extensive efforts; as in coughing. This suggests to us the propriety of using these different degrees of respiration, to test the nature and extent of bronchial obstructions. It may also be inferred, from what has been said, that the different stages and degrees of force in respiration may change the note of the different rhonchi; and thus produce such a variety, as that which we hear in the chests of some catarrhal and asthmatic patients.

[a] Dr. C. J. B. Williams.

Laennec used to call this combination of piping sounds—" rhonchus *canorus*." It may be readily conceived, too, that these several rhonchi may be variously combined; or exist at the same time in different parts of the lungs; and give rise to numerous combinations, on which it is useless to dwell. The loudness of a " sonorous " or " sibilant " rhonchus, is no proof of the severity of the disease; nor is the fact of its being audible over the whole chest, unless the natural breath-sound be, at the same time, absent or very feeble in parts. But the presence of the " bubbling " rhonchi, does imply mischief proportioned to its extent; and if they are heard over a large space, and accompany the whole act of respiration,—diminishing or superseding the natural breath-sound,—they denote disease of a very serious character; because, as our hearing informs us, there is an obstructing liquid in the tubes where there ought to be only air, and the function of respiration must be injured in proportion.[a]]

b. Auscultation of the Voice.

Natural Voice-Sounds.—When any one, in a healthy state, speaks or sings, the voice resounds through every part of the respiratory organs. If we seek by auscultation to discover the nature of this resonance, we shall find it to differ in the larynx, the trachea, the bronchia, and the pulmonary tissue. The voice resounds so forcibly in the larynx and the superior portion of the trachea, that when heard through the medium of the stethoscope applied over those parts, the other unassisted ear does not distinguish the sound of the voice proceeding from the speaker's lips. This resonance is not so loud at the inferior portion of the trachea; and is still less so when the stethoscope is applied to the upper portion of the sternum. This resonance is yet strong, though diffuse, in the great bronchial branches situated at the root of the lungs, and which we explore by applying the stethoscope to the interscapular spaces. The sound of the voice does not pass through the instrument, but resounds at its extremity: nevertheless, the resonance is heard more plainly than the voice itself. In the pulmonary tissue, and in the expanded bronchial ramifications, this resonance is scarcely heard; and the stethoscope discovers nothing more than a slight trembling;—such as may be felt by the hand placed upon the chest of the speaker. But, in those who have a powerful and deep voice, this resonance is at all times to be heard, upon whatever point of the thoracic surface the stethoscope be applied, as powerfully as at the interscapular spaces of ordinary persons.

Bronchophony.—[If from any cause the lungs become impermeable, the resonance of the voice becomes audible in the small bronchial branches; and it increases greatly in the larger branches, if the induration is in a part situated near the root of the lungs: such resonance is called " bronchophony." This effect also takes place when the small bronchial ramifications are dilated; so much so, that the resonance is heard almost as plainly as at the larynx. " *Accidental* bronchophony ", therefore, indicates either an induration of the pulmonary tissue, or a dilatation of the small bronchia, or both combined at the same time. " Bronchophony " may be heard at all points of the thoracic surface. But it is more frequently recognised at the interscapular spaces, and the subspinal fossæ of the scapulæ;—on account of the proximity of the great bronchial branches, and the frequency of the hepatization of the inferior lobes of the lungs. It also as often occurs at the arm-pits, and beneath the clavicles;—by reason of tuberculous

[a] Dr. C. J. B. Williams, on " Diseases of the Chest "; Pages 27 to 31.

indurations which are so very frequently developed at the summit of the lungs.

Pectoriloquy.—When there is an excavation of the lungs, communicating with the bronchia, the resonance of the voice is heard over the place, just as upon the larynx. This is called "pectoriloquy"; which is either "perfect", "imperfect", or "doubtful." It is "perfect", when the voice appears to issue directly from the chest, and to pass entirely through the tube of the stethoscope. It is "imperfect", when the transmission of the voice is not complete, notwithstanding the presence of every other local symptom of excavated lungs. It is "doubtful", when the resonance is very feeble, and only to be distinguished from bronchophony by signs drawn from the place where it is heard, and from the history of the disease. "Perfect pectoriloquy" is the result of the complete vacuity of the excavation; the greater density of the pulmonary tissue surrounding the excavation; the communication of somewhat voluminous bronchia with the cavity; and the proximity of the cavity to the parietes of the chest. It is generally the sign of an excavation of middling size. It is also very evident in small cavities;—provided they are surrounded by hardened lung, and are near the surface of the lungs; but in very large excavations, wherever their seat, pectoriloquy is almost always very slight. "Pectoriloquy" is suspended occasionally, during a greater or lesser time, if the bronchia which communicate with the excavation are obstructed by expectoration. It is diminished, or ceases entirely, when the cavity communicates with a vast number of bronchia, or opens into the pleura. It may take place at any point of the thoracic surface; since excavations may be formed in any part of the lungs; but as excavation is generally the consequence of a resolution of tubercles, and as these tubercles are principally developed in the upper portions of the lungs, it follows that pectoriloquy is most frequently heard beneath the clavicles, and in the hollow of the arm-pits. Dr. Elliotson states, that pectoriloquy may often be easily detected, on making the patient speak in a strong whisper, although it be doubtful when he speaks aloud. He also recommends that, when there is any doubt as to pectoriloquy or bronchophony, the voice should be explored on each side, for comparison, with the plug of the stethoscope removed.[a]]

Ægophony.—"Ægophony" is a particular resonance of the voice, which is heard at nearly the same points as "bronchophony", and is often coincident with it; but it is the result of very different anatomical conditions. "*Simple* ægophony" is characterized by a tremulous jerking voice, like that of the goat; with an acute silvery tone, not possessed by the natural voice of the patient; rarely heard as if within the stethoscope, and seldom if ever passing through it. In one case ægophony is pectoriloquous,—passes distinctly through the tube, like pectoriloquy; and this is where the portion of lung, which has an effusion around it, (producing the ægophony,) is solidified. When it is heard with "bronchophony", this goat-like voice resembles that of a man speaking with a counter between his teeth and lips; or still more that of *Punch*. The existence of effusion into the pleura, is the anatomical condition producing ægophony. But this effusion must not be very abundant; for, if so, ægophony is no longer heard: it is again manifest when the effusion diminishes, and finally disappears with the fluid by degrees. It therefore coexists with pleurisy, and continues from the first to the third day: it exists only for a few days in *acute* pleurisy, but continues many months when this disease is

[a] Sharpe's Manual of Auscultation; Pages 18 to 21.

chronic. In both cases it is a favourable symptom; since it proves the effusion to be of small extent. "Ægophony" may not be present in pleurisy under three conditions:—1. When the effusion of fluid is very rapid and very abundant. 2. When old adhesions obstruct the effusion of fluid into the pleura. 3. When there are false membranes without effusion. Those who have thought that "ægophony" was audible in this last case, have mistaken it for "bronchophony." When the patient stands or sits, "ægophony" is heard between the spinal column and the scapula, and along a zone of three fingers' breadth, drawn from the inferior angle of the scapula to the nipple, following the direction of the ribs. When he lies in a prone position, it is heard only at the side. The extent over which "ægophony" is heard, will hardly allow it to be confounded with "pectoriloquy." The latter is bounded by narrow limits; is rarely discoverable at the same place with "ægophony"; has not the jerking character; and is moreover accompanied by "cavernous respiration", and other signs of excavation. "Ægophony" is distinguished from "bronchophony", with which it often coexists; inasmuch as the latter is constantly accompanied by "bronchial respiration", and is always heard at the same place,—whatever may be the position of the patient; while "ægophony" changes its place with a change of position, and is generally attended by a pure respiratory murmur, although it be but feeble. The distinction of "ægophony" and of "bronchophony", as the one or the other may exist alone or predominate, determines whether the pleurisy is simple or complicated with pneumonia; and which affection is the more serious; or whether pneumonia alone exists. To hear distinctly that goat-like voice which forms the principal characteristic of "ægophony", the stethoscope should be firmly applied to the chest, and the ear placed lightly upon its auricular extremity.

Metallic Tinkling.—By "metallic tinkling" is meant that sound which may be perfectly imitated by gently striking a piece of metal, glass, or china, with a pin; or by dropping grains of sand or pins into a glass. "*Metallic tinkling*" is heard when the patient breathes, speaks, or coughs; but more feebly in the former than in the two latter cases; sometimes the reverse of this happens, but that is an extreme case. When pectoriloquy exists at the same time, this metallic tinkling and the voice traverse the tube of tho stethoscope; but, when pectoriloquy is not present, a light acute sound is heard within the chest;—analogous to the vibration of a metallic string struck with the finger. "*Metallic tinkling*" can be heard in two cases only:—1. In that of the co-existence of a serous or purulent discharge in the pleura with pneumato-thorax. 2. When a large tubercular excavation is partly filled with liquid pus. "Metallic tinkling", therefore, may be taken as a sign of a triple lesion, when pneumato-thorax is joined to empyema; since there must exist at the same time a fistulous communication between the pleura and the bronchia;—the result of a tuberculous vomica, of an abscess in the lungs, or of a gangrenous eschar. The magnitude of the fistulous opening, and the relative proportions of air and fluid poured out, may be ascertained by this sound; since, the more clearly the tinkling is heard, the greater is the fistulous opening; and the greater the extent of the vibrations, the larger is the space filled with air; but the maximum of sound is (perhaps) when the air and fluid occupy equal spaces. Thus this space may be estimated (with sufficient accuracy) by the stethoscope, and by percussion exercised at the same time at different points; when a resonance similar to that of an empty cask, mixed with the tinkling, will be heard. Sometimes this sound passes into another, similar to that which is produced

by blowing into an empty decanter: this is the "bottle-buzzing" or "amphoric" sound. Respiration, the voice, and cough equally display it. There are two circumstances which produce this "buzzing resonance" more frequently than the tinkling; although sometimes these sounds succeed one another, or are alternately produced for uncertain periods, or even heard simultaneously:—1. When two or more fistulous openings exist between the cavity occupied with air and the bronchia. 2. When this cavity is extremely vast, and contains but a small quantity of fluid. "Metallic tinkling" may be evinced by a fact quite independent of the voice, cough, or respiration. Thus, when pneumato-thorax with an effusion of fluid has taken place, and the patient is made to sit up, sometimes a drop of the fluid which was retained above falls down at the moment of examination; —producing a sound similar to a drop of water let fall into a decanter three parts empty; and it is accompanied by an evident "metallic tinkling." The latter, and the "amphoric buzzing", are always heard after the operation for empyema; as long as there is a communication between the cavity and the air, either by the external wound, or by a fistulous opening.

There is a phenomenon of no value as a sign, but which might be mistaken by the inexperienced for the metallic tinkling:—it is produced by the friction of some hard parts upon one another, where the ribs allow much mobility of parts; and resembles the sounding of fire-arms in military exercises.

c. Pleural Friction-Sound.

[There is a heavy sound similar to that which is produced, under the stethoscope, by rubbing the finger against a bone: this is called "the *ascending* and *descending* friction-sound." It is the result of interlobular emphysema; and, in conjunction with the "dry crepitant rattle, with great bubbles", becomes a sign of that disease. This "friction-sound" takes place in the following circumstances:—1. When the internal surface of the pleura becomes unequal or wrinkled. 2. In pleurisy, when there is little or no effusion, and when the pleura is covered only with false membrane, more or less thick. 3. When there is moderate effusion; and old adhesions do not, in certain positions of the body obstruct the lungs; while rising above the level of the fluid, and rubbing against the sides of the chest, at a point where the ear may be applied. This friction disappears when the effusion is very abundant; and reappears as the fluid diminishes. It is sensible to the hand, as well as to the stethoscope: it may sometimes be heard by a distant observer, and even perceived by the patient himself. The habitual friction between the two glistening surfaces of the pleura, gives out no appreciable sound;—owing to their extreme polish. It takes places only when the healthy surfaces are changed by disease, or other causes.[a]]

The subjoined tabular view of the chief phenomena of auscultation of the organs of respiration, is extracted from Dr. C. J. B. Williams's work on Diseases of the Chest.

SOUNDS PRODUCED BY THE PASSAGE OF AIR IN RESPIRATION.

Sound of Respiration, or Breath-Sound.—
Natural; produced by collision of the air against the sides and angles of the air-tubes.

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[a] Sharpe's "Manual of Auscultation"; Pages 36 and 37.

Tracheal; heard in the neck and at the top of the sternum.
Bronchial; near the upper parts of the sternum, between the capsulæ, &c.
Vesicular; in most other parts of the chest.

Morbid, modified in production or transmission.

Bronchial, or whiffling; transmitted from the bronchi by condensed tissue of the lung.

Cavernous } produced in morbid cavities communicating with the
Amphoric } bronchi.

RHONCHI, produced by increased resistance to the air moving through the lungs.

Dry;	Sibilant, Sonorous, Dry Mucous	produced by viscid mucus in the bronchi, or by swelling of the membranes, or by pressure upon them.
Moist;	Mucous	produced by a bubbling passage of air through liquid in the bronchi.
	Submucous	liquid in the finer bronchi.
	Subcrepitant	liquid in the smallest bronchi.
	Crepitant	viscid liquid in compressed smallest bronchi.
	Cavernous	liquid in a morbid cavity.

SOUNDS OF THE VOICE TRANSMITTED THROUGH THE CHEST.

NATURAL SOUNDS, *heard in a healthy chest.*

Tracheophony; in the neck and at the top of the sternum.
Bronchophony; near the top of the sternum, between the scapulæ, in the axillæ, &c.
Pectoral voice-sound; in many parts of the chest.

MORBID SOUNDS, transmitted or produced by a diseased chest.

Bronchophony, transmitted by condensed pulmonary tissue.
Ægophony, the same vibrating through a thin layer of liquid.
Pectoriloquy, resounding in a cavity in the lung.
Tinkling, a changed echo of the voice or cough in a large cavity.

SOUNDS PRODUCED BY THE MOTIONS OF THE LUNGS.

Sounds of friction, when the pleuræ are dry, or rough from deposits.
Emphysematous crackling, by the irregular passage of air between the lobules.

SECTION IV.—GENERAL REMARKS ON THE DIAGNOSIS OF PULMONARY DISEASES.

[Having given a short sketch of the sources of physical diagnosis, I[a] shall announce the great principles that govern their application to the detection of disease. These may be stated as follows:—1. The value of most of the preceding signs, or of their combinations, in the determination of the seat, nature, or extent of disease, is to be estimated more by comparison with the phenomena of other portions of the chest, than by their mere existence in a particular situation. 2. The greater the number of physical signs which can be combined in any particular case, the more accurate will our conclusions be. But of these combinations, the most important and indispensable is that of the passive and active auscultatory phenomena. 3. The existing physical signs, are to be considered in relation to the period of duration of the disease, and the rapidity or slowness of their own changes. 4. In all cases, the value of physical signs must be tested by the existing symptoms and previous history; while, on the other hand, the observation of these physical signs, enables us to correct the conclusions to which the unaided study of symptoms would lead us.

In the cases we are every day called to treat, the value of physical signs

[a] Dr. Stokes.

must be tested by the history and symptoms; and these, in their turn, must be corrected by the physical signs. Whoever neglects either source of information, will fall into the most fatal errors. We must have recourse to the assistance of each and every one of these means; and even still, with all this combined knowledge, we shall meet with cases, the real nature of which is involved in the greatest obscurity. Indeed, when we reflect on the infinite complications of disease, modified by circumstances infinitely numerous, it would be strange if such did not arise; and there can be no doubt, that if our means of diagnosis were extended one hundred-fold beyond their present state, the same circumstances would still occur. Physical signs form an addition,—constitute an assistance to diagnosis, but nothing more; yet of their value every impartial mind must be convinced, who compares the state of our knowledge previous and subsequent to their discovery. It is on the discovery, explanation, and connexion of those signs with organic changes, and with the symptoms and history of the case, that Laennec's imperishable fame is founded. Time has shewn, that his principles of diagnosis were not the bagatelle of a day, or the brain-born fancy of an enthusiast; the use of which, like the universal medicine, was to be soon forgotten, or remembered only to be ridiculed. It has shewn, that the introduction of auscultation, and its subsidiary physical signs, has been one of the greatest boons ever conferred by the genius of man on the world. A new era in medicine has been marked by a new science, depending on the immutable laws of physical phenomena, and—like other discoveries founded on such a basis—simple in its application, and easily understood. A gift of science to a favoured son: not, as was formerly supposed, a means of merely forming a useless diagnosis in incurable disease; but one by which the ear is converted into the eye; the hidden recesses of visceral disease opened to the view; a new guide in the treatment, and a new help in the early detection, prevention, and cure, of the most widely spread diseases which afflict mankind.[a]]

[a] Dr. Stokes's "Treatise on Diseases of the Chest"; Section 1; Pages 24, 40, and 41.

CHAPTER IV.

DISEASES OF THE LARYNX AND TRACHEA.

SECTION I.—ACUTE LARYNGITIS.

Not Described by Cullen.—I shall now proceed to consider inflammation of the commencement of the air-passages, properly so called;—inflammation of the larynx,—"laryngitis." This disease is not mentioned by Cullen. He speaks of "cynanche *trachealis*";—he speaks of the wind-pipe, and of croup; but not of this particular inflammation situated in the larynx. Indeed, so little was it formerly attended to, that when two or three physicians died of it, some years ago, it was considered almost a new disease; but, on looking into old writers, we find it well described.

Morgagni and others have described this disease;—proving that it is not new to medical men;—but, from there being no "outward and visible sign", in some cases, it was called "angina *occulta*"; to distinguish it from common sore-throat, which they called "angina *manifesta*."

Symptoms.—In this affection, there is hoarseness or whispering; and, indeed, almost suppression of the voice. The breathing also is hoarse, loud, and rough. The inspirations are long. There is great dyspnœa; and, besides the constant difficulty of breathing, there are occasional paroxysms of dyspnœa, in which every muscle of the body comes into play; the eyes start; and the person looks as if he were being hanged. Such is the state of the parts, that there is also frequent orthopnœa (from ορθος, *erect*; and πνοη, *breathing*);—that is to say, the person cannot breathe unless he be erect. From the great difficulty of breathing, the face is pale and ghastly; the lips are pale and livid; and perhaps the face and throat are swollen. There is pain felt in the throat, exactly in the situation of the larynx; and on pressing the larynx, we are sure to find it tender. Sometimes, but not always, there is redness and swelling of the face.

Sometimes there is swelling and redness of the fauces, of the "velum pendulum palati", and uvula; and, indeed, of the tongue. Occasionally, "cynanche tonsillaris" co-exists with laryngitis. Indeed, it *frequently* does so;—the inflammation commencing in the tonsils, and spreading into the larynx. The epiglottis is very often swollen. The epiglottis is a part of the larynx;—so much a part that, in many anatomical books, it is enumerated with the cartilages of the larynx. Sometimes there is cough, but not always. Sometimes, too, there is difficulty in swallowing. In the function of deglutition, the larynx is raised and brought forward; and if a part of the larynx so much pressed upon be inflamed, of course there is a difficulty of deglutition;—*dysphagia*, as it is called. There is also expectoration of viscid mucus; for the inflammation, being seated in a mucous membrane, will (of course) affect the secretion of that membrane. The tongue, likewise, is very foul;—from the inflammation taking place in its neighbourhood. These are the *local* signs; and they are those of inflammation;—redness, swelling, heat, and pain.

General Symptoms.—From the disturbed function, there are also *general* symptoms. There are thirst, heat, extreme restlessness, and great anxiety. The difficulty of breathing must occasion great restlessness, and extreme anxiety. The pulse is rapid; and there is at last a clammy sweat. The pupils, too, at last become dilated; and the patient keeps his mouth constantly open. The difficulty of breathing occasions, I presume, such an accumulation of blood in the head, that more or less compression exists; and the pupils consequently become dilated; and the patient, from the want of breath, opens his mouth, gasps, and makes an effort to take in all he can.

Duration.—This disease, when acute, lasts only about three or four days:—not including the previous days, on which there may be "cynanche tonsillaris"; but reckoning from the time when the larynx becomes actively inflamed. Death sometimes occurs very suddenly. A violent spasm takes place; and the patient is quickly destroyed.

Most Common in Adults.—This is a disease which occurs almost always in adults. Children have *croup*,—inflammation of the *wind-pipe*; but when inflammation of this violent kind attacks adults, it affects the tube higher up;—it affects the *larynx*; and it has, therefore, been called "the croup of *adults*."

Morbid Appearances.—After death, we find the mucous membrane of the glottis, and of the posterior part of the epiglottis especially,—perhaps the mucous membrane of the whole of the larynx,—red, swollen, and œdematous;—swollen not merely as mucous membranes are when inflamed, but from effusion into the subjacent cellular membrane. The "rima glottidis" is found to be nearly closed; and this would appear to be the great source of dyspnœa;—the œdematous state of the parts, which produces nearly a closure of the "rima glottidis." Sometimes the disease proceeds so far as to cause an effusion of fibrin; so that, notwithstanding the disease is an affection of the *mucous* membrane, fibrin is poured forth,—just as in a *serous* membrane; and sometimes we find a quantity of pus;—or, at least, of puriform fluid. Occasionally the tonsils are not merely red, as I stated, but even ulcerated; and occasionally the pharynx and the trachea below, and even the bronchia, are also inflamed. We are not, therefore, to expect one uniform appearance in the disease.

Pathology of Laryngitis.—We find the essence of it, in all cases, to be a violent inflammation of the larynx; and, in general, an œdematous state of the "rima glottidis" and the parts around; but frequently there is inflammation higher up, about the tonsils and the "velum pendulum palati";—perhaps, also, inflammation of the pharynx. With respect to the quality of the fluids, they will vary from thick mucus to puriform fluid, and even up to fibrin; but that which we particularly notice, is an œdematous state of the submucous tissue. All these appearances are nothing more than we might expect. The œdematous state, which perhaps is fatal, is nothing more than what occurs when the cellular membrane is inflamed in any other part of the body. When inflammation is situated near cellular membrane, it secretes abundantly. In violent inflammation of the skin, the cellular membrane secretes to a great extent; so that there is more or less œdema; and the same thing occurs here; but from the circumstance of the parts being air-passages, and the inflammation being in the narrowest part of the passage, it is often dangerous. The same occurrence, situated a little higher in the pharynx, produces only a trifling inconvenience.

Causes.—The disease begins from a catarrh. The person has a common cold; and the latter generally arises from cold and wet. The application

of cold alone will produce the disease; but it usually results from a union of the two, applied either to the throat or to the feet. A few days after exposure, the patient has great hoarseness; and then pain in the larynx comes on. Sometimes it does not arise from a common cold; but, as I have mentioned already [a], a pretty brisk inflammation of the tonsils takes place, and it spreads from them. Occasionally, too, it takes place suddenly; but I have seen it in the middle of a chronic disease. There is no part of the body which can be inflamed *chronically*, that may not become the seat of *acute* inflammation; and therefore this occurrence may take place in the throat. When there is a syphilitic sore-throat, or a chronic affection of any kind, patients may suddenly experience great difficulty of breathing, and be in the greatest danger from active acute laryngitis.

[Acute inflammation of the larynx has been brought on by swallowing scalding or corrosive liquids. By the convulsive action which these excite in the throat, they are in part thrown on, and even into the glottis. Children accustomed to drink from the mouth of a tea-kettle or tea-pot, have often attempted to do this when these vessels contained scalding water; the result has been violent inflammation of both pharynx and larynx. Instances of this accident were first recorded by Dr. Marshall Hall. Mr. Porter observes, that when a person attempts to drink (by mistake) a corrosive liquid, a similar convulsive action takes place;—closing the pharynx, and throwing the offending matter violently backwards through the mouth and nostrils, under the epiglottis; and thus this accident becomes a cause of acute inflammation of the larynx. Mr. Ryland has, with good reason, placed the inhalation of flame, or of very hot air, among the causes of acute inflammatory injuries of the larynx. Persons who die from severe burns, if it be only about the head and face, generally suffer from severe dyspnœa; and the mouth and larynx are found in a highly inflamed and congested state: these effects he very rationally ascribes to the great heat of the air inhaled at the moment of the conflagration. The inhalation of very acrid vapours, might possibly have the same effect. As exciting causes of asthenic laryngitis, erysipelas, scarlatina, small-pox, and measles, may be mentioned; and we may add, that inflammation of the tongue from the excessive use of mercury, and diffusive cellular inflammation from punctured wounds, have been known to extend to the cellular tissue of the larynx, and cause death. M. Bayle and Dr. Tweedie have noticed, that œdematous laryngitis sometimes suddenly supervenes, without any obvious cause, during and after typhoid fevers. It occurs, also, not unfrequently, in the course of chronic disease of the larynx; and is sometimes the cause of death in these cases. We [b] have known it to come on, and hazard life, in a patient with aneurism of the arch of the aorta; before the tumour had well shown itself outwardly.

Habitual intemperance, long courses of mercury, and frequent and long-continued exertions of the voice, are supposed to predispose persons to attacks of laryngitis. Except in cases of scarlatina, measles, and small-pox, and of the accidents before alluded to, laryngitis never attacks children; and, of those advanced in life, Dr. Cheyne states that it most frequently occurs in such as are liable to indigestion connected with a disordered state of the liver. In most instances, the subjects of it had previously been liable to sore-throat.

Diagnosis.—The symptoms of acute laryngitis, are generally sufficiently characteristic to separate it from other diseases affecting the breathing. The

[a] See Page 812.

[b] Dr. C. J. B. Williams.

stridulous or hissing inspiration, heard most distinctly at the larynx (which is drawn down at each act), the seat of the sensation of pain or constriction at that part, often the visible condition of the epiglottis, and the absence of pectoral signs, suffice to distinguish it from diseases of the chest. Abscesses external to the larynx, and compressing it, may cause difficulty of breathing and swallowing: sixteen years ago we [a] saw a fatal case of this kind, which was mistaken for laryngitis; until the first incision of the throat after death gave issue to a quantity of pus, which had formed among the numerous muscles of the tongue and larynx. Careful examination will generally distinguish these cases by the partial or general swelling at the upper part of the neck, often with tenderness and an inability to open the jaw. Mr. Porter thinks that they differ from those of laryngitis in the breathing, although obstructed, being less sibilous, and more gradually oppressed; and in the diminished mobility of the larynx, when pressed from side to side against the spine. We [a] should conceive, that the absence of the peculiar cough and hissing hoarseness of laryngitis might, in some cases, better assist the diagnosis. Spasmodic affections of the larynx, may generally be distinguished by the complete absence of fever, and by the suddenness of the attack; but they may not be so easily distinguished from the œdematous laryngitis supervening on chronic diseases; which is, in effect, generally combined with spasm: still, in this case, there is usually a previous slight access of fever, and increase of the chronic symptoms. Spasm of the glottis is a very rare affection in adults, and occurs only in hysterical or highly nervous subjects.

Prognosis.—Laryngitis has been considered, by Dr. Cheyne and others, to be the most fatal of all the inflammations. Of seventeen cases observed by Bayle, during six years, only one recovered. Of twenty-eight cases collected (from various authors) by Mr. Ryland, ten recovered; which he justly considers to be above the average. In most of the fatal cases, death took place between the first and the fifth days. The prognosis must, therefore, in all cases be unfavourable; and the more so, as the disease has lasted longer, and with progressive increase of the difficulty of breathing. When the face loses its colour or becomes livid, and the faculties obtuse, from the circulation of black blood, the danger is extreme. On the other hand, decrease of the difficulty of breathing and of swallowing, a returning freedom of expectoration, with an improved expression and colour of the countenance, give rational hopes of recovery.[b]]

Treatment.—This is a disease in which, if in any, it is necessary to be most active in treatment. No trifling practice is admissible here. We cannot trust to nature; nor can we trust to *medical* measures alone;—for it is necessary (in cases which last any time, and which become very severe) to use the combined force of medicine and surgery.

Bleeding.—The first thing to be done is, undoubtedly, to bleed freely in the arm;—to make the patient faint, if we can; and then to cover the throat with leeches. I am taking it for granted that the patient is able to bear it. The disease may attack a person with syphilitic sore-throat; and he may be worn out with mercury and disease; so that we may not be able to bleed in the arm; but still, in most cases, I am satisfied it would be best to set the patient upright, and take as much blood as he can spare;—be it three, or four, or twenty, or thirty ounces; and to produce fainting, if possible. There can be no rule for the quantity; but it may be necessary to take thirty or forty ounces, and to apply from six to thirty leeches;

[a] Dr. C. J. B. Williams.

[b] "Library of Medicine"; Volume 3; Pages 42 and 43.

ccording to the age and strength of the patient. After the leeches, a oultice for some time may be a good application; and then, after all, a lister, if we please; but not earlier.

Mercury.—In this disease mercury is recommended, even by those who o not ascribe any active power to mercury in general. It is of the highest nportance to get the mouth tender as early as possible; and therefore we ıust not wait a couple of days for salivation to take place. A solitary case f this disease is recorded in the "Medico-Chirurgical Transactions"[a]; /here ten grains of chloride of mercury were given every two or three ours, till ptyalism was produced; and as soon as the patient began to spit, ıe affection ceased. I have treated many cases of the disease in this ıanner; and with the greatest success. In a case of this kind, it will not o to give a few grains of calomel night and morning; for the patient is in onstant jeopardy;—we are never sure of his life, from hour to hour. It ould be good practice to rub in mercury on the extremities. If we exibit mercury by the mouth, it is necessary to give it in large and repeated oses. I will not say any thing about the dose; because if we know that ıe patient is soon affected by mercury, a small quantity will do. I only tate that it is necessary to get the mouth sore, in one way or other, as oon as possible.

Bronchotomy.—If the patient be in great danger,—if his attacks of diffiulty of breathing come on frequently, it will not be right even to wait for tyalism; but it will be requisite to make an opening into the throat;—o as to enable the patient to live till the mercury produces its effects. Bronchotomy[b], is absolutely necessary, in many cases of this disease. By pening the air-passages below the part inflamed, instantaneous relief is fforded; and the patient will live so much the longer. This cannot have the ffect of curing the disease, but it has the effect of enabling the patient to live onger;—to live, therefore, till we adopt other means to cure him. I have had to speak as a pathologist) some very *beautiful* cases of this description; where ıe combined force of the two great divisions of the profession, has most ecidedly saved the patient's life; but where neither would have done lone. A mere opening of the larynx will not cure the inflammation, and ıe patient may die before the mercury can have any effect; and, therefore, is necessary to watch the patient constantly; and if the symptoms deidedly grow worse, the operation ought to be performed without delay. t is an operation which, if properly performed, can do no harm. The yspnœa arises, as I have said, from an œdematous state of the "rima lottidis"; and if we enable the patient to breathe notwithstanding that, as he inflammation subsides the œdema goes down. The paroxysms of diffiulty of breathing, clearly arise from spasm; and if an opening be made elow, so that the patient can breathe through it, the disease may occasion s much spasm above as it chooses;—the patient is safe.

Spasmodic Closure of the Larynx.—The least pressure in these parts vill occasion spasmodic difficulty of breathing. In the "Medico-Chirurgical Transactions"[c], Mr. Lawrence describes the case of a person, who had ttacks of dyspnœa, from very slight pressure of an aneurism of the "arteria innominata." The direct diminution of the trachea by the tumour, vas found to be very inconsiderable; but it was sufficient to produce irriation, and to cause violent attacks of spasmodic dyspnœa.

But, independently of this œdema and tension of the parts, the inflamma-

[a] Volume 9; Page 31.

[b] From βρογχος, *the windpipe*; and τεμνω, *to cut*.

[c] Volume 6; Page 227.

tion of the membrane itself, will throw the parts around into violent spasm;—just as occurs in inflammation of the urethra and bladder. When inflammation exists about the larynx, the person is continually seized with a violent difficulty of breathing, without any pressure, but merely from the irritation; and many persons, without any inflammation about these parts deserving the name of "laryngitis", will die in a moment. I have seen several cases of persons, who have been seized with a sudden difficulty of breathing, when they were supposed to have only a common sore-throat; some of whom have died in the course of three or four hours, and some in a minute. When inflammation exists in the fauces, and extends to the glottis, without descending to the larynx and producing laryngitis, the person may be seized with spasmodic difficulty of breathing, and die instantly. I once saw a young man, who, in consequence of a fright, became very nervous, and therefore liable to spasmodic diseases. He merely caught a common sore-throat, for which six leeches were applied; and, while the ward was full of medical men, a violent spasm seized his throat, and he died instantly. Every thing was done for him that could be done; but he was quite dead. I have seen several patients with more decided inflammation than this, (but still not with inflammation deserving the name of "laryngitis",) who have died in a moment. When, therefore, there is laryngitis, we may well suppose how dangerous the case is; and how necessary it is to be active in the highest degree. Whenever a patient becomes very hoarse, and we hear his voice hissing ("sibilous") through the larynx, and find the tube is tender on pressure, alarm should instantly be taken, and the disease treated actively:—although the patient may make no particular complaint himself; and although, on looking into the throat, we cannot discover any thing particular.

SECTION II.—CHRONIC LARYNGITIS.

Symptoms.—A much more common disease than this, however, is *chronic* laryngitis; an affection of which many cases occur. This species of the disease is attended with a very hoarse cough, and likewise with a hoarseness of the voice; and sometimes the person, both when coughing and talking, makes a sort of crowing sound. The alterations in the voice are very great. There is hoarseness, roughness, squeaking, and crowing; and sometimes it is nearly suppressed. The cough, too, varies in the same way. Sometimes it is very hoarse; and sometimes very shrill. The respiration in chronic laryngitis, is occasionally hissing; but not necessarily so. It is observed in *most* cases; but by no means in *all*. There is a copious discharge of mucus, and sometimes of pus. In these cases, I have always observed pain on pressure. If the lungs be sound, we must learn that chiefly by means of auscultation;—by ascertaining that the sounds of the chest are healthy; and that there is no pectoriloquy. However, it is sometimes difficult, when the voice is nearly suppressed, to make up one's mind on the subject. Some say they can tell it as well when the voice is suppressed, as when it is not; but I confess I have not attained that perfection. This disease may occasion great emaciation; and from that circumstance, as well as on account of the discharge of mucus of a puriform character, patients may easily be supposed to be in a state of pulmonary consumption; and it is a fact, that the disease does sometimes co-exist with "phthisis pulmonalis."

Diagnosis.—[The most characteristic signs of chronic laryngitis, are the

ermanent change of the voice, and the peculiar cough before described[a]; ith hissing breathing, and pain or tenderness in the larynx, when these appen to be present. Except in syphilitic cases, where the fauces are lso diseased, little is to be learnt from examination of the throat; for it is npossible to see or reach further than the epiglottis, and to get a view of iis is a matter of difficulty. Neither is crepitation felt on pressing the rynx to be depended on; for, according to Trousseau and Belloc, this iay be produced in a healthy larynx. Dr. Stokes describes, as a stethoopic sign of chronic laryngitis, a harshness in the sound of the air passing irough the larynx,—giving the idea of a roughness of surface, perceptible ven when the breathing is not distinctly stridulous. In a few cases he bserved (above the thyroid cartilage) a rhonchus, like the sound of a valve rapid action, combined with a deep humming. We[b] much question iat the latter sound was seated in the larynx; for such a sound is often roduced in the jugular veins. When the laryngeal constriction is conderable, the peculiar sound of the passage of air through it will sufficiently stinguish it; and where it is slight or altogether absent, laryngeal disase may yet be known as the cause of the cough and other symptoms, by ie negative indications of the thoracic organs;—the sound of percussion id of respiration being good throughout the chest. But pulmonary ibercle is very commonly conjoined with laryngeal disease; and the two fections are apt to disguise each other. The noisy laryngeal respiration, id the absence of the voice, may destroy the chief distinctive signs of thisis in its early stages; but as the disease advances, the dulness on ercussion, and perhaps cavernous rhonchus in some part of the chest,—rticularly under a clavicle or scapular ridge,—with a more copious purunt expectoration, night-sweats, and more rapid emaciation, sufficiently nounce this most destructive complication. When the breath and sputa laryngeal disease are very fetid, it may be suspected that some part of e cartilages is dead. This is generally the case where chronic abscess ens outwardly, about the thyroid cartilage.

Prognosis.—The milder and simpler forms of chronic laryngitis, are by means incurable; in fact, they generally yield to judicious treatment: id were it not for their liability to exacerbations from acute œdematous flammation, and to complications with pulmonary diseases, they could rdly be called dangerous. Both these destructive complications may be prehended when the disease has continued long, with increasing severity symptoms of the voice and respiration, with a change of the cough from y and ringing to loose and undivided, with increasing purulent expectoraon, and particularly if the disease has resisted treatment. If, from the story of the individual, there be any suspicion of a scrofulous tendency, id particularly if symptoms of pulmonary disease,—such as slight cough, ortness of breath, pains in the chest or shoulders, quickened pulse, &c. -preceded those of the laryngeal affection, the prognosis is unfavourable; id if there are found any physical signs of phthisis—such as dulness under clavicle,—the case of the patient must be considered almost hopeless. œtor of the breath and sputa, implying mortification of the cartilages, is so very unfavourable; but it is more probable that the dead portions of iese may be thrown off, than that tuberculous disease of the lung comned with a laryngeal lesion can be cured. In all doubtful cases, parcularly those of a syphilitic origin, the state of the general health and

[a] See Page 816.

[b] Dr. C. J. B. Williams.

strength, as well as the degree of the local affection, must be duly taken into account, in estimating the probable issue of the case.[a]]

Morbid Lesions.—After death from this disease, we find the common results of chronic inflammation. The mucous membrane is frequently thickened,—frequently indurated,—frequently granulated;—exceedingly rough, and containing numerous little cavities (if I may so call them). Frequently it is ulcerated. The same appearances very often extend along the trachea.

[These changes may be enumerated as follows:—1. Slight thickening, with or without vascularity of the mucous membrane. 2. Purulent secretion from the surface; secretion of lymph confined to the larynx, and combined with ulceration of the mucous membrane. 3. Hypertrophy and scirrhous induration of the submucous cellular tissue. 4. Atrophy and softening of the internal laryngeal muscles. 5. Purulent, tuberculous, or serous infiltration of these muscles. 6. Softening of the ligaments of the larynx. 7. Linear contraction of the ventricles. 8. Enlargement and thickening of the epiglottis. 9. Expansion and thinning of the epiglottis. 10. Contraction and shrivelling of the epiglottis. 11. Superficial ulcers of the laryngeal face of the epiglottis. 12. Ulcerous destruction and removal of the epiglottis. 13. Superficial ulcerations of the rima, and mucous membrane of the larynx. 14. Deep irregular ulceration of the ventricles. 15. Defined ulcers of the ventricles. 16. Ulcerative destruction of the arytænoid[b] and other cartilages. 17. Spreading ulceration of the mucous membrane, with warty excrescences. 18. Submucous abscess of the larynx. 19. Abscess of the ventricles. 20. Abscess around the cricoid. 21. Mortification of the cricoid. 22. Mortification of the thyroid cartilage. 23. Ossification of the cartilages. 24. Ossification of the epiglottis. 25. Caries of the ossified cartilages. 26. Phosphatic concretions in the ventricles. 27. Cauliflower-vegetations of the larynx. 28. Tubercle of the larynx. 29. Warty excrescences. 30. Cancer of the epiglottis and larynx. 31. Hydatids. It need scarcely be remarked that, in many instances, several of these lesions may occur in the same case, either primarily or consecutively. A simple mucous inflammation may, in one patient, be followed by changes very different from those in another; and nothing can be more various, than the combinations of morbid alterations which may thus arise.[c]]

Treatment.—In the treatment of this *chronic* form of the disease, we are by no means so successful as in that of the *acute*. In fact, the treatment, for the most part, is very unsatisfactory. The best method we can adopt, is the repeated application of leeches, and subsequently of blisters. The internal exhibition of mercury, too, is of the greatest use. If the disease be a *scrofulous* inflammation, however, of course mercury will do no good, but rather make things worse. It is best, in almost all cases, to give it a fair trial;—taking care not to hurt the constitution; but to make the mouth moderately sore, and to keep it so;—to treat it as a mere chronic inflammation. It will very frequently subside; but far *more* frequently, I believe, the treatment is very unsatisfactory.

On account of the sufferings of the patient, and the harassing cough, it is often necessary to give narcotics, to procure sleep. Conium answers

[a] "Library of Medicine"; Volume 3; Page 49.

[b] From αρυταινα, *a funnel*; and ειδος, *resemblance*.

[c] Stokes, on Diseases of the Chest; Part 1; Section 3; Pages 236 and 237.

exceedingly well. Some have found relief from the inhalation of the fumes of tar; and others from the inhalation of chlorine;—either by diffusing it through the apartment of the patient, or making him breathe through water in which a quantity of chlorine exists. But it is very necessary, in all these cases, to proceed cautiously. Tar-fumes, chlorine, and many of these things, will produce very great irritation, even in small quantity; and therefore it is right always to begin by impregnating the water, or the apartment, very *moderately*; and, if it produce no irritation, then we may go on to a great extent.

Some have recommended, as internal medicines, copaiba and cubebs; because they have done good in irritation of another mucous membrane. I have not been satisfied with these medicines; but as they are recommended, I mention them. Some have recommended the application of lunar caustic. A solution of nitrate of silver is made, and a sponge, dipped into it, is pressed down to the "rima glottidis"; so as to produce a new action there, and lessen the morbid sensibility;—with the hope, that the same good change which is observed at the spot at which the nitrate of silver is applied, may spread downwards. I have known this remedy employed; and, as may be imagined, fruitlessly; but if the disease were situated merely at the "rima glottidis", good would be done by it. I have no experience of it myself; but I have seen cases in which I understood it had been employed without any harm.

[MM. Trousseau and Belloc place much confidence in medicaments applied directly to the diseased part; and some of those which they recommend are of a very energetic kind;—such as nitrate of silver, corrosive sublimate, sulphate of copper, &c. They may be applied either in solution or in powder. The solution which they have found most effectual, is that of nitrate of silver, in the large proportion of from one to two parts in four parts of distilled water. This solution may be applied to and behind the epiglottis, by a small roll of paper bent at its moistened end. A more effectual mode is with a small round piece of sponge, fixed to a long rod of whalebone bent, at an inch from the sponge, to an angle of eighty degrees. The patient's mouth being opened wide, and the tongue pressed down with a spoon, the sponge is passed to the top of the pharynx; as soon as it reaches the fauces, a movement of deglutition takes place, which carries the larynx upwards, at which moment the sponge is brought forward, and squeezed under the epiglottis, and the solution freely enters the larynx. Convulsive cough, and sometimes vomiting ensue; but the application causes no pain. A less disagreeable mode of applying the solution, is by a small silver syringe, filled one-fourth with the solution, and three-fourths with air. To this is affixed a tube five inches long, bent at the free end; which being carried beyond the epiglottis, the syringe is forcibly discharged; and, in consequence of the air in it, throws the solution, not in one stream, but in a fine shower; part of which enters the larynx. The patient is then made to rinse his mouth with, and swallow, salt water, or water acidulated with muriatic acid, which decomposes the remains of the nitrate; the same precaution should be used, where this agent is applied in substance. MM. Trousseau and Belloc found this application (which they term "cauterization") highly beneficial in several cases of chronic laryngitis. In cases of aphonia, probably dependent on relaxation rather than inflammation, it effected a cure in a few days; in some worse forms of the disease, with probably ulceration of three or four years' standing, its repeated application during five or six weeks was successful; and it produced considerable temporary improvement, in three cases which proved after-

wards to be tuberculous. Solid substances may be applied to the larynx in powder by insufflation; as recommended by Aretæus for "angina maligna." The powder is put into one end of a reed or glass tube, and the other is carried back as far as possible into the mouth: after a full expiration, the patient closes his lips around the tube, and inspires suddenly and forcibly through it; by which some of the powder is carried into the larynx and trachea. The cough which is excited should be restrained as much as possible;—to prevent the too speedy expulsion of the medicine. The powders used by MM. Trousseau and Belloc, are subnitrate of bismuth, which may be used pure with safety and advantage in most forms of chronic laryngitis, even that accompanying phthisis; calomel with twelve times its weight of sugar; red precipitate, sulphate of zinc, and sulphate of copper, each of which must be mixed with thirty-six times its weight of sugar; alum with twice its weight, and acetate of lead with seven times its weight of sugar; and nitrate of silver with twenty-two, thirty-six, or seventy-two times its weight of sugar. The last is said to be most effectual in erythematous laryngitis, with erosions or ulcerations. Calomel and red precipitate have proved beneficial in ulcerations, whether syphilitic or not; but they should not at first be repeated oftener than twice or thrice a week. The others may be used twice or oftener daily, according to the nature of the case. The powders should be impalpably fine: the least roughness or perceptible fragment of a crystal excites such efforts to cough, as insure the expulsion of the powder. This description of the treatment of MM. Trousseau and Belloc, is taken from an abstract in the "British and Foreign Medical Review"; and appears to be well worthy of the attention of British practitioners;—proving the safe direct application of powerful agents, which (as in external diseases) are likely to improve the action of the diseased parts.[a]]

SECTION III.—CROUP.

Synonymes.—Acute inflammation, of a very violent description, when it attacks the larger portion of the air-tubes, is situated (for the most part) lower down in children than when it occurs in adults. That intense, violent, adhesive inflammation,—inflammation, at least, causing a portion of fibrin to be thrown out,—which attacks adults, usually affects the larynx; so that *laryngitis* is the disease of adults; and the disease of children, corresponding with this, is *croup*;—"cynanche *trachealis*", or (more properly) "tracheitis." The latter term is the most simple; and every body knows what is meant by it. The disease has been called "angina trachealis"; because there is a quantity of lymph formed. In this country it is called "croup"; in the east, I understand, it is called "roop"; and perhaps it is so in other places.

Symptoms.—This disease is marked by a rough, clanging, ringing cough;—a cough which gives the idea of sound conveyed through a small brass pipe. Besides this cough, if the disease be severe, there is hissing ("sibilous") respiration; but it is chiefly in the inspiration that it is heard. It is harsh, rough, shrill, or hissing;—there being various modifications. The voice, too, is either harsh, crowing, or nearly suppressed. There is a difficulty of breathing; and this is felt particularly during inspiration. These are the most common symptoms. There is no difficulty in swallowing; no pain in the throat, except at the lowest part; no pain in the larynx (where

[a] "Library of Medicine"; Volume 3; Pages 50 and 51.

here is always pain or tenderness in laryngitis); but in croup, at the owest part of the throat, where the trachea exists, there is frequently pain on pressure. The expectoration is mucous; sometimes mixed with fibrin and shreds of lymph. As this is a violent disease, there is violent pyrexia. During the first stage the face is flushed, the pulse is rapid, and there is great anxiety of countenance. Sometimes the peculiar clanging cough is heard for some days before the child is ill enough to shew its complaint; so that many mothers have been surprised, on being told by a medical attendant (who has accidentally been in the house, and heard this peculiar cough), that the child was in danger.

Varieties.—[We may meet this disease under two essentially different forms. It may occur, in the first place, as a primary, idiopathic, and active inflammation of the respiratory mucous membrane; in which case the accompanying fever is symptomatic. In the second place, we have it *preceded by fever*, and the formation of false membranes in the pharynx and the cavity of the mouth; which membranes, by extending downwards into the glottis and larynx, produce the symptoms of croup, in the advanced stage of another and totally different disease.

The greatest confusion has arisen, from authors not carefully separating these two forms of disease, in their descriptions of croup, and in their opinions as to its treatment. For the sake of clearness, I[a] shall arrange their symptoms in pairs of opposite characters;—distinguishing the affections by the names of "primary" and "secondary" croup.

Primary Croup.	Secondary Croup.
1. The air-passages primarily engaged.	1. The laryngeal affection *secondary* to disease of the pharynx and mouth.
2. The fever symptomatic of the local disease.	2. The local disease arising in the course of another affection, which is generally accompanied by fever.
3. The fever inflammatory.	3. The fever typhoid.
4. Necessity for antiphlogistic treatment, and the frequent success of such treatment.	4. Incapability of bearing antiphlogistic treatment; necessity for the tonic, revulsive, and stimulating modes.
5. The disease sporadic, and in certain situations endemic, but never contagious.	5. The disease constantly epidemic and contagious.
6. A disease principally of childhood.	6. Adults commonly affected.
7. The exudation of lymph spreading from the glottis, from below upwards.	7. The exudation spreading to the glottis, from above downwards.
8. The pharynx healthy.	8. The pharynx diseased.
9. Dysphagia either absent or very slight.	9. Dysphagia common and severe.
10. Catarrhal symptoms often precursory to the laryngeal.	10. Laryngeal symptoms supervening without the pre-existence of catarrh.
11. Complication with acute pulmonary inflammation common.	11. Complication with such changes rare.
12. Absence of any characteristic odour of the breath.	12. Breath often characteristically fœtid.

From the consideration of these characters, we must admit that, independently of minor differences, there is a broad line of distinction between these affections of the throat. In the one, the windpipe is the seat of an idiopathic, primary, and highly inflammatory disease; while in the other, its affection is accidental, inconstant, and secondary to a diseased state of the pharynx; which, in its turn, is either symptomatic of, or closely connected with, a morbid state of the whole system. Yet, as I[a] said before, the want of an accurate distinction between these affections, has led to the

[a] Dr. Stokes.

greatest misapprehension; and we see British physicians ridiculing the opinions and treatment of the continental practitioners, and *vice versâ*;—the error, all the while, arising from the confounding of two essentially different affections. In the croup, as described by British authors, the utility of antiphlogistic treatment has been tried by experience.[a]]

Duration and Progress.—The disease may last from twenty-four hours, to three or four days, or even *several* days; and the child may either die completely exhausted, or be suddenly cut off in a moment, by spasm. Just as *death* sometimes occurs suddenly, so does *amendment*. Generally, patients recover by *degrees*; but sometimes they recover very *rapidly*,—almost *suddenly*. When recovery is exceedingly slow, shreds of fibrin are perhaps spit up for several weeks.

Morbid Appearances.—On examination after death, we find (of course) redness of the trachea; and such is the intensity of the inflammation, that lymph lies upon the red membrane;—sometimes forming a complete tube, and even extending into the bronchia. Besides this tube of lymph, which is so continually seen, we frequently observe a quantity of puriform, and even bloody fluid, in the air-tubes. When we open an inflamed serous membrane, we always see lymph lying upon the affected part; but, besides that, we always see more or less turbid serum, even so thick and yellow as to approach to pus; and sometimes there is pus. So in a mucous membrane, when it is inflamed very intensely, besides fibrin, there is a quantity of thin fluid, inclining more or less to pus; and at last actual pus. There is also a bloody fluid.

Age at which it Occurs.—This disease occurs chiefly in children, between weaning and puberty. It is occasionally seen in infants at the breast, but more frequently not till they are weaned; and Professor Home, of Edinburgh, says that the sooner children are weaned, the sooner they are liable to it. They have more experience at Leith than we have here; and observations, therefore, are more easily made there. It chiefly affects those of a full habit of body.

Causes.—The cause is undoubtedly, in almost every instance, cold and wet. It occurs, therefore, more frequently in Winter and Spring, than at other times; and if it occur in Summer, it is generally when a damp evening has succeeded to a hot day. It is seen most frequently in a situation near the water-side;—in fact, in all damp situations. It is more frequent, too, in northern than in southern latitudes. It is sometimes epidemic;—that is to say, a great number of children, in particular seasons, are affected with it. An endeavour has been made to pervert the word "*epidemic*" from its common original meaning;—"that which attacks people at large." In that sense we have a peculiar signification; so as to distinguish between *epidemic* and *contagious* diseases. But *contagious* diseases may be *epidemic*;—not from this cause or that; but merely because they extend temporarily over a whole district at once. But although this disease is frequently epidemic, I cannot believe that it is ever contagious;—at least, I have never been able to satisfy myself that such was the case. It certainly does often affect more than one in a family at once; but this may only arise from all the children in the family being exposed to the cause at the same time; and from another circumstance,—that there is a constant tendency to it; and therefore children in the same family, may be supposed liable to the same disease. Now and then, a peculiarly striking circumstance takes place; and we are inclined to believe that the disease

[a] Dr. Stokes, on Diseases of the Chest; Part 1; Section 3; Pages 205 to 207.

must be contagious; but I think mistakes are frequently made in the case of croup. I will not say that it is *never* contagious, because I have not seen every circumstance that other people have; but, from what I have seen and read, I cannot persuade myself that it is contagious. It is a fact, that many children have it in the same neighbourhood; but then they have been visited with the same vicissitudes of atmosphere; and the occurrence may thus be explained. And when it occurs in the same family, this fact might explain it;—together with the additional circumstance, that all their constitutions are predisposed to the same disease. I know, too, that several children in a family will have it, but at different times; and some of the children in a family will be sure to have it; and therefore I presume there is a constitutional tendency to it;—just the same as in inflammation of other parts. Professor Dupuy says, that it once occurred in dogs at Alfort; and that the same appearances were observed in them, as in human beings.

Nature.—[The nature of croup has been the subject of much discussion. In Dr. Copland's "Dictionary"[a], the reader will find an account of the various opinions which have been held respecting it. Our limits do do not permit us[b] to enter into these; and we shall only give that view which, in the present state of our knowledge, seems most tenable; and which best comports with the whole history of the disease, and the effects of remedies on it. These indubitably prove true croup to be essentially an inflammatory disease of the air-passages, especially of the trachea and larynx. But why does it differ from the catarrhal or bronchitic inflammations which we find to occur in the same parts? Many authors seem to consider its seat to be the same as that of catarrhal inflammation, and that the difference of its product (lymph instead of mucus) is to be ascribed to the early age at which it most frequently occurs. But this is insufficient; for at the same age, we meet with bronchitis affecting every portion of the air-tubes, yet without constituting croup. Others again, and among them Dr. Copland, refer the peculiarity of the product to an excess of albumen in the blood[c]; but even this, although it probably has a share in determining the amount of membranous or other solid formations within the air-tubes, does not alone seem sufficient to cause it; nor can it be ascribed to the intensity of the inflammation; for although the albuminous effusion is generally thickest and most tough in *sthenic* cases of croup, yet it is pretty abundant in *asthenic* cases;—so much so, that Andral and Gendrin consider plastic inflammations of mucous membranes to be rather of the subacute than of the most acute kind. To say that the inflammation is one of a specific character, throws no light on its nature. But does not the pathological and anatomical history of croup seem to point out, that the seat of its inflammation is deeper than that of bronchitis? The distinct and circumscribed position of the inflammation and painful constriction in the most marked cases; its fixedness in this part,—not wandering or creeping about, as catarrhal inflammation does; the tenderness, and sometimes the swelling of the trachea and larynx externally; the nature of the product of the inflammation,—which is coagulable lymph, as from serous or cellular membrane; the thickened state of the submucous texture found after death in the earliest stages, and the tendency of this texture to suppurate in chronic cases, where the subject approaches adult age,—seem to render it probable, that the inflammation owes its peculiar character and results to its being more deeply seated, more of a phlegmonous character

[a] Volume 1; Part 2; Page 449.
[b] Dr. C. J. B. Williams.
[c] "Dictionary of Practical Medicine"; Volume 1; Part 2; Page 461.

than mucous inflammations, and involving essentially the submucous cellular tissue. This view has not been generally held; Mr. Ryland alone distinctly inclines to it, when he remarks, that "the inflammation of croup appears, in the first instance, chiefly to affect the cellular tissue that enters into the composition of the mucous membrane, and not the muciparous follicles themselves; and the albuminous exudation is poured out by the secernent arteries of the cellular structure." Dr. Stokes remarks, that no satisfactory explanation of the greater frequency of croup in the infant has been given; and he seeks to account for it by the general fact of the predominance in the young subject of white tissues, which reproduce their kind. This idea may lead to an explanation, but it does not set it forth; and it leaves still a mystery why croup differs from bronchitis in the same subject. But if we examine the air-tubes of young subjects, we find in them, as in other parts, an abundance of the fine submucous cellular tissue; while the mucous membrane is more fine and less complex than it becomes in after-life; when, from the continued irritations to which it has been exposed, its follicular apparatus attains its full activity and development. The blood, too, in the young subject, abounds with the plastic material of nutrition; which is more abundantly thrown out under the influence of inflammation, than in the adult. Yet, as long as the inflammation, even in young subjects, is confined to the mucous membrane, the disease is simply catarrhal or bronchitic, and its product mucous or purulent. But the inflammation may readily reach the active and vascular submucous tissue; and then it has the more fixed character of the inflammation of croup, the product of which easily transudes through the fine mucous membrane; and, as in the analogous case of serous inflammations, —which are also seated chiefly in the subserous tissue,—the product is coagulable lymph.[a] In adults, where the mucous membrane is more developed, and the submucous tissue less so, inflammation is less likely to reach the latter: when it does, it attacks the looser parts of the larynx, and, modified by the active mucous secretion, its product is pus, instead of lymph; or it may be confined to the tissue, and cause the œdema, thickening, or purulent infiltration of laryngitis.

The pathological history of croup is quite intelligible. The inflammation may commence in the submucous tissue, or it may have been first catarrhal; in which very common case, catarrhal symptoms precede those of croup. The inflammation immediately causes increased sensibility of the contractile fibres, and interstitial effusion in the lining of the trachea and larynx: hence results the constriction, partly spasmodic, partly from swelling of the air-tubes; and hence the croupy inspiration and cough, and the hoarseness. Afterwards lymph is poured out in a liquid state; and, becoming concrete, forms the false membrane;—another cause of obstruction to the passage of the air; both directly by its bulk, and also by the spasmodic contraction which its presence causes in the muscular fibres of the tube. The latter cause acts especially when the false membrane reaches to the larynx, and excites its very irritable muscles: in such cases, the paroxysms of dyspnœa and cough are frightfully severe and suffocating. The share which spasm has in causing the dyspnœa may be inferred from the fact, that in no case have the air-passages been found so much blocked by the albuminous secretion, as to account for the amount of the obstruction; and in many cases the constriction has appeared greatest, where little or no exudation was found after death. It must not be forgotten, however, that

[a] See Pages 97 and 113.

œdematous swelling—like that of erysipelas—may disappear after death. The separation of the concrete matter from the tube, and the prevention of its becoming permanently adherent and organized, is doubtless owing to the mucous secretion, and the continued motions of the tube. In cases where the albuminous effusion is less plastic, or the follicular mucous secretion more abundant, the matter may be liquid and purulent; and this generally takes place in the bronchitic variety. The collapse which takes place towards the fatal termination of croup is, like that in bronchitis, to be ascribed to the imperfect state of the function of respiration, and the consequent injurious effect on the vital powers. The lividity, coldness, occasional attacks of convulsions, &c., are the result of the circulation or stagnation of imperfectly oxygenated blood. From the same cause arises, also, the congestion in the lung; which may in parts take on the irritation of inflammation, and become hepatized. The emphysema occasionally detected in the lungs, is plainly produced by the violent efforts of breathing.[a]]

Treatment.—The treatment of this disease must be energetic and decided;—just as I stated was requisite in laryngitis.[b] It would be right to bleed from the arm, or jugular vein, perhaps; and to apply a number of leeches over the throat. It is to be considered as an inflammatory disease, that must be treated briskly. I would make the same observation respecting leeches, that I have already done[c] respecting other inflammatory diseases of the throat. I should prefer leeches to a blister, and general bleeding to local; but I should follow up general by local bleeding. After the leech-bites had bled well, with the assistance of a poultice, I would repeat them, if necessary, and then apply a blister. There is extreme danger here; and therefore mercury should be given with the greatest freedom. Whatever disputes there are about mercury, we shall find, that in acute hydrocephalus, in laryngitis, and tracheitis, mercury is of the highest importance. Children will bear a larger quantity of mercury, in proportion, than adults; and it would be right to give a child, every two or three hours, as much as it would bear without vomiting and purging. This is a much better practice than the administration of emetics. Many cases will get well with emetics; but this will be successful in a larger number of instances. The warm-bath is useful, but not of high importance; and, when the leeches have bled well, some have advised applying cold to the throat. I see no impropriety in it. The good effects of applying ice to the *heads* of children, justify the application of ice in a bladder to the *throat*; but I have no personal experience of it.

Bronchotomy.—Some have recommended bronchotomy in this disease; but I believe it generally fails. Bronchotomy can only be a temporary measure.[d] It may enable the patient to breathe well for the time; but, of course, it can have no effect upon the inflammation. If the disease were not so extensive, it might be beneficial, by giving us time to cure the affection; but, unfortunately, we frequently have inflammation of the trachea, larynx, and all the ramifications of the bronchia; so that it is hardly possible for the child to recover from such a mass of disease. However, bronchotomy has been tried in many cases, and failed; and I have myself employed it without success. A number of cases are recorded, where it was of no use; though it appears occasionally to have been of service. One instance (there may be more) is recorded in the "Medico-Chirurgical Transactions"[e], by Mr. Chevalier; who made an opening into

[a] "Library of Medicine"; Volume 3; Pages 55 and 56.
[b] See Page 814.
[c] See Pages 814 and 818.
[d] See Page 815.
[e] Volume 6; Page 151.

the trachea; the consequence of which was the discharge of a quantity of viscid bloody fluid; and the patient speedily recovered. If, after the ordinary treatment of the disease,—free bleeding, mercury, blistering, the application of cold, and (if we choose) the administration of emetics,—if we cannot make the mouth more tender, or bleed any farther, and yet the child is dying,—it would be better, if the friends would allow it, to make an opening into the trachea,—in order to give the patient a chance; but, in a great number of cases, it is a very slender chance indeed. I would not do it till I had told the parents that the child would die *without* it, and would most likely die when it was *done*; for otherwise it would be said, that we had cut the child's throat, and killed it. It is a frightful thing to make an opening in the air-passages, unless we prepare the patients (or their friends) for it.

Seneka.—In America, they recommend a decoction of seneka in this disease. But this is a stimulating substance; and, if it does good, I cannot believe that it is in the active inflammatory stage. When the inflammation is subsiding, and great secretion is going on, it may stimulate the parts and "brace them up"; but I have not been tempted to give the remedy in the active acute form of the disease.

Liable to Recur.—This disease, however, occasionally takes place without any inflammation; or, at least, any *important* inflammation. Children who have once had the croup, will frequently, on catching cold, have a crouping cough,—a little hoarseness; so as really to labour under the signs of croup; but, in such cases, the pulse is not quickened, and the child is not particularly ill. If a child have once had the croup, there is in general little fear from other attacks. If parts have been once inflamed, they soon fall into a state of inflammation again; but then it is not *active* inflammation; and sometimes the inflammation is scarcely perceptible;—the disease appearing to be merely spasmodic. I have known children have six or seven attacks of croup.

It is always safe, in these cases, to apply antiphlogistic treatment;—not vigorously, as in the first instance; but to put a number of leeches on the throat, and administer calomel once or twice a-day, and (if we choose) an emetic. These means generally dissipate the disease. I know that some patients neither require leeching nor purging; and are benefited at once by an emetic. A slight inflammation has occurred; it has thrown the parts into a state of spasm; and an emetic will frequently cure it; but it is generally safer (unless we know that an emetic has cured the child before) to apply leeches to the throat, and give a dose or two of calomel. We are never sure that it is merely a spasm. There may be some little inflammation, which is increasing; and therefore it is the safest plan to begin with this treatment. If the child be not worse, but plays about, then the best thing is to give iron. Iron is a good thing to lessen morbid irritability in any part of the body. If there be inflammation it will do no good; but if there be mere morbid irritability, I know it is one of the best things. I shall have occasion to state that spasmodic cough, of a ringing character, yields most readily to iron. It is best not to begin with it; but to adopt antiphlogistic treatment for a day or two; and then we may give iron safely. The sesquioxide may be administered in treacle; or the sulphate in sugar, or tea. Children sometimes will not take it without these accompaniments.

SECTION IV.—ORGANIC AFFECTIONS OF THE LARYNX AND TRACHEA.

The Larynx.—Besides simple inflammation of the larynx and trachea, these parts are subject to various organic diseases. The larynx is frequently in a state of ulceration; and not unfrequently there are excrescences upon it;—looking, to all appearance, like warts. They are the same as warts on the genitals. Sometimes scrofulous tubercles form there. Sometimes scrofulous abscesses form in the cellular membrane; and sometimes there is cancer, and melanoid deposit.

As far as I know, in the greater number of cases, it is impossible during life to make a diagnosis between simple chronic inflammation of the larynx, and these organic changes. We find a person with tenderness of the larynx, and hoarseness;—his voice, perhaps, being reduced to a whisper; he coughs a great deal, and the cough is ragged or shrill; there is wasting, perhaps a constantly quick pulse, and tenderness;—shewing, altogether, that the larynx is diseased. But I confess, I am not able to distinguish between simple chronic inflammation of these parts, and ulceration, or the existence of excrescences, or the existence of various deposits.

In the commencement of such cases, I should recommend the remedies of chronic inflammation;—leeches over and over again; blisters afterwards, if we choose; a seton in the neighbourhood of the larynx; the exhibition of mercury; and narcotics to lessen the irritation. If these things do no good,—if the patient gets worse, the corporeal strength is decaying, and the symptoms in the throat (so far from diminishing) are increasing,—then we may suspect there is organic disease; and we shall generally be right. It is only in the latter stages of the disease, that any distinction can be made. When my remedies fail, I then begin to think there is organic disease.

Occasionally the larynx is ossified. Sometimes it becomes completely ossified; and deglutition is rendered very difficult. The larynx cannot move up and down; and the passage of the throat becomes so much diminished, that the patient can scarcely swallow; and, indeed, he dies of the disease.

The Trachea.—The trachea, likewise, sometimes gradually becomes ossified; and all the various diseases that I mentioned[a] under the head of organic affections (melanosis, scirrhus, cancer, and encephaloid disease) occur here. But more frequently we have thickening of the mucous membrane, induration, considerable excrescences, and scrofulous tumours; and then the common effects of inflammation;—ulceration; the formation of abscesses; and, finally, a carious state of the cartilages.

SECTION V.—CATARRH.

General Character.—This is a very slight inflammation of the larynx, trachea, bronchia, and the mucous membrane above these parts;—that portion called "the *Schneiderian* membrane" (from having been described by Schneider); and the membrane of the frontal sinuses, and even the conjunctiva of the eyes. The inflammation, in this disease, is not by any means so intense, as that which occurs in laryngitis and tracheitis; for it is an instance of common inflammation of a mucous membrane. It is, in general, a very *slight* inflammation; but it extends through the whole tract, from the conjunctiva of the eyes;—running down the lachrymal canal; and

[a] See Pages 217 to 240.

not only affecting the membrane of the nostrils, but also the frontal sinuses, the throat, the tongue, the larynx, the trachea, and the bronchia. As it affects such an extent of surface, dangerous symptoms more frequently arise than we are aware of. This, in medical language, is called "catarrh"[a]; and, in common language, we call it "a cold."

Symptoms.—There is a feeling, at the same time, of soreness throughout the body; and generally there is tenderness of the surface; which makes the person uneasy, if he press much upon any one part. There is stiffness, and an aching of the whole body; but it is chiefly felt in the back of the neck. There is likewise headach;—I presume, from the congestion in the frontal sinuses. Perhaps there may be more or less congestion within the head; but I should think that it arises chiefly from congestion of the frontal sinuses;—at least, that the former is inferior to the latter. There is likewise chilliness, and morbid heat. The patient is chilly, and creeps towards the fire; and yet if we touch him, he is hotter than he should be. There is great sensibility of the surface; so that the least breath of air blowing upon him, causes a sensation of cold. The mind also is affected. There is heaviness of the head;—sometimes amounting to stupor; so that people are quite stupid. From the state of the conjunctiva, there is frequently stiffness and smarting of the eyes; and, from the irritation of the membrane within the nostrils, there is sneezing. There is, also, from the disturbance of the membrane, loss or impairment of smell, and apparently of taste. People say they can neither smell nor taste. I believe they can taste, although they cannot smell. Many things may be smelt as well as tasted; and these are tasted just as acutely as before. From the inflammation in the air-passages, the breath is hot; so that when we have a cold, the air expired from the lips is hot;—as though it came from a hot place. There is generally hoarseness, some cough, and a little soreness at the front of the chest. When the mucous membrane is inflamed, it is sore at the division of the trachea; and there is soreness in the situation of the larger branches of the bronchia.

Increased Secretion.—All the parts that I have mentioned, discharge more freely than in the healthy state. They are all covered with mucous membrane,—if the *conjunctiva* can be considered a mucous membrane; they are all in a state of slight inflammation; and therefore they are in a state of preternaturally increased discharge. The eyes "run" (called "lachrymation"[b]); and there is a discharge from the nose (called in Latin "distillatio"; or, as we say, "catarrhus"). The discharge from the nose, is likewise called "*coryza.*"[c] At first, the secretion is limpid; like drops of water from a rock. It is thin and transparent; but afterwards it grows more copious and thick.

As the symptoms decline, the quantity of the secretion declines; and, as all the symptoms go away, there frequently arises a little inflammation about the mouth and nose, and an eruption; so that the common people say the cold is going, because there is a "breaking out" about the mouth. When the cold goes off, and the inflammation within ceases, it is very common for slight inflammation of an herpetic character[d] to take place about the mouth. During the existence of the disease, the tongue is white, the skin dry, and the urine red; and when all is declining, the urine has a lateritious sediment;—the common symptom of inflammation. There is also a loss of appetite. The stomach is much affected in this disease. People

[a] From καταῤῥεω, *to flow down.*
[b] From λακρυμα, *a tear.*
[c] From καρα, *the head;* and ζεω, *to flow.*
[d] See Page 439.

cannot eat; and sometimes there is also an affection of the mucous membrane down the œsophagus, and in the stomach. There is heat and pain there, and tenderness on pressure. The pulse during the disease is quick.

Progress and Duration.—The affection has a disposition to begin above, and travel downwards; so that persons know very well which part of the mucous membrane is inflamed, at different times. When it is the mucous membrane of the frontal sinuses and nose, they say it is "in the head";—they feel so heavy and stupid. Then that goes off, and they begin to cough. As it leaves the upper part, it generally increases in the lower; and then, after a tickling in the throat, and hoarseness, there is frequently pain down the front of the chest, and cough; and also more or less difficulty of breathing. After that the tickling of the throat is diminished. But though it travels downwards, it frequently mounts up again. Sometimes people are beset with it in all parts at once; but generally, if the disease be slight, we see it travel downwards; and if a person have a relapse, it will come again above; but then people say they have "caught a fresh cold." The disease will last from twenty-four hours to some weeks; and sometimes it is the forerunner (as I stated before [a]) of violent inflammation of the larynx, or of the bronchia. It is often the prelude to various active inflammatory diseases.

Causes.—The common cause of this affection, is the application of cold,—especially when united with moisture, or when the body is over-heated and perspiring; and more particularly when the cold is applied partially. Many persons have a common cold in a few minutes, if exposed to a draught; but they will bear exposure to the air without any such effect. Mere cold will cause it, without any subsequent application; because, while sitting in a room without a fire, when we ought to have one, the nose will begin to "run", before we go into a room with a fire. While we remain in the cold room, we begin to sneeze; and other symptoms of catarrh come on;—proving the action of the cold itself. Most probably the constriction of the skin being so great, the Schneiderian membrane passes into great activity. Change of residence appears to increase the susceptibility to the disease. Some susceptible people always take cold if they change their residence; and some will catch cold without leaving their beds.

Treatment.—The best mode of treatment, is to keep the body perfectly warm;—so as to get rid of the chilliness. It is usual to increase perspiration by wine and brandy, and other stimuli; but it is better to do it by caloric itself. The warm-bath, or a vapour-bath, is very good; and a local bath is also very proper; and when the patient is warm, plenty of hot liquids, without any wine or brandy, are exceedingly useful. If we put wine and brandy into hot liquors, there will most likely be headach afterwards.

Diet and Exercise.—During this time a person loses his appetite; and therefore nature indicates that he should take but little food; and that little should be chiefly fluids, and of a weak nature. When a person has been ill for any length of time, one of the best modes of getting rid of the cold, is by perspiring through exercise. Exercise in the open air if possible; or good exercise, at any rate,—so as to produce considerable perspiration,—is one of the best remedies. But great care must be taken not to catch cold, when perspiration is induced; for if a person allow himself to cool suddenly, when he is hot, his last state will be worse than his first. Good brisk walking, or dumb bells, or battledore and shuttlecock, or

[a] See Page 828.

skipping, are highly serviceable. The patient should be careful to keep himself warm afterwards; or he will catch cold upon cold, till the most serious effects are produced.

Influenza.—Catarrh is sometimes epidemic; and then it goes by the name of "influenza."[a] We have numerous returns of this epidemic catarrh throughout Europe; and it is not confined to the human race; for horses, dogs, and cats are all liable to it. There was a very remarkable influenza in England, in the year 1782;—there having been one in the East Indies and China, in 1780. It appeared (as many epidemics do) to travel westward;—having made its first appearance in the east. Respecting that epidemic, it is mentioned that an East Indiaman (the Atlas) had its crew attacked, while sailing from Malacca to Canton; and when it arrived at the latter place, they found that the people had all had influenza there, about the same time that the crew had had it at sea. This was an argument against the disease being contagious; for if the people had it out at sea, and found, when they arrived at a distant part, that the inhabitants had had it about the same time, it shews that it must have been something atmospherical, and not any thing communicated from man to man. There has been a great difference of opinion respecting the contagiousness of different epidemics of this kind. Some contend that this and that influenza is merely epidemic; and others, that it is epidemic through its contagious nature. We have had epidemics of this description, but I never saw any thing to make me believe that the disease was contagious; though I should be sorry to deny it merely because the cases that came under my notice, did not appear to be contagious. Strong facts have been adduced to shew that it is contagious; and then there are others, equally strong, tending to shew the contrary;—just as is the case with regard to cholera.

The symptoms are usually more severe than in common catarrh. When the disease is epidemic, it is not so slight as when sporadic. When epidemic, there is generally complete loss of appetite, great lassitude and debility, and a very severe cough. It will attack persons both *out* of doors and *in* doors indiscriminately; and also individuals at sea. Sometimes it affects every member of a family at once; and sometimes it affects them in succession.

The epidemic influenza attacks people of all ages; but children less than others. It is sometimes fatal to persons who have chronic disease of the chest. An influenza is sufficient to stir up inflammation, when it exists in any part of the body. When the disease is not epidemic, but sporadic, it lasts from a few days to a few weeks; and when it is strictly epidemic, it generally continues for a few months. What the cause of it is, I do not know.

SECTION VI.—SPASMODIC AFFECTIONS OF THE LARYNX.

[Endowed with a curious and complicated muscular apparatus, and with exquisite sensibility, the larynx is liable to various forms of neurosis. Of these, the active have only, as yet, been investigated; while of the existence of the passive forms scarcely any notice has been taken. Under the first head we may class the spasmodic croup of children, the spasm of the glottis in hooping-cough, and the various forms of hysterical, nervous, and sympathetic cough; while of the second we can only say, that paralysis of the muscles of phonation is seen in certain cases of cerebral disease; and

[a] The Italian word for "influence."

that, reasoning from analogy, we may further admit the existence of another form of paralysis, similar to that of the intestines in ileus, and of the intercostal muscles in pleurisy, and resulting from the same cause;—namely, the inflammation of a tissue in connexion with the muscular fibre.[a]]

a. Laryngismus Stridulus.

Resembles Croup.—[There is a disease which often attacks the larynx, especially that of infants and children; which has so near a resemblance to croup, as to be very generally confounded with it; and which is hence known by the name of "spasmodic croup." But notwithstanding the resemblance of many of its symptoms, it is essentially different from it, and ought to be arranged in a different place. The distinctive characters of bronchlemmitis or croup are, inflammation of the mucous membrane of the trachea and bronchial vessels; and the secretion of a peculiar concrete and membrane-like material, that lines the tracheal tubes, and threatens suffocation by obstructing them. In the disease before us, we have neither inflammation nor membrane-like secretion; while the sense of suffocation is produced, not by obstruction, but by spasm.

Distinguished from Asthma.—Nor is it strictly an asthma; though it makes an approach to it, and forms the "*Spasmodic* Asthma" of Millar, Parr, and various other writers. In asthma, the constriction commences in the chest, and chiefly exerts itself there; though the spasm may extend to the upper part of the trachea. In spasmodic laryngismus, the constriction commences in the larynx, and is chiefly confined to that organ; though it may extend to the chest. In the former, the respiration is wheezy, but the voice is not stridulous; in the latter, the voice is stridulous, but the respiration is rarely wheezy, or rather rarely so in an equal degree;—evidently showing a difference in the seat of the two diseases.[b]]

History and Progress.—[This convulsive affection occurs by paroxysms, with longer or shorter duration in different cases, and in the same case at different times. It consists in a peculiar mode of inspiration, which it is difficult accurately to describe. The child, having had no apparent warning, is suddenly seized with a spasmodic inspiration; consisting of distinct attempts to fill the chest, between each of which a squeaking noise is often made; the eyes stare, and the child is evidently in great distress; the face and extremities, if the paroxysm continues long, become purple; the head is thrown backwards; and the spine is often bent, as in opisthotonos: at length, a strong expiration takes place; a fit of crying generally succeeds; and the child, evidently much exhausted, often falls asleep. In one of these attacks a child sometimes, but not frequently, dies. They usually occur many times in the course of the day; and are often brought on by straining, by exercise, and by fretting; and sometimes they come on from no apparent cause. They very commonly take place after a full meal, and they often occur immediately upon waking from sleep; though, before the time of waking, the child had been lying in a most tranquil state. As the breathing is affected by these paroxysms, the complaint is generally referred to the organs of respiration, and it has been sometimes called "chronic croup"; but it is very different from croup, and is altogether of a convulsive character;—arising from the same causes, and relieved by the same

[a] Stokes on Diseases of the Chest; Part 1; Section 3; Page 261.

[b] Dr. Mason Good's "Study of Medicine"; Class 2; Order 2; Genus 2.

remedies, as other convulsive affections. Accompanying these symptoms, a bending of the toes downwards, clenching of the fists, and the insertion of the thumbs into the palm of the hands, and bending the fingers upon them, is sometimes found, not only during the paroxysms, but at other times. Clenching the fist with the thumb inserted into the palm of the hand, often exists for a long time in children without being much observed; yet it is always to be considered as an unfavourable symptom, and frequently is a forerunner of convulsive disorders;—being itself a spasmodic affection. It rarely happens that a child recovers from an attack of this sort, unless the progress of the disorder has been interrupted by a timely application of proper remedies, without a general convulsion. Then the friends become alarmed; and a disease which had existed for two or three months, is, for the first time, considered to be important enough to require medical assistance; after all the farrago of popular medicines—such as "fit-drops", "soot-drops", assafœtida, &c.—have been ineffectually applied. Convulsions of this description seldom, if ever, occur after the expiration of the third year of a child's life; and not often in children which have lived by sucking till they have teeth, and have never taken animal food till the "dentes cuspidati" have come through the gums; this, however, is liable to some exceptions.[a]]

Causes.—[The principal *causes* of the croupy convulsion in children, in a practical point of view, are:—1. *Dental* Irritation. 2. *Gastric* Irritation. 3. *Intestinal* Irritation. And here I[b] must make the all-important practical remark;—that I have *never* seen the measures suggested by this view of the causes, when *early* and *effectually* enforced, fail in remedying this disease. Besides these especial causes, there are others which act upon the nervous centres. Passion, vexation, and certain odours, are of this class; and (singular as it may appear) the state of sleep *predisposes*, at least, to attacks of this kind of convulsion.

Pathology.—The origin of this disease was erroneously referred to the cerebrum by the late Dr. J. Clarke, to whom we owe its detection; and to compression and consequent paralysis of the pneumogastric and its recurrent nerves, by the late Dr. Hugh Ley, to whom we are indebted for an otherwise invaluable treatise upon it.[c] It is, in reality, an excitation of the true spinal or excito-motory system. It *originates* in:—1. The *Trifacial*, in teething. 2. The *Pneumogastric*, in over or improperly-fed infants. 3. The *Spinal Nerves*, in constipation, intestinal disorder, or catharsis. These act through the medium of the *Spinal Marrow*, and:—1. The *Inferior* or *Recurrent Laryngeal*, the constrictor of the larynx. 2. The *Intercostals* and *Diaphragmatic*, the motors of respiration. When the *crowing inspiration* passes into actual *convulsion*, the larynx, from being *partially*, becomes *perfectly* closed; and there are violent *expiratory* efforts, with consequent congestion of the encephalon, and all its terrific train of evils. The same mode of viewing this important subject, leads us to give its proper place to *each* of the series of symptoms: the *spasmodic* or *spinal* are the *first* in order; the *cerebral* the *second*. We are thus enabled to see the just relation and position of effusion into the ventricles of the brain, with regard to this disease; it is the *effect*, not the *cause*.

Treatment.—The proper mode of treatment comprises the remedies—1. *Against* the *attacks*. 2. *In* the *attacks*, and in the *threatening* of the attack. 3. Against their *effects*. The remedies *against* the attacks, or the *preven-*

[a] Dr. John Clarke's "Commentaries on the Diseases of Children."

[b] Dr. Marshall Hall.

[c] "An Essay on the Laryngismus Stridulus, or Croup-like Inspiration of Infants. By Hugh Ley, M.D."

tion, consists in avoiding all the exciting causes: dental, gastric, or intestinal irritation; passion; vexation; disturbance; interrupted sleep; &c. The remedies in the *threatening* of attacks, consist in the watchful and prompt repetition of the same treatment, lancing the gums, and relieving the stomach and bowels. The *sleep* especially should be watched; and if there be a sardonic smile, or starting, or other symptoms, the little patient must be *gently* awakened; and the remedies just enumerated should be administered. Mental agitation must be most cautiously avoided. After the gum-lancet, I would advise a copious enema of warm water. If there be great threatening of an attack, I would tickle the fauces, dash cold water on the face, and irritate the nostrils;—having the patient placed, as speedily as may be, in the warm-bath. To guard against the effects of the attacks, we deplete the blood vessels about the head with cupping, or leeches; apply an alcoholic lotion constantly all over the head; or, if the case be urgent, the ice-cap. In addition to these measures, the secretions must be corrected;—mild mercurials being given, perhaps, to affect the system; and diuretics, if the urine be scanty: afterwards, change of air is of undoubted efficacy; and a very mild tonic plan may be added with advantage;—as minute doses of the sulphate of quinina, of the carbonate of iron, &c. Sponging with *warm* salt-and-water, is also a valuable auxiliary remedy. It is impossible to conceive the vast importance of this subject. If any thing could add to this importance, it is the fact that the convulsions of infancy frequently lay the foundation of epileptic attacks in youth, or adult age. Sometimes the transition is so gradual and continuous, that the two affections are proved to be obviously the same.

With the same objects, the diet and the condition of the bowels must be attended to with *equal* energy. *All* irritation must be avoided; and, among these, *drastic* medicines must be ranged. A young nurse's or ass's milk should constitute the diet. Enemata of warm water may be used, effectually to relieve the bowels, night and morning. The "tinctura hyoscyami" and hydrocyanic acid are important auxiliaries; but especially change of air. A cold lotion, the ice-cap, and perhaps leeches, must be used to guard the head; the feet must be fomented and kept carefully warm.[a]]

b. Nervous Affections of the Larynx in the Adult.

[We meet with spasm of the glottis in the adult, either with or without organic disease of the larynx; though in most cases it supervenes on chronic laryngeal affections. In females, however, we find it as one of the symptoms of the protean hysteria; when it may be a transient or long-continued affection. The spasm is commonly during inspiration.

I [b] have not materials to enable me to enter into an account of the various hysterical and nervous affections of the larynx in females; but shall merely enumerate those which I [b] have observed, most of which have been long known:—1. Simple aphonia, supervening on mental excitement. Its duration is exceedingly various, and its disappearance often as sudden as its invasion. 2. Fits of croupy breathing. 3. Long continued stridulous breathing, without fever. 4. A hard, loud, solitary cough, without any stridor. In its more violent forms, this has got the name of "tussis ferina." 5. A similar cough, followed by an inspiration not stridulous; but with the *ex-*

[a] Dr. Marshall Hall, on Diseases and Derangements of the Nervous System; Chapter 5; Pages 171, 172, 173, 181, and 182.

[b] Dr. Stokes.

spiration long, sonorous, and groaning; so as to resemble the howling of a dog. 6. A short but teasing cough, occurring in the most rapid succession; and during the paroxysm causing the greatest distress and exhaustion. 7. The most violent form of the "tussis ferina"; with greatly increased action of the heart and arteries, hurried breathing, loud puerile respiration, and profuse sweatings. In such a case I [a] have seen the disease continue for more than a year; yet there was no emaciation.

Other forms may also occur; but the above are those which have fallen under my [b] own observation. With respect to diagnosis, the points of importance are,—the co-existence of other hysterical phenomena, or their having preceded the symptoms; the absence of fever, the character of the cough; *the want of the regular succession of phenomena as observed in laryngitis*; the frequent absence of hoarseness; and, lastly, the resistance of the symptoms to ordinary antiphlogistic treatment. [c]]

Spasmodic Cough.—There is a cough which occurs every now and then; and which is not the "*hooping*-cough"; but what may be termed "*spasmodic* cough." This affection is, perhaps, united with a degree of inflammation; or perhaps not; but if it be united with inflammation, it is out of all proportion to it. I believe this is what is meant by "spasmodic cough." I have seen a few instances of a most violent cough, tearing persons in pieces, like hooping-cough; but still it was *not* hooping-cough; and it occurred in adults.

In this disease, iron is by far the best remedy. I have cured every case which I have seen of it, by the exhibition of the sesquioxide of iron. In many of these cases there is no indication for bleeding; although, if the patient be robust, it may be expedient to bleed in the first instance; but I have always treated such cases with the sesquioxide, and with great success. In every case where the cough is out of proportion to the inflammation, or where there is an organic disease (even consumption), iron appears to be the best remedy. Many cases attended by cough and expectoration, which have been mistaken for phthisis, have given way to this remedy.

Nervous Cough.—I have now and then seen a very extraordinary cough in young women. All very extraordinary cases, independent of organic disease, are to be seen in young women. Cases are continually seen in young women, of so extraordinary a nature, that we could not believe in their accuracy, if we merely read them in books. I recollect very well seeing a young lady, single,—for these cases almost all occur in single ladies,—who complained, that every time she inspired she coughed, night and day. She breathed slowly; but when the time came for expiration, she coughed. Nothing was expectorated; and on listening to the chest, there was nothing preternatural to be heard. She had coughed in that way for months. At first the cough was quiet when she slept; but when I saw her, it would not allow her to sleep. I did her no good; and what became of her I did not hear. It was the most extraordinary case I ever saw. I have no doubt it was a nervous cough;—that it did not depend upon any inflammatory or organic disease; and that it would cease entirely of itself, in the most sudden manner.

Barking Cough.—Occasionally females will have a *barking* cough. Sometimes they will have a violent spasmodic cough, such as I have now described, only modified in various ways; so that they will make all sorts of strange noises (such as shrieking);—unattended by organic disease, and apparently

[a] Dr. Stokes.
[b] Dr. Stokes's.
[c] Dr. Stokes, on Diseases of the Chest; Part 1; Section 3; Pages 263 and 264.

arising from a mere nervous derangement of the parts. The exact nature of these affections, I have not been able to ascertain.

Aphonia.—It is right to mention, that the voice is sometimes lost, or reduced to a mere whisper, without any inflammation,—without any œdema,—without any obstruction, as it would appear, of the parts. This affection, which is called "aphonia", occurs chiefly in females; and is altogether what we call "a *nervous* complaint." It occurs sometimes in boys as well as in girls; but it is chiefly an affection of women. I think it is easily made out. There is no tenderness of the larynx on pressure; there are other nervous symptoms in the body; and the person is weak and nervous altogether. Frequently there is no tenderness on pressure, and frequently no cough; or if there be cough, there is nothing else;—no pain with it;—no expectoration; and the disease frequently comes on suddenly, and goes off in the same manner. It has frequently come on in the course of a few minutes;—at any rate, in a day. It ceases, perhaps, as suddenly; and then comes on again.

There is no danger whatever; but sometimes persons lose their voice for many months; and I have heard of cases where they have lost it for years; and, from a sudden circumstance, without any apparent reason, the voice will return. I do not know any mode of treatment better than the shower-bath; and attention to the improvement of the general health, in every possible way.

CHAPTER V.

BRONCHITIS.

SECTION I.—ACUTE BRONCHITIS.

When inflammation attacks the air-passages at large, and particularly those within the chest (the ramifications of the bronchia), and affects these latter very severely, the disease is termed "bronchitis" (from βρογχος and *itis*); —inflammation of the bronchia.

Synonymes.—This is the most common kind of inflammation of the lungs. The far greater number of those who have what is called "inflammation of the lungs", have inflammation of the ramifications of the bronchi; so that there is nothing heard of now but "bronchitis"; whereas we formerly used to hear only of "pneumonia", or "peripneumonia." But since it has been ascertained that the inflammation which we every day see, resides in the mucous membrane of the bronchia, the term "inflammation of the lungs" has fallen into less frequent use; and we have, instead, the term "bronchitis." One portion of the substance of the lungs is made up of the bronchial tubes, and therefore the term "inflammation of the *substance* of the lungs" is very proper; because those tubes are an integral part of the lungs.

General Symptoms.—In this affection, which occurs every day, the breathing is quick and shallow. To make up for the shallowness, the patient breathes quickly. If the patient breathe deeply, the mucous membrane is put upon the stretch so much, that it occasions great uneasiness. He is more comfortable when he takes a small quantity of air into the chest; but it must be accomplished more frequently than on ordinary occasions. There is frequently a sense of constriction of the chest, and of soreness about the larger bronchia. It is sometimes difficult for a patient to lie down; but in other cases he can do so perfectly well. There is every variation as to cough. In some persons there is intense cough; if they even turn a little in bed, it shakes the bronchial membrane sufficiently to produce cough. Some cannot turn; some can scarcely lift their arms;—they cannot produce so slight a motion of the chest as that, without experiencing cough. In other patients the cough is by no means severe. If it be severe, people are confined to their bed; but if not, the motion produced by exercise makes the breathing more difficult.

The Expectoration.—From the first there is some expectoration. The mucous membrane cannot be so irritated, without secreting more than it should; and this expectoration may increase to a very great amount. If the inflammation become very severe, it diminishes again;—but still the patient has more secretion than in health. If a person have a very active inflammation, the secretion diminishes; and then, when the disease declines, or degenerates into the passive or atonic form, the secretion may become immense. At first it is thin; but it soon becomes thick, and fre-

quently of a very yellow colour,—so as to look almost like pus; only it is very glutinous; and, for the most part, swims in water. It may appear very black;—as black as if soot had been mixed with it; but there are various other shades;—blue, green, yellow, and white. This expectoration is not excessively tenacious. It is certainly viscid; but not so tenacious as when the air-cells are inflamed. In the latter case, the matter is so tenacious, that if a person spit into a vessel and turn it up, the expectorated matter will not run out, but will adhere to the sides.

Headach.—There is headach, sometimes very severe, when the cough takes place. The headach is of that character, when it exists at all, that patients almost always describe it as "a *splitting* headach"; and sometimes there is drowsiness. There is great congestion in the head; and a more or less inflammatory state.

The Pulse.—The pulse is accelerated. It may be as high as 100; or even still higher. As the inflammation affects a mucous membrane, the pulse is generally large and soft. It may be hard;—for there is a great variety in these things, but for the most part it is full, and rather soft; or, at any rate, not a *firm* pulse. There is not the softness of *debility*; but a pulse of no remarkable *power*.

State of the General Surface.—The skin is frequently dry; and, of course, the tongue is dry, and generally of a dirtyish white colour; and sometimes it is covered with a great deal of mucus. The skin, for the most part, is hot; and now and then persons sweat violently. The face, too, shews great congestion. General congestion probably takes place; for, in many cases, there is drowsiness and headach; and there is likewise redness and fulness of the face. At the moment of coughing, the veins of the temples and neck are greatly distended, and the whole face becomes turgid.

Progress of the Disease.—If the disease go from bad to worse, the patient cannot lie down at all. His face becomes livid, from the congestion. The lips become purple; and I have seen the face become really black;—of such a hue that I could not have believed it had been the result of bronchitis, if I had had it represented to me. It was as dark as when a patient has taken nitrate of silver to a great amount; or where there has been a communication between the two ventricles of the heart. The pulse, at last, becomes weaker and softer; and, at the very last, vermicular. The surface becomes blue; and both the forehead and chin are bedewed with a cold clammy perspiration. In this state of things, the expectoration becomes very scanty, or ceases altogether; not because it is not secreted, but because the patient is too weak to expectorate it; so that he may almost be said to be drowned inwardly by mucus. In cases which are left to themselves, or badly treated, it is said that dyspnœa comes on about the fifth or sixth day, and is followed by death.

If, on the other hand, improvement take place, the constriction is removed. The cough is not much diminished; but it does not hurt the patient as it did. There is copious expectoration. The pulse becomes slower and softer; without, however, becoming so soft as in health. The surface perspires; and the tongue becomes moist. Still, if the case be severe, there is a discharge which appears to be puriform. In other cases, the patient neither gets well nor dies; and then there is considerable expectoration. Still the pulse is kept up, and still it is hard. In consequence of the cough, he does not gain strength; but perhaps becomes more and more emaciated. He has night-sweats; and at the end of many

months he may die, or get all but well; and then when he is exposed to a common cold, he may have difficulty of breathing, and more or less bronchitis; so that some persons who have been ill, will never be able to get through a winter without an attack of asthma;—that is, shortness of breathing.

Signs afforded by Auscultation.—Besides these symptoms, however, there are others which may be learned by the ear. As bronchitis is an inflammation of the inner surface of those tubes through which the air passes, they are necessarily altered in diameter; and instead of being only moistened, there is an *abundance* of mucus, and mucus of a different consistence to what it usually is; we must therefore suppose, that there will be a very different sound in this disease, from what there is in health. On listening over the part that is inflamed, we hear, instead of the natural murmur, a sound both louder and rougher than usual; and if the inflammation be very great, the sound is then so loud and rough, as to resemble the *snoring* of some small animal. This is called the noise of "*sonorous* respiration", or "sonorous *rattle.*" Some choose to use the Latin word "rhonchus"[a]; and some say "râle"; and would not say "rattle" for the world, because it is not scientific. However, there is a rough snoring sound; something like the bass string of an instrument. Besides that, we frequently observe a squeaking or shrill sound;—something like the chirping of a bird; and that is termed "*sibilous* rattle." It is frequently shrill, like the noise made by a grasshopper. One or both of these phenomena we constantly observe. Of course they are not heard all over the chest; but only at those parts where the tubes are affected.

There is another peculiar circumstance in this affection; namely, that all at once, while we are listening, the sound occasionally ceases entirely; and if we continue to listen, we hear it again as before; or if we make the person cough, we then hear the sound of respiration again. This is peculiar to the disease; and arises, as is supposed, from a large tube becoming temporarily obstructed by mucus;—so that its ramifications get no air; and, when the mucus is removed, the air enters as before. When the sound of respiration ceases in a part, if we only make the patient cough, that is generally sufficient to dislodge the mucus, and the respiration returns. This is called, by Laennec, a pathognomonic sign of this disease.

Sometimes, on placing our hand over the chest, we discover a vibration at the same moment; but that is not always the case. It depends upon the extent, or the intensity of the affection. If the air pass with great difficulty, it shakes that portion of the chest. However, it is not of very great importance.

Auscultation of the Cough.—This *wheezing* (as we call these rattles in English) occurs, not only when the person is *speaking*, but in a much more marked degree when he is *coughing*. If we have a doubt about the nature of the disease,—as to whether it is bronchitis or not,—because we do not hear a sonorous or sibilous rattle, by making the patient cough, we may then determine the nature of the case to a certainty. In coughing, there is generally a more violent inspiration; and as soon as we produce that, it will have the desired effect. Frequently also this disease may be detected at the back and root of the lungs, when we cannot find it anywhere else. In that situation, both in respiration and in coughing, sonor-

[a] A snorting, or snoring.

ous and sibilous rattles are frequently heard, when they are heard nowhere else. In most instances, persons can tell a case of bronchitis without this; but sometimes they cannot. Sometimes a patient will breathe quickly, and the pulse will be quick; and yet we are at a loss to say what the disease is. Sometimes I have known it difficult to say whether the disease was in the chest or not; whereas, by listening to the chest, and making the patient breathe quickly and cough, the disease has been fairly made out. In listening to the respiration, in a case where we suppose there is bronchitis, it is right to make the patient breathe as quickly as he can; and we shall then hear the sounds more distinctly; it causes still more full respiration.

If the affected part be at a considerable distance from the front, we cannot hear the rattles well. The nearer they are to the surface, the louder we hear them.

Signs afforded by Percussion.—In bronchitis the sound on percussion is not altered; on striking over every part of the chest, we find it sound as in health. At the very moment at which we may cease to hear respiration at one part, if we strike that part, we still hear a hollow sound; and for this reason;—although respiration is not going on, there is air there. There is no fluid collected, and no solidification of the lungs; but the air is there much as it is in health; and therefore, on striking, we have the natural hollow sound.

[Dr. Stokes, in the following propositions, has indicated the present state of our knowledge with respect to the physical diagnosis of simple bronchitis:—

"1. In almost all cases, percussion gives no direct sign. 2. An accumulation of mucus in the lower portions of the lung, may give a certain degree of dulness. 3. In the great majority of cases in which there is a co-existence of the signs and symptoms of bronchitis with dulness, we may infer the existence of some disease, either of the parenchyma or of the pleura. 4. Conversely, the absence of dulness with the existence of irritation of the lung, gives a great probability that the case is one of simple bronchitis. 5. A copious effusion of muco-purulent matter may exist in the bronchial tubes, without a perceptible dulness of sound on percussion. 6. In certain cases of bronchitis with effusion, a metallic sound may be produced on percussion. This is somewhat similar to the *bruit de pot fêlé* of caverns; but is to be distinguished from it by the clearness and greater diffusion of sound, and absence of the stethoscopic signs of a cavity. 7. In many cases, on application of the hand, a distinct vibration is felt, in accordance with the motions of respiration. 8. The modifications of respiration, as observed by the stethoscope in bronchitis, seen to be connected with mechanical obstruction more or less complete, and which may proceed from one or all of the following causes:—turgescence or hypertrophy of the mucous membrance; the existence of various secretions; and, lastly, the occurrence of spasm. 9. In the mode of recurrence of the various phenomena, there are the greatest possible differences in different individuals. 10. As a general rule it may be stated, that the more intense the sonorous, sibilous, or mucous râles, or any combination of them, during ordinary respiration, the more severe may the disease be considered. 11. But in certain cases of intense bronchitis of the minuter tubes, the sounds during ordinary respiration cease to be a measure of the intensity of disease; as they become louder during the convalescence of the patient. 12. In the secretive stage of bronchitis, the mucous rattle may occur, on the one hand, with large and isolated bubbles; and, on the other, may pass

into a râle almost crepitating;—the sound on percussion still continuing clear. 13. In consequence of bronchial inflammation, the entrance of air into a certain portion of the lung may be prevented; in which circumstances, the signs are nullity of respiration, with persistence of clearness of sound. 14. This obstruction may result from organic change of the mucous membrane, or from the plugging up of the tubes by their own secretion. 15. In the first of these cases, the absence of diminution of the respiratory murmur is permanent, while in the second it may be temporary, and removeable by a fit of coughing; yet, even in this case, the obstruction by concrete mucus has continued from the period of its occurrence, until the fatal termination. 16. If in a case of mucous catarrh, a sudden dyspnœa supervenes, with absence or diminution of the respiratory murmur in a particular portion of the lung,—this portion also preserving its clearness of sound on percussion,—we may make the diagnosis of obstruction of the bronchial tube by its own secretion."[a]]

Treatment.—The *treatment* of this disease is perfectly easy. We have only to bleed the patient well, and to follow it up by local bleeding. According to some, the latter answers better at the back, than at the front. I do not know that this is the case, but some say they have contrasted the two modes;—which is more than I have done. I have generally been contented with cupping at the front. Some say there is more advantage from cupping on each side of the spine; and others prefer the root of the lungs, and the large vessels. I am quite sure that, in this disease, mercury is of the greatest use. I have had many cases that have yielded the moment the mouth has become sore. Or if we choose, instead of making the mouth sore, great advantage may be derived from the exhibition of tartar-emetic in large doses;—so as to keep the patient nauseated, and from time to time produce vomiting. Vomiting causes a great discharge from the affected parts; and therefore it is more useful than in any other inflammation. In many inflammations, it would be dangerous to practise vomiting; but in bronchitis many trust, next to bleeding, to the exhibition of full doses of tartar-emetic;—a grain or more every three or four hours. However, I am not so satisfied with this plan, as with making the mouth sore; but if the patient do not go on so fast as we could wish, then we may give tartar-emetic afterwards. Nevertheless, I am quite satisfied that making the mouth sore is one of the most expeditious modes of cure. I need not say that blisters, low diet, and moderate purging, are also exceedingly proper. The treatment is that of common inflammation[b]; and if it be well practised in time, and if the patient be not the subject of chronic bronchitis, the treatment is easy enough. If the patient have *acute* supervening on *chronic* disease, our chance is slight; but even then the case must be treated on the same principles.

SECTION II.—ASTHENIC BRONCHITIS.

Symptoms.—It is to be particularly remembered, that bronchitis will sometimes destroy life in the most insidious manner. It may exist without pain, and may then be easily passed over; I mentioned that it will frequently exist with little cough[c],—not half the cough that is often present in common catarrh;—and then also it may be easily passed over. The patient is considered to have "a little cold"; but there is such prostration of strength, as surprises every

[a] Dr. Stokes, on Diseases of the Chest; Part 1; Section 2; Pages 79 to 81.

[b] See Page 124.

[c] See Page 836.

body; and in three or four days the individual is past hope. I have known several cases of this description. This occurs particularly in those advanced in life; and therefore, whenever we are consulted by individuals near sixty, or who have passed that age, and we observe difficulty of breathing, the respiration hard, and the pulse quicker than it ought to be, it is well to listen to the chest, and find what disease he has. The respiration may be sonorous, sibilous, or both; or perhaps mucous; and the patient may be labouring under excessive inflammation of the bronchia. We may hear these sounds in many parts of the chest.

Pathology.—This species of the affection is called "*asthenic* bronchitis";—that is, the form of inflammation which is described as *atonic*[a]; where the inflammation, however active, may be attended by no great strength of constitution; and where it very soon degenerates into passive inflammation, or the patient absolutely sinks. There is no power in the *system*; but the *parts themselves* are more or less inflamed; and at that time of life, with such a state of the constitution, the inflammation is sufficient to expend all the powers; and at the end of a few days the patient sinks. When a patient, therefore, in the decline of life, has a cold sufficient to make him call in medical assistance, it is necessary carefully to examine the breathing; and to observe whether it is frequent or not. It is also right to listen all over the chest; in order to ascertain whether there is not a pretty considerable degree of bronchitis;—considerable either in *degree* or *extent*; for sometimes it is inconsiderable in degree, but considerable in extent; and that is quite sufficient to hurry the respiration.

Treatment.—This is an unpleasant case to treat; and I have lost many such patients in a winter. They are usually seventy years of age, or older; they have bronchitis; they cannot bear much bleeding; their powers are gone; and it is frequently vain to attempt to relieve them. All we can do is to bleed to two ounces; to bleed locally; to apply blisters; to get the mouth sore; and to give emetics; but we cannot do much with any thing.

Tonics.—When the *sonorous* and *sibilous* rattle degenerates into *mucous* rattle; if this be observed all over the chest; if the patient's powers be gone, and he cannot lift himself in bed without aid,—we may occasionally get him through, by good support, by wine and milk, and (according to the practice of some) by bark; but very frequently, in spite of all that can be done, he will slip through our fingers. It is always provoking to lose a patient; but there is sometimes an especial reason for it; and we lose our credit, because we have not alarmed the family, as we should have done. When old people are attacked with this disease in such an insidious manner, and their strength is all gone, it is very easy to offend the family by saying the patient has "only a cold", when he is all but dead. I have heard some old practitioners say, that these cases should be treated with bark and wine from the very first; and that they invariably cure the patient. One always doubts a man who says he cures *every* complaint, however excellent his plan may be. The powers have been prostrated, from time to time, by some cause or other; but after the first bleeding (with which, perhaps, we cannot go far), and after blistering, and producing a slight affection of the mouth, or nausea and vomiting, it is necessary, in a short time, to support the patient well; and if there be any doubt about the propriety of going on with this strengthening plan, it is better to do so;—giving an emetic every day, so as to clear out the chest, and induce a free secretion; and during

[a] See Pages 117 and 139.

the rest of the day, giving bark or quinina, and good nourishment, or even wine.

Opiates.—In these cases it is necessary to procure rest by means of opiates or narcotics, of various descriptions; but the essential thing is to cure the bronchitis. The bronchitis frequently comes on in an insidious manner, and is accompanied by no constitutional signs; but it is in old people that this particularly happens. We never see it in children, or in the middle period of life; but in those advanced in years we see it every day.

Sometimes called Peripneumonia Notha.—It is this form of the disease that has been called "peripneumonia notha";—as if there were *bastard*, not *real*, peripneumonia; but I believe the word is used very indefinitely. Sydenham applies this expression to common bronchitis; where the head is "ready to split", and where all the symptoms present are such as I described as common to bronchitis.[a] We had better abolish the term "*peripneumonia notha*"; and remember that there is a disease of the air-tubes (that is, bronchitis) that may be *active*,—accompanied by strength; and must be cured by strong measures; and that sometimes it is attended by no strength at all; or, at least, that the strength will all go away in a day or two; and that whatever measures are adopted, must be employed the first few days. I believe the term "*peripneumonia notha*" was supposed, by some, to apply to the latter state only; but if we read Sydenham, we shall find it clear that he applies the term to those cases where there is considerable pain.

SECTION III.—CHRONIC BRONCHITIS.

Bronchitis is very frequently a *chronic* disease. Sometimes, and indeed generally, this is a mere degeneration of the acute form. In some persons, the disease, when it has once begun, however acute it may be, never ceases. At least, they have it every winter afterwards. Subsequent attacks of the disease may not be *active*, but more or less *passive*; and some patients have the affection for two or three years, and then they die. But if we ask many asthmatic people (as they are called),—that is, persons who have passive bronchitis every winter,—they will say that it came on originally after severe inflammation of the lungs, or a very violent cold.

Age at which it Occurs.—It is in the middle aged and the young, that chronic bronchitis is most frequently the consequence of a very acute affection. In *old* people, it generally comes on very slowly; and is the consequence of what is apparently nothing but catarrh;—that is to say, a very slight acute attack of bronchitis, in old persons, degenerates into chronic bronchitis. In old people, too, it comes on very imperceptibly. They will perhaps have a severe cold one winter, and have it for two or three months; and then, the next winter, they will have it still worse; and so they go on, as long as they live;—having it worse and worse every winter.

Commonly called Asthma.—This chronic bronchitis passes, vulgarly, under the name of "asthma"; and even among some medical men (especially those educated a long time ago) the term "*asthma*" is applied to bronchitis. Now asthma is, properly speaking, a pectoral difficulty of breathing. I say "*pectoral*"; for the causes of many difficulties of breath-

[a] See Pages 836 and 837.

ing, are situated in the larynx or in the windpipe. A spasmodic dyspnœa may be situated altogether in the larynx. Asthma, however, is purely pectoral. A spasmodic difficulty of breathing, such as true asthma, is frequently united with inflammation or congestion of the mucous membrane of the bronchia; that is, with chronic bronchitis; because when the mucous membrane is inflamed, it is commonly thrown into spasm; and unless it be removed, the muscles are also thrown into a state of spasm.

Humoral Asthma.—When the two diseases are united, they pass under the name of "humoral asthma";—that is, spasmodic difficulty of breathing, with a great quantity of fluids in the chest. The "humoral asthma", mentioned in old writers, is nothing more than what I have now stated.

Frequently a Cause of Asthma.—Chronic bronchitis is very frequently the cause of asthma. When a part has been frequently inflamed, it becomes excessively irritable, and at length spasm takes place; so that, when a person has chronic bronchitis, it is worse at one place than another,—it is worse at one *season* than at another; and the patient will be seized, all in a moment, with additional difficulty of breathing. We may sometimes have spasm without any inflammation of the bronchial tubes; but a common cause of spasmodic difficulty of breathing, is certainly chronic bronchitis.

Varies in Degree.—This chronic bronchitis, whether united with a spasmodic condition or not, varies in degree; from great congestion of the bronchial membrane, and of the whole lungs, down to a mere gleet,—a mere flux or gleet of the mucous membrane; in which state the mucous membrane may be red, or it may be without the ordinary signs of inflammation. We may have nothing but a mere gleet;—such as occurs in gonorrhœa when it has long gone by; and which, of course, does not deserve the name of inflammation. It appears to me (as I mentioned formerly [a]) that, in the latter case, there is exactly the same state as we see in a serous membrane, where it pours forth a great quantity of fluid, but where no signs of inflammation can be discovered. On the contrary, the parts are whiter than usual, and have the appearance of satin.

Symptoms: Cough.—In all these varieties of chronic bronchitis there is cough. There is also copious expectoration; and the expectoration is of all descriptions;—frothy, ropy, mucous, serous, watery, tenacious, and viscid (like gluten). Sometimes it is short and creamy;—just like pus; and sometimes it is absolutely purulent. These varieties of expectoration frequently exist, at the same time, in different proportions; and sometimes they succeed each other. The expectoration may be sweet and inodorous; or it may be dreadfully fetid; but there is no danger from the latter circumstance. I have seen females with expectoration so fetid, that their sisters could not bear to sleep with them;—so fetid, that they were disagreeable to themselves; and yet no sign of danger whatever presented itself, and the patients did exceedingly well. They were going about without any particular ailment, except that they had a copious expectoration. In colour it will sometimes be bluish, sometimes black; or it may be yellow, green, brown, or reddish. The latter is owing to the admixture of a little blood in it. Then, as to quantity, it may vary from a few ounces to two or three pints, in the twenty-four hours.

Dyspnœa.—The other symptoms vary in intensity. There may be dyspnœa, or there may be none at all. There may be merely cough and expectoration; but that is more particularly the case in what may be called mere "gleet of the mucous membrane." When there is congestion of the lungs, or a spasmodic constriction, we may have difficulty of breathing; and

[a] See Page 112.

in other cases there may be such dyspnœa, that the patient cannot lie down;—such dyspnœa, that it will cause plethora of the head, face, and neck, distension of the jugulars, suffusion of the eyes, and (I might almost say) blackness of the nose and lips, or even of the whole face. In such cases of extreme congestion, the extremities may become cold and blue, and the urine scanty. The pulse may be either full, or small and feeble. In short, there may be all those symptoms which make many believe that hydrothorax has existed;—that, unquestionably, there has been water in the chest. It is in cases of this description that we are told, every day, by those who never employ their ears, that such a patient has water in the chest; and yet, on opening them, we find none at all, or not sufficient to explain the symptoms. I have frequently seen persons with all these severe symptoms; and yet, on opening the chest, there has not been a drop of water found in it; but I have found the lungs so congested with blood, that they would not collapse. On listening with the ear, all this was clear beforehand. Respiration was heard at the lowest part of the chest; whereas, if water had been there, we could not have heard respiration. On whatever side water exists, if the person be upright, there can be no respiration in the situation of the water; and on striking the part there can be no hollow sound;—on the contrary, the noise produced is like that occasioned by striking a solid, fleshy part,—like the thigh. Chronic bronchitis, therefore, may sometimes exist without any congestion of the lungs; or there may be the greatest degree of congestion.

Signs afforded by Auscultation.—This disease is very easily recognised, without auscultation; but the simplicity of the affection can only be determined by the aid of the ear. A person may easily say that another has bronchitis, whether it is acute or chronic; but without the aid of the ear, it is frequently impossible to say whether there is not something worse than bronchitis. Bronchitis may be frequently cured, or so reduced that little may be left; but there may be present another disease of a fatal character; and we may be able to ascertain this only by the ear. In chronic bronchitis, the rattles (before described [a]) may exist, in most, or nearly all parts of the chest; and they will be in different parts on different days. The different rattles may occur on different days;—"sonorous" rattle one day, "sibilous" another, and "mucous" a third.[b] The "mucous" rattle is seldom continuous. It generally arises from the presence of a great quantity of mucus; and if patients clear the lungs well (as they generally do), once or twice a-day, then the rattle ceases. In this, as in the *acute* variety of bronchitis, the respiration may occasionally cease in particular parts. It is by no means so frequently suspended as in the *acute* form of the disease; and some say that it *never* is; but occasionally it is lost; and then, for the most part, we hear it again.

Mistaken for Phthisis.—That form of the disease which is characterized by great expectoration, and that of a character nearly resembling pus, which is attended by a little dyspnœa, but by no signs of congestion, and which is followed by emaciation,—so that people waste, and at last becomes hectic, is continually mistaken for phthisis; while, on the other hand, that form in which there is congestion, is mistaken for hydro-thorax. That species which is so often mistaken for phthisis, and passed by, may (if properly attended to) often be cured. This form, indeed, is better known by the *general* symptoms, than by the *peculiar* symptoms I have just mentioned. It is ascertainable by the ear, and by the absence of other symptoms of phthisis;—just as the congestive form of the disease is known, not only by

[a] See Page 838. [b] See Pages 803 and 804.

passive symptoms, but by the absence of signs of hydro-thorax, or of disease of the heart, and so on. This form of the disease is known by the absence of pectoriloquy; and by other signs, which I shall hereafter mention.

Catarrhus Senilis.—Various names are given to the affection just described. When it occurs in old people, it is called "catarrhus *senilis*." It is a kind of bronchitis, attended with various degrees of congestion, and frequently none; but attended with gleet, and a great discharge; and occurring in old people. It is nothing more than an ordinary affection of a mucous membrane;—that mucous membrane being the bronchial.

Dry Catarrh.[a]—Laennec considers the affection just described to be a particular form of chronic bronchitis;—a form more frequently attended with asthmatic complaints than any other. He says, that what is called "asthmatic spasmodic difficulty of breathing", most frequently arises from a kind of bronchitis in which the secretion is exceedingly viscid; and in which the mucous membrane is thickened and swelled,—particularly in the small branches; so that some of them are nearly blocked up; and in which the secretion is glutinous,—even firmer than pitch; and is disposed to form globules the size of hemp or millet-seeds, semi-transparent, and of a pale grey colour. I have no observations of my own on this subject. I have not been able to verify Laennec's remark; but, as he asserts it, it is worth attending to. Where we find asthma occurring, we ought to suspect that it is not a pure disease, but dependent upon bronchitis; and we ought to ascertain whether the expectoration possesses the characters just enumerated. He says that these globular bodies are seen in the expectorated phlegm; and that occasionally they are less consistent, and grow yellow; and sometimes resemble the vitreous humour of the eye. Such an expectoration is hardly noticed by the patient, in the midst of the common mucus which is secreted from the large branches; and which gives rise to so slight a cough, as not to merit his attention. He says the difficulty of breathing,—the spasmodic ailment, is almost the only thing of which the patient complains.

Here then is a *third* disease, which may be supposed to exist without chronic bronchitis; and which has continually been mistaken. Chronic bronchitis, attended by emaciation, may be mistaken for *phthisis*; where there is great congestion, it may be mistaken for *water in the chest*; but that particular form where there is an exceedingly viscid secretion, with small globular bodies, is (according to Laennec) continually mistaken for pure *asthma*.

Treatment.—The treatment of chronic bronchitis is very various under different circumstances. According as the symptoms are inflammatory, and our patient strong, must our treatment approach to that for the acute disease; and according as the patient is weak, and there are signs of *passive* rather than of *active* inflammation, so must we be careful in lowering the strength.

Cautious Removal of Blood.—In the latter case, where there are signs of *congestion* rather than of *inflammation*, and the powers of the patient are feeble,—we may very easily conceive the great importance of not taking away a drop more blood than is absolutely necessary. Where we see the face black, the body bloated, and the legs swollen, and only a small quan-

[a] The expression "*dry* catarrh" involves a contradiction, if we look to etymology; since the word "*catarrh*" denotes a flux or discharge; but as this phrase has been used by the moderns, I shall employ it (in this place) to designate those inflammations of the bronchia, which are attended with little or no expectoration. — *Laennec, on the Chest; translated by Forbes; Part* 1; *Book* 1; *Chapter* 1; *Section* 5.

tity of urine is formed, it may be necessary to take away a small quantity of blood;—perhaps a little from the jugular vein; or we may cup the patient between the scapulæ, and on the front of the chest; but the loss of more than a few ounces can seldom be borne.

Diuretics.—Diuretics and emetics are of the greatest utility. By diuretics we unload the lungs considerably. There is always a great collection of serous fluid in the air cells and tubes, and by diuretics we produce a great alleviation to the patient. It is a good practice to combine digitalis and squills. We may give many diuretics together, when we cannot increase any one of them. When we cannot give the patient a larger dose of squills, without making him sick, we may add digitalis. It is certainly a very common occurrence to be able to give diuretics together, many of which have a tendency to produce sickness, without producing more sickness by the combination of the whole, than if we gave only one of them. The efficacy of a diuretic is generally thought to be much increased by giving a small quantity of mercury. This is an old remark; and I believe it is a correct one. It is stated, that diuretics act more powerfully on the kidneys, if we give a small quantity of mercury with them, than if the latter be omitted.

Emetics.—Great relief is derived from the exhibition of emetics; and among the best is ipecacuanha. By giving antimony two or three times every day, we debilitate the patient; and this is not a case for diminishing the strength. We only want to unload the air-tubes; but antimony is a very depressing agent; and if given every day for a fortnight or three weeks, it may produce great irritation of the mucous membrane of the stomach (gastrodynia); and therefore I think ipecacuanha is the best. Patients will bear, not merely fifteen or twenty grains, but thirty; and it is a safe medicine. I am told that if given in large quantities, it comes from the stomach, and produces no more effect than a small one. It is of great use to give an emetic every morning, or every other morning, and thus clear out the bronchia; it is an excellent remedy. When acute bronchitis has lasted a considerable time, and we do not deem it proper to evacuate, emetics may be repeated more freely;—especially in the case of children. When the case is not very severe, a nauseating dose of ipecacuanha, squills, and other things of that description, is very useful. Among the best expectorants are those which excite nausea.

Do not Purge.—It is always necessary to attend to the bowels. If we do not, there is still more congestion; but it is very dangerous to purge briskly. In these cases the powers of the patient soon sink; and it is better to trust to emetics and diuretics.

Blisters and Dry Cupping.—It is frequently of very great use to blister the chest; but the employment of tartar-emetic-ointment, is rather a severe and cruel mode; and I have not seen that it is any better than an ordinary blister. Some persons are fond of "dry cupping." There is no loss of blood in that operation; and yet there is a great determination of it from the inner parts.

Narcotics.—Besides remedies of this description, it is frequently necessary to employ others of a soothing nature. Among the best is hyoscyamus, or conium; which may be given night and morning. There is no rule for the dose of these; but we may increase them to a much larger quantity than we begin with. I have seldom found stramonium of much use in lessening the cough. It is not to be compared with hyoscyamus, or conium, or opium. Opium is one of the best things; but, in many of these cases, there is a great disposition to heaviness of the head; and opium has the

inconvenience of confining the bowels; so that though it is a good medicine in the form of Dover's powder, yet it is not so good as hemlock or henbane.

Inhalation of Different Vapours.—We may sooth the air passages much, by making the patient inhale different vapours. Patients may inhale the steam of hot water; but one of the best modes is not to let them inhale the steam, but to have a vessel so contrived that the air they breathe comes through hot water. We cannot charge air with a dose of salts; but there are many things which may be taken up by the air, and which may be inspired in this way: we might make a solution of opium, or of extract of conium, and let the patient breathe through it. I have not much experience of it; but I have put hyoscyamus and conium into water, and have made the patients breathe it; and this has afforded great relief. Some persons have used prussic acid; and they say it has been productive of great relief. Chlorine may be introduced in this way; and I have seen it lessen the irritation. Some persons employ iodine; but it is right not to use more than one drop of the saturated solution of iodine. Some patients will bear three or four drops, but some will not bear more than one; and I have known some people who could not bear one drop, put into three quarters of a pint of water. It is right to begin with the smallest quantity; and never to increase it beyond what is borne without the least irritation. I had a patient in St. Thomas's Hospital, who laboured under chronic bronchitis; and who found great relief from breathing through tanner's liquid. Without taking any medicine, the tanner's liquid diminished his cough, and he became much better. People living in the neighbourhood of tanners' pits, often find their respiration improved.

Tonics.—Where there is no fullness of the chest, but the bronchitis resembles phthisis;—where the patient wastes away, and has a tiresome cough, tonics are of great advantage. Where there is a disposition to dropsy, emetics and diuretics are proper; but where the patient is more or less hectic, and is spitting up a great quantity,—a state which often occurs in young persons,—tonics are of great use; and iron is one of the best. In the first volume of the "Medico-Chirurgical Transactions"[a], there is an interesting case of a lady, supposed to be in a consumption; but by means of three grains of sulphate of iron, taken twice a day, she got well. I have had cases of that description without end;—where persons were supposed to be on the verge of phthisis; but where there was nothing but bronchitis. There were no signs of tubercles; but there was irritation of the mucous membrane;—producing constant tickling in the throat.

SECTION IV.—EFFECTS OF CHRONIC BRONCHITIS.

a. Dilatation of the Air-Tubes.

When chronic bronchitis has existed for a length of time, it is very common for something more than congestion, and a thickening of the mucous membrane, to take place; it is very common for the bronchial tubes to become *dilated*. Sometimes one, sometimes several branches, and occasionally the whole of the branches in one lung, will become so large, that those which naturally should admit only a fine probe, will have a canal equal to that of a common goose-quill, or even sufficient to admit a finger;

[a] Page 13. The case is reported by Dr. Stanger.

and perhaps these dilated branches are seen spreading to others, not nearly so large as themselves. This is the consequence, in some instances, of chronic bronchitis; but whether it is that the particular tubes become hypertrophied, so as to grow to this diameter,—*grow*, in every sense of the word; or whether they become so distended with mucus, that they acquire this increased cavity, I cannot say. It is, however, by no means an uncommon occurrence.

Varieties.—There are two or three varieties of this dilatation. Sometimes we see it throughout the tube; and it may occur in one tube or several; and, not unfrequently, the coats of the tube are hypertrophied and indurated at the same time. Secondly, the tubes are sometimes only enlarged in one spot; and then a mere cavity exists. It is occasionally so large, that it will contain a nut. In a third form, the dilatation will occur at intervals; so that there is a series of small enlargements. The pulmonary texture, on being cut into, appears as if it were swollen with a number of small red tumours; and the whole become filled with a puriform secretion. In this last form, the coats are said to be always thin,—as though the dilatation had arisen merely from mucus; while, in the two first forms that I have mentioned, the coats are generally hypertrophied; and the dilatation appears to be the result of the hypertrophy. Hence it would appear, that this dilatation occurs sometimes from hypertrophy, and sometimes from a mere obstruction by mucus; and the result is that, in two forms of the disease, either the whole length or a part of the tube is dilated;—just as is the case sometimes with the heart; while, in the third form, there is a series like a string of beads; and the coats are exceedingly thin; as though the change of form resulted, not from hypertrophy,—for then the parts would not be thinner,—but from simple distension. In cases of this description some other symptoms arise. The disease is attended with great debility; and the patient is "broken-winded."

Auscultatory Signs.—It may be supposed that such an alteration as this, will give rise to some alteration in the sound of the chest. This is a matter rather of curiosity and of pathology, than of practical importance; but still, if any disease produce any symptom whatever, it is right to know what that symptom is;—whether it will turn to good account or not. We ought to make it a general rule to go straight forward, and make as accurate a diagnosis as possible, whether we can do good or not; because, if it be not of practical application *to-day*, yet it may become so by-and-bye.

When small tubes are dilated, they approach nearer to the natural size of large tubes; and therefore, if there be any difference in the sound of respiration, in the sound of a cough, or in the sound of the voice, in the large branches, it ought to be the same when the small tubes become large ones;—and this is actually the case.

If it so happen that certain tubes are dilated, we then hear, instead of the respiratory murmur before mentioned [a], a sound approaching to that of the bronchia, and even approaching to that of the trachea. This is one of the chief signs of the bronchia being dilated. They may, as I have just said, be dilated to such an extent, as to sound very much like the trachea; but, in general, we have only *bronchial* respiration.

If any of the bronchial tubes be very much dilated, so that *small* tubes attain the size of *large* ones, we have over the former just such a sound as we have over the latter in health. Bronchophony occurs at a part where it should not exist; and if the bronchial tube be dilated enormously,—

[a] See Page 801.

nearly to the size of the trachea, so that it amounts to a cavity,—we have *pectoriloquy*; and pectoriloquy is neither more nor less than the same sound which we always hear, on applying the stethoscope to the larynx. It must be a very extreme dilatation, however, to enable us to hear the voice come through the tube in this way. It is common to have *bronchophony*; but to have *pectoriloquy*, is a rare thing. Indeed, there must be a larger dilatation than I ever met with. Such a dilatation occurs from time to time; but it is so rare that I never met with it. There are drawings of it; and there is no doubt as to the existence of the fact. In dilatation of the bronchial tubes, therefore, there is bronchial respiration and bronchophony; and if the dilatation be very great, there is tracheal respiration, and a tracheal voice. Of course, the nearer the tube is to the surface, the more clear are these sounds.

b. Diminution of the Air-Tubes.

Chronic bronchitis, however, will sometimes induce the very opposite state. Instead of causing the tubes to become *dilated*, it may cause their coats to become thicker; and the canal will thus be *diminished*.

From Effused Lymph.—Sometimes there is lymph effused within; so that the tubes are completely obstructed. When lymph has been effused within, and the tube has been obliterated for the time, it has been called "a bronchial *polypus*." It is nothing more than the same occurrence that takes place in croup;—that is to say, lymph is effused; only not in a tubular form. I once knew a case of gonorrhœa, which filled the urethra with lymph; which lymph was discharged in a tubular form. Where the bronchia have been obstructed by lymph, it has been an instance of chronic inflammation;—at any rate, not of *acute* inflammation. In old books, it is said, that nobody could imagine what was the matter with the patient; and that then such a mass as this has been spit up. In cases of this kind, it is easy to say what would be the auricular symptoms: at the obstructed part there would be no sound of respiration; and as soon as the lymph was spit up, there would be the murmur again.

Contraction of the Sides of the Tube.—But without such a cause of obstruction as this, the tubes are sometimes blocked up. The cavity is obliterated by the sides becoming thickened and contracted; and then, of course, no respiration is heard at the part; and this want of respiratory murmur is permanent. In the case of acute bronchitis, it will cease (from a temporary obstruction of the tube) for a few hours; but coughing removes the obstruction, and we hear the sound of respiration again; but when the obstruction arises from a contraction of the tubes, the want of respiration is permanent.

c. Dilatation of the Air-Cells.

Improperly termed Emphysema.—Chronic bronchitis produces a farther change, precisely of the nature of dilatation, of which I have already spoken. The minute tubes of the bronchia terminate in the air-cells; and it occasionally happens that the air-cells are dilated by this disease. This has been called "*emphysema* of the lungs"; but I think it an improper expression; because by "*emphysema*" we mean the presence of air in the cellular membrane, where there ought to be no air. Now in this case there is no air in the cellular membrane,—no air in any place but where it ought to be; only the part which contains the air is too large,—contains too much.

Appearance of the Cells.—These dilated air-cells attain, in general, only the size of millet-seeds; but here and there one may be seen the size of a hemp-seed, and even as large as a cherry-stone. When they are the size of cherry-stones, it is very probable that many cells are dilated into one common cavity. I should think this was the cause. At the termination of each twig of the bronchia, where it is as fine as a hair, the air-cells are situated all along it,—just like grapes upon a stalk; I think it probable, therefore, that when a bronchial twig is dilated to a great size, the air-cells which separate from it, are dilated into one. Occasionally, those of the greatest magnitude actually project on the surface of the lung; and are so prominent as to present a large globular form externally. Sometimes they are as large as a walnut, and even larger. There is a preparation at St. Thomas's Hospital, where there is a tumour of this description on the snrface of the lung. In extreme cases of this kind, the edges of the lung are quite translucent, and standing away from the body of the lung.

Occasionally attended by Emphysema.—If the quantity of air be very considerable, the sides of the cells may crack; and then a communication is established between them and the cellular membrane; so that true emphysema is superadded. In that case, the tumour upon the surface of the lung may attain a very great size; and the air may, by pressure, be forced about. But notwithstanding that the cells occasionally crack, and that air escapes into the cellular membrane of the lung, still it is found, that it does not move about very extensively;—not so extensively as it does in other parts of the body.

General Appearance of the Lung.—If lungs with dilated air-cells be inflated and then dried, (which, I imagine, is the best way of preserving them,) the dilatation of particular air-cells will be seen, on cutting into them, to be more considerable than appeared externally. When the dilatation is considerable, and at the same time so extensive as to occupy the whole lung, we find, on opening the chest, that instead of collapsing, the lung rebounds, and projects beyond the chest. A lung thus affected, necessarily sinks less in water than a healthy lung; and, on being handled, does not crepitate in the usual way, but gives such a sound as would arise from the slow escape of air; and we cannot empty it so readily as a healthy lung. The tissue of the lung is drier than in health; and even the roots of the lungs have not the usual infiltration found in that part. The lungs resemble those of a reptile, more than those of a man. The lung of a frog has a large receptacle for air,—not the minute cells that we have; and on opening the animal, the lung escapes the boundary of the chest. When only one lung is thus affected, it has been seen to become so much more bulky than the other, as to push aside the mediastinum, if on the *left* side, and to produce an enlargement of the heart, if on the *right* side.

Best Described by Laennec.—Laennec has described this condition of the lungs far more accurately, and far more minutely, than any of his predecessors; but (as may be seen from his engravings) it was well known to Dr. Baillie. Dr. Baillie speaks of an enlargement of the air-cells, causing the lungs to resemble those of amphibious animals.[a] He considers it probable that two or three cells may be broken into one[a]; and therefore, although Laennec has the credit of having first described it, it is right that we should give Dr. Baillie his due. Dr. Baillie also remarks, that Sir John Floyer distinctly describes the disease, as seen by him in a mare; and he considers the remark as applicable to the human subject. "The

[a] "Morbid Anatomy"; Chapter 4; Section 7.

bladders", says Sir John Floyer, "are either broken, and admit the air into the membranous interstices, or else they are over-distended; like a hernia in the peritonæum. This will produce an inflation of the whole substance of the lungs; and that a continual compression of the air and blood-vessels; which will produce a constant asthma." He was aware of this dilated condition of the air-cells; and he describes asthma as occasionally caused by this over-distension.

Causes.—The causes of this over-distension, and rupture of the coats of the air-cells, may be a violent inspiration and retention of the breath;—such as occurs in blowing a wind-instrument. It may be from a mere debility of structure,—a loss of elasticity; but the most common cause is the want of a due expansion of the lungs. Whatever prevents any one part of the lungs from expanding, when the thorax expands;—whether it be a material obstruction of the bronchial ramifications; or a compression of them; or whatever else;—it will occasion those parts which remain dilatable, to keep dilated in a corresponding increased degree, in order to fill up the vacuum which the expansion of the chest occasions. When we inspire, we dilate the chest; and the air rushes down the trachea, and the lungs follow the dilated portions. If there be any part that will not dilate, then (I presume) other parts are over-dilated, to fill up the vacuum; and, in that way, those parts which we distend are *over*-distended, in order to compensate for the want of distension in other parts; and when once over-distended, they are often unable to recover themselves; just as is the case in other parts of the body;—the urinary bladder, for instance. I presume it is on this account, that dilatation of the air-cells is so common in persons labouring under chronic bronchitis;—especially where the membrane is most thickened; and where the secretion, if there be any, is tough and adherent, so as to produce obstruction. Such, at least, is the explanation which presents itself to my mind.

Laennec, however, gives a different explanation. He supposes that the air which passes through the imperfectly obstructed tubes, in chronic bronchitis, cannot easily escape again; but there it remains, imprisoned in the air-cells, by a mechanism somewhat similar to the mechanism of the valves of an air-gun; and the succeeding inspiration introduces a fresh supply; so that the accumulation is very great. I cannot refute this explanation; but the occurrence of the facts upon which I ground *my* explanation, is indisputable; and Laennec, to prove his opinion right, should have shown that the dilated air-cells are those belonging to the tubes in which obstruction exists. That he has not done; and I conceive they are not those in which there is obstruction.

Auscultatory Signs.—The existence of this state of the lungs,—morbid dilatation of the air-cells,—cannot be known without the use of the ear. Dr. Baillie, of course, knew nothing of auscultation. It was not known or practised till after his time. But he says, with great truth,—"When the cells of the lungs are much enlarged in their size, persons have been remarked to be long subject to difficulty of breathing, more especially on motion of the body; but I believe no symptom is at present known, by which this disease may be discriminated from some others incident to the chest."[a] The dyspnœa does not differ from the same symptom in other circumstances. It frequently occurs in paroxysms; and will continue for many years. But the pathognomonic signs are obtained from percussion and auscultation;—not from either alone, but from the union of the two;

[a] "Morbid Anatomy"; Chapter 4; Section "Symptoms."

for if, when the air-cells are greatly dilated, we strike that part of the chest, a sound is heard exactly as in health, and perhaps even clearer; for, owing to there being but little pulmonary substance there, we have a sound more hollow than even in health. This is the first thing which we must expect. Then, by listening to respiration at the part, there is very little murmur audible. Instead of a number of minute cells, with air rustling in them, there are only two or three cells largely dilated; and therefore the air cannot rustle as before; so that we hear very little of the respiratory murmur. The air which is there, scarcely leaves the air-cells;—scarcely passes to and fro. The part is not expanded; and the consequence is, that there is very little motion of the air. But it is to be remembered, that we *do* hear *some* respiratory murmur; and this is the distinction between the presence of air in the pleura, and the presence of air in merely dilated air-cells. If air exist in the pleura, there it remains; and we have more sound than usual; but, on listening, there is no respiratory murmur; for the air is in a state of stagnation. In the case of dilated cells, however, there is a little air driven out, and a little drawn back again; and therefore there is a trifling respiratory murmur. In the one case there is none; but in the other there is some.

It is said that when this affection is extensive, there is another pathognomonic sign; the inspiration is made with a crackling sound;—as if the air were entering, and distending lungs which had been dried, and the cells of which had been universally dilated. The lungs are drier in this state than in health; and when the case is very severe, the inspirations are attended with the sound I have just described;—a sound similar to that produced by blowing into a dry bladder. This has been termed by Laennec "dry crepitous rattle, with large bubbles." It is an odd appellation; but it conveys the idea of dryness, and is therefore a "dry crepitous rattle"; and it gives us the idea of the bursting of bubbles, on the surface of fluid; and therefore Laennec says—"with large bubbles." These are extreme cases. I never witnessed one of them. If we reflect a moment, there is no difficulty in remembering this. When the tubes are dilated, they approach to the size of the bronchia; and the sound must, therefore, be the same in the former as in the latter; and if the air-cells be dilated, it stands to reason that we cannot have the same minute murmur, that we have when the air is passing into a thousand minute cells. It is also evident that we shall have a clear sound there,—just as in health; because there is air there, as before; and if the dilatation be very considerable, we have a clearer sound than before; because there is little else there but air;—little pulmonary substance.

Treatment.—Nothing can be done, either for bronchial tubes or for air-cells that have fallen into this dilated state. The treatment will not vary from that proper for chronic bronchitis. We must treat the case on general principles.

CHAPTER VI.

PNEUMONIA.

HAVING concluded the subject of inflammation of the air-*tubes*, I shall now proceed to inflammation of the air-*cells*. A large number of cases of inflammation of the lungs, are considered to be inflammation of the *substance* of that organ; but they are in fact nothing more than bronchitis. In by far the greater number of instances, it is not inflammation either of the air-cells, or of the cellular membrane; but inflammation of the bronchial tubes. Occasionally, however, we have inflammation (as it would appear) of the air-cells themselves. This, properly speaking, is "peripneumonia."[a] The term "*pneumonia*"[b] is the name given to any inflammation within the chest;—even to inflammation of the heart and pericardium[c]; but the word "*peripneumonia*" is more properly applied to inflammation either of the air-cells, or of the cellular membrane around them;—whichever it may be.[d] For myself, I have no doubt that the inflammation is seated in the air-cells themselves; and it is in this point of view I shall now speak of it.

General Symptoms.—The common, well-known symptoms of this disease,—those which are discernible without the aid of the ear,—are very much like those of bronchitis. There is pyrexia, general feverishness, rapidity of respiration, shallowness of respiration, cough, and expectoration. In bronchitis, I mentioned that there is a sense of constriction in the front of the chest; and a soreness (sometimes pretty considerable) in coughing[e]; whereas in peripneumonia, if there be any thing, there is rather a deep-seated dull pain. This is sometimes confined to one spot; though, for the most part, this dull uneasiness is pretty much diffused; and, indeed, is frequently so very slight, that a diagnosis cannot be universally made from it. Then the dyspnœa, if people lie still, is by many persons scarcely complained of, any more than it is in bronchitis. Some persons labouring under bronchitis, will not allow that they have difficulty of breathing; neither will they in peripneumonia. Just as in bronchitis, there is frequently violent cough; but sometimes there is scarcely any[e];—the cough is infrequent and soft.

Character of the Sputa.—There is, however, according to Laennec, a decided difference with regard to the expectoration. He considers that the expectoration, in peripneumonia, is a pathognomonic distinction; and points out the nature of the disease. He says that when, in this disease, the sputa are received into a flat and open vessel, they unite into so viscid and tenacious a mass, that we may turn the vessel upside down, even when full, without the sputa being detached; for although they may partially hang from the vessel's mouth, the great bulk still sticks to the vessel.

[a] From περι, *about*; and πνευμων, *the lung*.

[b] From πνευμων, *the lung*.

[c] The word is not now used in that sense; and the term "*peripneumonia*" is very much out of fashion.

[d] See Pages 836 and 842.

[e] See Page 836.

Their tenacity is such, he says, that they vibrate like so much jelly; and the tenacity prevents the air-bubbles from breaking, though they are very numerous in this kind of sputa, and sometimes very large. The air does not escape, but forms bubbles; and for the most part, be they small or large, they remain. I cannot confirm or disprove Laennec's assertion, from my own observations; but I think all will allow that we must look beyond the sputa, as well as beyond the general symptoms, for an accurate diagnosis of this disease. For Laennec allows that the sputa are frequently not so viscid; he allows that, frequently, they are of some shade of red or green; though for the most part they are but little coloured; and he allows that, frequently, they are almost destitute of air-bubbles,—frequently a mass of mere mucus or pituitous secretion, with a few glutinous, and slightly tawny portions. I cannot but think, therefore, as he allows all this, that we ought not at all to depend upon the sputa for a diagnosis. Indeed, when the characteristic sputa do occur, as they continually do, it is very often only at the onset of the disease,—only for a few hours; and sometimes even then only in so small a quantity, as scarcely to admit of being collected.

Morbid Appearances.—The pathognomonic signs of this disease, are acquirable by the ear only; but before considering them, it will be necessary to trace the appearances in the lungs after death, and the succession of the changes. This is an opposite course to what we usually adopt. Generally we speak of *post-mortem* appearances *after* we have done with the symptoms; but here it is necessary to reverse the order; for the symptoms are in accordance with the unnatural changes.

First Stage.—In the *first* stage of inflammation of the air-cells, the lung merely suffers an accumulation of blood; so that it becomes more solid and heavier than usual. It looks livid externally, and retains the impression of the fingers;—like an œdematous limb. On cutting into it, it is found to be of a deep blood-colour, and replete with frothy, bloody fluid; but still the lung is spongy;—still it crackles under the fingers. This is a stage in which, after death, we find nothing but an accumulation of blood and serum. As the lung crackles after death,—as it contains air to the very last, we expect to hear the murmur of respiration in these particular parts during life; and that is the case; and as air is admitted, we expect to hear, on percussion, the usual hollow sound of the chest; and that likewise is the case. But the murmur which is heard when the inflammation has only reached the first stage, in that particular part, is accompanied (even from the very first moment of the attack) with a crackling sound. We have not the ordinary murmur of respiration; but it takes place with a *crepitous rattle*, as it is called; or, if we please, a crepitous *respiration*. It gives the idea of numerous minute, and almost dry bubbles; and this dry crackling is heard the more decidedly, the nearer the inflammatory spot seems to be to the surface; and those who have employed their ears frequently, can from practice tell the exact depth of the inflammation, from the loudness of the crackling. The nearer the disease is to the surface, the louder is the crackling.

Second Stage.—When the inflammation has become more intense (so as to constitute the *second* stage), the lungs are heavy; and they become so firm as to resemble liver; and on this account the term "*hepatization*" has been applied to this state; but, in my opinion, very absurdly. The lungs are not changed into liver. If they were, it would be "hepatization"; but if they only remain as *solid* as liver,—something *like* liver, it is an improper word. By "*ossification*", we mean an absolute conversion into

bone; and by "*hepatization*" we ought to mean a conversion into *liver*. If a thing is to be named in this way, because it is only *like* another, strange words might be applied to every thing. Andral proposes another term,—"*solidification*"; which I think better. If the lungs have become solid, "solidification" is a correct term. In this state, where the lung has become solidified, it will not crackle under the finger;—it has evidently become impervious to the air. If we cut it, squeeze it, and scrape it, very little fluid escapes; and what does escape, is not frothy; neither is it so thin as that which escapes in the first stage. I presume that, in these cases, there is more or less fibrin effused or deposited; and that is the explanation of the solidity;—the want of air, and the want of frothy fluid. When the lung has fallen into this condition, we may presume what the symptoms are. On striking that part of the chest where the lung has become solid, of course we cannot have a hollow sound. There is no air there, as there usually is. There is no room for it; but there is a solid mass; and, on striking over it, we have the same dead sound as if we struck over the liver. On listening to the part, as it contains no air, of course there is no respiratory murmur; and, there being no murmur, there is no respiration; so that we cannot hear the crepitous rattle. In the *first* stage we have crepitous rattle, because there is a thin fluid in the air-cells; but here there is *no* thin fluid in the cells;—they are all solidified; and therefore there is no crepitous respiration. If, however, the part happen to be situated near a large bronchial tube, we hear the patient's voice there;—on account of solids being better conductors of sound, than aëriform bodies.

Third Stage.—Before death, however, a still further change will take place. Inflammation of the lungs tends to suppuration; and, at an advanced period, a *third* stage occurs. But there is a peculiarity in suppuration of the lungs;—the pus is *diffused*, and not collected into an *abscess*. After the second stage, when the third begins, the lung is as hard as before; but it becomes yellowish, or of a straw-colour. When the pus is first formed, in small quantity, there is quite sufficient to change the colour of the lung; but after a little time the pus is more abundant, the lung becomes soft, and will yield to the point of the finger. In this stage, just as in the second, there is no hollow sound on striking the chest; neither is there any respiratory murmur; but a loud mucous rattle;—that rattle which we may have an idea of, by recollecting the sound occasioned by air passing through soap-suds. The mucous rattle is heard in the bronchia; either from some of the pus going into them, or a secretion from their own membranes.

Abscess of the Lung.—Should an abscess be formed, however,—should the pus be collected into a mass, a characteristic symptom will be heard; such as I shall mention under the head of "phthisis." But such an occurrence is extremely rare. I do not recollect above twice seeing an abscess in the lungs, great or small, resulting from inflammation; and when I did see abscesses, they were small and full; and just as likely to be the result of a few distinct tubercles, which had existed in the lungs previously to the inflammation, as of inflammation itself. Some persons will have an old tubercle or two formed in the lungs, without inflammation. That is what we see continually. These tubercles may suppurate, and an abscess be formed; and if the lung fall into a state of inflammation, the solitary abscess may be ascribed to inflammation. When abscesses do occur in the lung, I am satisfied that Laennec is right in asserting, that they are almost always occasioned by the softening of tubercular deposition,—the softening of scrofulous deposit. "Among several hundred dissections of peripneumonic subjects," says Laennec, "I have not met with a collection

of pus in an inflamed lung, more than five or six times. These were not of large extent; nor were they numerous in the same lung." Even Broussais, to whom Laennec was in many points indebted, declares that he never saw ulceration in the lungs, without tubercles, more than once; and then the inflammation resulted from a musket-ball, which was tantamount to a tubercle. The reason assigned by Laennec for the rarity of an abscess in the lungs is, that the disease is either cured by art, or destroys life before it proceeds to the length of destroying the pulmonary tissue;—that death takes place before the disease advances so far, as for matter to be formed in the lung, in the form of an abscess.

Those cases of inflammation of the lungs which end in the existence of abscess, are marked by the same auscultatory phenomena, as occur when there is a phthisical excavation. We hear the sound come through the tube; and when the patient breathes, there is the sound of a cavity; and there is a metallic tinkling;—as if a bell were struck with the point of a pin, or something very fine.

Its Progress.—This disease is frequently fatal when it is not of great extent; and when it has not passed the first of the three stages to which I have alluded. The first and second of these stages, are frequently seen in different parts of the same lung; and so may even the third stage. We observe one stage going into another.

Usual Seat of the Disease.—It is very remarkable that, in the greater number of instances, the inflammation commences at the lower part of the organ; and it may not extend higher. Consequently when the disease has advanced, it is in the lower part of the lung that the second or third stage is generally found; while higher up, the disease may be only in the first stage, or entirely absent. The right lung, it has been asserted, is more frequently affected than the left. Of that I cannot speak; but I can speak to the fact of inflammation beginning at the lower part of the organ, in an infinitely greater number of instances than higher up. There can be no doubt that the membrane of the air-cells, and not the surrounding cellular tissue, is the seat of the disease. In the second stage of the disease,—when the lung is solidified, but still red,—if the structure be cut or torn, instead of the natural appearance of the cells, the inflamed part has minute granules, round or oval;—corresponding exactly with the appearance which the air-cells would give, if filled with a tenacious fluid, and solidified. Indeed, Louis found that, by forcing fluid into the bronchia, the same granular appearance might be produced by art; and therefore this granular appearance clearly arises from the air-cells being filled with the same tenacious fluid. The crepitous or crackling rattle also, I think, shews the same thing; for it is heard in another affection, in which this thick fluid evidently exists in the air-cells. In hæmoptysis, when bleeding takes place in the air-cells, the same sound is heard as in peripneumonia. In hæmoptysis, this must arise from little bubbles snapping and cracking through this fluid; and as precisely the same sound is heard in peripneumonia, I think it is a strong argument to prove that the air-cells are affected by the disease; more especially when we see that a certain peculiar fluid is spit up in the affection.

Progress of Amendment.—If, by art, the disease be remedied,—if the inflammation yield, of course the lung goes through the same stages as before, but inversely. The third stage comes to the second, and the second to the first; and it is found that the signs audibly noticed by the ear, go through the very same inverted course. The auscultatory phenomena heard in the second stage disappear; and those which occurred in

the first stage are heard again. Nothing is more interesting, certainly, than to trace the reversed order of the changes here. Suppose the disease has only gone into the first stage, we hear the hollow sound on striking as in health; and, on listening, we hear a crepitous rattle, and even a crackling. But while the patient is being cured, the crepitous rattle declines;—it becomes fainter and fainter every day; and, instead of that, we have the natural murmur of respiration more and more distinct. Suppose the second stage has been reached, and we are successful;—in that case the want of a hollow sound, on striking the chest, gives way; and we hear, by degrees, a little hollowness of sound, which increases more and more every day; till that side of the chest sounds as hollow as the other. The respiration had ceased from the lungs having become solid; but we hear a little crepitous rattle, increasing every day, till it is heard as distinctly as in the first stage; and then, having arrived at the first stage, the disease passes through that entirely. The crepitous rattle declines; and the natural respiratory murmur becomes more and more distinct. I mentioned that, in the third stage, we still have no hollow sound; but we have a mucous rattle, generally from the entrance of pus into the bronchial tubes.[a] This declines by degrees, if the patient get better; and then we gradually hear a crepitous rattle, from the cells losing a part of their viscid contents; so that they again admit a portion of air. The chest then regains its hollow sound on striking; and, at last, the crepitous rattle declines.

Anatomical examination shows the changes of the part to be precisely correspondent with these auscultatory phenomena. When the first stage is recovered from, the lung is found to grow less red,—less turgid. Supposing the patient dies from intense inflammation of one part of the lungs, there is a lower degree in another part; and we find that is only in the first stage; but we are still able to make our observations there. Perhaps we have cured the inflammation at that one spot; respiration is heard there more and more; while in another part it is heard less and less. But the patient dies; and, by examining different parts of the lungs after death, and having listened to them through life, we are able to trace the changes.

When the inflammation of the third stage is being recovered from, the lungs become less turgid; and when the second stage is being recovered from, and the lung is going back to the first, the colour also becomes less intense; the texture becomes softer; the weight decreases; the organ, on comparison, affords more fluid; and the fluid becomes more and more of a frothy character. In the second stage, as I mentioned [b], there is a considerable granular appearance; which declines in the third, and the vesicular character of the lung returns. When the third stage is recovered from, the yellow colour becomes lighter and lighter; the pus becomes more aqueous, less thick, and at length frothy; the accumulations of pus are reduced to mere specks; the vesicular appearance returns; the lung crepitates, and at length grows natural; and the little serous infiltration that existed is absorbed.

Importance of the Auscultatory Signs.—Notwithstanding that cases of peripneumonia are every day recognised, and the amendment or exasperation of the disease ascertained, by practitioners who never employ their ears (as though nature had given us ears to be used on every occasion, except when we are practising our profession); yet the observation of the auscultatory signs, in the three stages of peripneumonia, is sometimes more than a phi-

[a] See Page 855.

[b] See Page 856.

losophical observation,—more than an intellectual gratification. Many cases of inflammation of the lungs, I know, have been overlooked in the midst of other diseases; or have been totally mistaken. It is vain for those who obstinately refuse to avail themselves of the means given us by nature (in the sense of hearing) for learning the phenomena of disease,—it is vain for them to assert, that they can form an accurate diagnosis on all occasions; for these persons are perpetually lamenting, that medical evidence is uncertain; and, to my certain knowledge, they do frequently mistake diseases of the lungs for diseases of the heart, and diseases of the heart for diseases of the lungs. In the affection before us (peripneumonia), if it suddenly supervene during a chronic affection of the chest, they continually ascribe the symptoms to effusion, to pleuritis, to dropsy of the chest, or to something else;—having no idea whatever of the real disease. In phthisis, an aggravation of the dyspnœa, unattended by pain, is very common; and is ascribed to effusion into the chest, or the bronchia, or the substance of the lungs; and, in chronic bronchitis, such an aggravation is ascribed to an attack of spasmodic asthma; when the simple trouble of listening to the lungs would show crepitous rattle, and prove that the difficulty of breathing arises from the presence of peripneumonia. In various fevers (eruptive and simple), in simple dyspnœa (without pain), during an attack of rheumatism or of gout, peripneumonia is continually overlooked; and some surgeons have stated, that after severe wounds and operations, peripneumonia will occur in the most insidious manner; and will not be discovered till all possibility of remedy is over. Surgeons have lost patients under operations, after having suffered severe accidents, without knowing why; and, after death, they have discovered that the lungs were inflamed. This is a fact that is mentioned in many surgical books. All this mischief will be prevented by examining the chest with the ear, in every instance of dyspnœa whatever;—where there may be no pectoral symptoms at all;—no signs of any morbid affection of the chest; but where pectoral complaints are likely to supervene. This may be avoided by examining the chest, from time to time;—exactly as we feel it to be our duty, on other occasions, to ascertain not only the state of affected parts, but the state of the head, and of the abdomen.

Causes.—The *causes* of this disease are those of any other inflammation. I did not mention the causes of bronchitis; because in both diseases they are the same. Cold is a common cause; and so are vicissitudes of temperature;—cold and heat, applied in the way which I mentioned when speaking of inflammation.[a] Both bronchitis and peripneumonia supervene on the other affections of the chest. Nothing is more common, than to see bronchitis and peripneumonia united with diseases of the heart and pericardium; and so nothing is more common, in diseases of the lungs, than to see these affections. In phthisis we have bronchitis (acute and chronic) and peripneumonia; and so in every other disease of the chest. Inflammation is frequently idiopathic,—arising from a common cause; but sometimes it is symptomatic;—being the mere result of another disease in the neighbourhood.

Treatment.—On the treatment of the disease, I shall not dwell. It is only the treatment of any inflammation. Patients have sometimes borne the loss of an immense quantity of blood:—perhaps more in this disease than in most others. It is in this affection that those enormous bleedings, which I mentioned when speaking of inflammation in general[b], but of which

[a] See Page 119. [b] See Page 130.

I have no experience, are reported to have taken place;—a few gallons in the course of a few days. Mercury is of the same use in this affection as in bronchitis; and in bronchitis as in other inflammatory diseases.

[The indications of treatment in pneumonia, vary according to its stages. In the first stage, the chief object is to remove the inflammatory irritation and congestion from the pulmonary vessels; in the second the indication is to promote the removal of the interstitial effusion,—the product of the inflammation: even in this stage, when the strength fails, and more particularly in the third stage, it is necessary (as far as possible) to support the functions which are oppressed by the extent of the organic lesion induced. Particular symptoms may also give occasion to other indications in every stage.[a]]

[a] "Library of Medicine"; Volume 3; Page 148.

CHAPTER VII.

GANGRENE OF THE LUNGS.

Seldom the Result of Inflammation.—We might suppose that if the lungs ever became gangrenous, it would be the result of inflammation; as gangrene so frequently is in other parts of the body.[a] But I believe that the severest inflammation of the lungs seldom, if ever, induces mortification. Sometimes it may be the case; but it is so rare that I have never seen it. The lungs will fall into a gangrenous state, and there is more or less inflammation attending it; but the gangrene does not appear to be the *result* of the inflammation. On the contrary, indeed, when nature makes an attempt to get rid of a gangrenous spot, inflammation is induced all around, in order to discharge it;—so that inflammation is sometimes the result of gangrene.

Cases.—In my own practice I have only seen two cases of this disease. They were of a different kind; and completely illustrated what Laennec has advanced on the subject. On some points Laennec has brought our knowledge to perfection. In some cases nothing has been done since his time; and perhaps nothing *will* be done. In one of these cases, in my own practice, the gangrenous part was uncircumscribed. A large part of the lung was of an unnatural colour;—dark greenish, moist, and soft; and in some spots it was a mere putrid pulp;—little more than so much mud; and of an insupportable odour. In those parts of the lung which I saw, that were not in a gangrenous state, the organ was firm, and of a chocolate-colour, or a deep green. These appeared to be the three stages of the complaint. There was one part a chocolate-colour, or deep green, and quite firm; another part was moist and soft, and of a dark green; and the third part formed a perfectly putrid, soft, muddy mass. A large portion of each lung was in this condition;—in one of the three stages of this affection. In another case which I had, the gangrene was in more circumscribed patches or spots. There were patches of the lung, black, soft, moist, and offensive in the worst spots; and in other parts, where the lung was still firm, it was of a green hue.

No attempt, in this latter case of mine, had been made by nature to effect separation; but Laennec mentions that a gangrenous piece sometimes detaches itself, or is detached, from the surrounding parts;—just like a slough from caustic. That is an apt illustration of the appearance; because although the patches in my case were not separated, yet, if they had been, such would have been the state. The gangrenous part becomes dry and shrivelled;—just like a spot to which caustic has been applied; or it degenerates into a putrid paste, like mud. The surrounding structure is inflamed; as in other parts of the body when nature attempts a separation. When a dead part separates from the living by inflammation, the latter ends in ulceration[b]; so that the dead part is left without any connexion with

[a] See Pages 104 and 105.

[b] See Page 105 and 106.

the living. The living part disconnects itself; the dead part becomes isolated; and is afterwards separated. If nature succeed, as she does sometimes, a cavity is often found where the gangrene existed; and this cavity has a lining membrane. Sometimes no cavity is left, but a cicatrix is formed; and the whole appears to have grown up together. This appearance has been perfectly well described by Laennec, and by others. In some instances, the separated portion makes its way into the pleura, and pleuritis is induced; and pleurisy, with effusion and pneumathorax, are the consequences.

Symptoms.—In my two cases[a], the disease was marked by a sudden prostration of strength; a cadaverous alteration of the face; great feebleness of pulse; and an intolerable fœtor of the breath and sputa. One of these cases occurred in a man, who had long suffered from a loud hollow cough, with a copious frothy expectoration. The other occurred in a woman, who laboured under an encysted tumour of the pancreas. In her case a slight cough came on, which attracted no attention; and at last symptoms of gangrene appeared. These general signs will point out the disease, I imagine, much more than auscultation; but it is evident, that the gangrenous part must have less respiratory murmur than natural, that the part around will afford crepitous rattle, and that the cavity will give rise to pectoriloquy. If inflammation be set up for the removal of the slough,—causing the bronchial tubes to be affected,—there will be a "metallic tinkling"; but I imagine that far better evidence than this will be derived from the aspect of the patient;—from the cadaverous look, and the great debility; together with the intolerable stench both of the breath and the sputa.

Diagnosis.—When a part has become gangrenous, there is no hollow sound on striking the chest, and no respiratory murmur; but their absence may arise from numerous causes; and if any inflammation be set up around the dead part, to effect its separation, there will be a crepitous rattle; but no one could tell that this resulted from gangrene, rather than from some other cause. There are, however, certain signs observable by the other senses, which alone would make us believe there was gangrene; and these, together with the stethoscopic signs, make it tolerably certain. Sometimes the sputa, in this disease, are white and opaque at first; but they grow sanious, purulent, brown, and greenish; and they are, from the first, nearly as fetid as when the fœtor becomes gangrenous. This fetid odour of the sputa, however, cannot be much depended upon; nor can the fœtor of the breath. I have seen other diseases attended with extreme fœtor, but without gangrene; and I have seen extreme fœtor of the breath and sputa, without any danger whatever. Sometimes, in bronchitis, the fœtor both of the breath and sputa will be extreme. I mentioned having seen females, who were in tolerably good health, except that they spit up a little; and this expectoration was horribly offensive;—so that to stand near them was extremely unpleasant; yet they were walking about, and looking well.[b] I saw a case of this fœtor of the sputa, and smelling of the breath, in a person who died of phthisis. Occasionally the matter formed in phthisis is of such a quality, that the fœtor is much like that of the fæces. There is no danger *necessarily* from the extreme fœtor of the sputa, neither is there necessarily gangrene; but if, conjoined with this, we observe that the sputa are bloody, brownish, or greenish,—something like the discharge from a sloughing part; and when we observe any thing like little green fragments of lymph, together with a weak pulse, an elongated countenance, and a

[a] See Page 860.

[b] See Page 843.

cadaverous aspect; and when the patient is in the same state as people who are sinking from mortification in any other part;—then there can be no doubt of the nature of the disease. But the mere putrid smell of the breath, and of the sputa, certainly ought not to make us conclude that the patient must have gangrene of the lung; or, indeed, be in any danger. In the two cases of this disease which I had under my care[a], the persons became, in a few days, very much emaciated. The pulse suddenly fell, the temperature declined, and the countenance expressed the most extreme exhaustion; but, at the same time, I must honestly confess, that I had no idea, in either case, of gangrene of the lungs; and was much struck with the appearance after death; I could then compare it with the symptoms I observed during life. They were hospital-patients; and it was only when opening them, that I discovered the disease. I smelt something very horrible when near them; but I ascribed it to another cause.

Not necessarily Fatal.—When gangrene does exist in the lungs, it is not necessarily fatal. There have been clear cases of gangrene of the lungs, which have been recovered from; though all the symptoms I have mentioned occurred. Nature is sometimes sufficient, when supported by good nourishment, to get an individual through an affection of this description; and to cause a separation of the gangrenous part.

Treatment.—There is nothing peculiar in the treatment. We must support the strength of the patient, as in other cases where there is an absence of inflammation, and the presence of extreme debility.

[a] See Page 860.

CHAPTER VIII.

HÆMOPTYSIS.

THERE is another disease of the substance of the lungs, and of the membrane of the air-cells; which, after death, presents very much the appearance of inflammation; and, before the time of Laennec, was frequently (no doubt) mistaken for inflammation. This disease consists in the effusion of blood into the air-cells. I shall now, therefore, proceed to the description of hæmorrhage from the air-passages;—*hæmoptysis*.[a] This will be in conformity with the plan I have hitherto pursued; namely, that of treating first of inflammation, and then of certain other affections; among which is hæmorrhage.

SECTION I.—HÆMORRHAGE FROM THE AIR-PASSAGES.

General Characters.—This hæmorrhage may proceed from the mucous membrane of the air-*passages*, or from the air-*cells*. In the one instance, it is not necessarily a dangerous disease; in the other it is highly dangerous, inasmuch as far as it is likely to be very profuse. The greater number of cases of hæmorrhage from the air-*passages*, arise simply from an effusion of blood from the mucous membrane of the bronchial tubes. The blood which is spit up is florid,—generally of a bright scarlet colour; and it is frothy. It is spit up with a tickling in the throat; the pulse is quick; and there is heat in the chest. This is the description of hæmorrhage, which takes place most frequently in young adults; between the age of puberty, and the full adult period of five-and-thirty. It occurs, particularly, in that period during which the chest expands,—in which we "spread", as they say. The first part of life is disposed to hæmorrhage from the *nostrils*; the second to hæmorrhage from the *lungs*; and the third to hæmorrhage from the *abdomen*.

Diagnosis.—The disease, in general, is easily made out. The only difficulty is to distinguish between it and hæmorrhage from the stomach; but the latter is usually marked by a discharge of *black* blood. The blood is either discharged from the veins of the stomach; or it lies in the stomach so long after its escape from the vessels, that it acquires a venous hue. From the one cause or from the other, blood, when discharged upwards from the stomach, is generally black; and has also generally lain there long enough to be coagulated;—it is in clots, larger or smaller. Frequently, too, it passes through the pylorus, and is seen in the fæces. Besides that, it frequently comes up with the food,—with the contents of the stomach; and, when it does not, still it comes up with sickness and nausea,

[a] From *αιμα*, *blood*, and *πτυω*, *to spit*.

if not with downright vomiting. We know that people may have a discharge from the stomach without vomiting: sometimes a quantity of fluid comes to the mouth, and even portions of food come up without vomiting; and so it is with the blood. Occasionally, however, it comes up with decided vomiting. There is frequently a great uneasiness about the præcordia, and a fulness about the liver and stomach. These symptoms are all absent in hæmorrhage from the lungs. The blood, too, is florid; and, instead of being mixed with food, it is frothy; and is necessarily mixed with air, in consequence of the parts from which it comes. These parts will not allow it to stay so long as the stomach; and it generally comes up as soon as it is poured into the passages; and therefore it is seldom coagulated. Occasionally, however, there is a little coagulum; for it will sometimes lie sufficiently long to become solid and black, before it comes up. In addition to this, we have pectoral symptoms in hæmoptysis; instead of nausea and vomiting, we have a "stitch" in the side, a little cough, and a tickling in the throat. On listening to the chest, when the blood is in the air-passages, we hear sibilous and sonorous rattles.

Causes.—This species of hæmorrhage occurs more particularly in those persons disposed to consumption; with a fine soft skin, soft hair, and a sanguineous temperament; and, among these, it occurs more particularly in those who have a florid colour. The disease sometimes occurs in those who have evident signs of inflammation; sometimes it occurs where there is hardly any thing particular to be perceived about the individual; and sometimes it occurs in those, in whom there appears to be great strength of system. It is produced by all the causes of inflammation.[a] A blow on the chest, or catching cold, will give rise to it; but it very often takes place without any observable exciting cause. Violent exercise, and excitement of mind or body in any way, will occasionally produce it; but sometimes it occurs without any apparent cause.

Duration and Effects.—It will return at certain periods,—at intervals of a month or a twelvemonth; and at last it will cease altogether; and the patient will then become the subject of consumption. It is very common for consumption to take place in patients who have had several attacks of hæmoptysis; but this is not a necessary occurrence. I know many persons who expectorated blood, fifteen or twenty years ago, and who are now quite well. If a person spit blood, he should avoid every thing which causes an irritation of the chest; but he ought not to condemn himself; for I have known persons spit a considerable quantity, again and again, and yet afterwards do perfectly well.

Morbid Appearances.—When these patients die, we find nothing unusual on examination. If we examine a person who has died of phthisis, and who expectorated blood before there were marks of phthisis, there will be found nothing to account for the hæmorrhage. It is a mere effusion from the mucous membrane; which will pour out blood without a rupture of the large vessels. Small ones will sometimes throw out a gush of blood. When treating of hæmorrhage in general, I mentioned that we sometimes open persons who have died of hæmorrhage from the stomach and intestines, without being able to find a vessel ruptured. It was clearly an effusion from a thousand minute orifices.[b]

[a] See Page 117.

[b] See Page 148.

SECTION II.—HÆMORRHAGE FROM THE AIR-CELLS.

Sometimes, however, hæmorrhage from the lungs is not of this description. It does not take place from the mucous membrane; but it is a particular disease, occurring in the air-*cells*; and in that case the hæmorrhage is generally very profuse;—far more so than in other cases.

Morbid Appearances.—On examining patients after death, (for they frequently die of the disease in this form,) we find that certain parts of the lung have become exceedingly hard; and, if they be near the surface, the lung is seen through the pleura looking very dark. The lung appears variegated; and there are large black patches here and there. If they be deep in the substance of the lung, we cannot discover their extent; but on taking hold of the lung, hard patches are felt;—some as large as nuts, and some as large as walnuts. On cutting into them, we find they are of a deep-red colour; and no doubt, in former times, they have been mistaken for so many large circumscribed inflammations. These parts of the lung may be from one to four cubic inches in extent, and even much larger; and the redness is a deep damask-hue. Nay, it is sometimes so intense as to be black;—as dark as a black clot of blood. This portion of the lung is not only hard but heavy; and it will not crackle under the finger.

On cutting a portion of the lung in this condition, we observe the same granular appearance which, I stated, takes place in inflammation of the substance of the lungs.[a] This granular appearance, before the part is completely solidified, no doubt arises from blood being effused into the air-cells, and there coagulating. The blood coagulates in each air-cell; the minute coagulum of each cell becomes a little grain, and furnishes this granular appearance. The diseased parts are usually quite circumscribed; so that the surrounding portion of the lung is in every respect healthy. In inflammation of the substance of the lung, the diseased appearance is gradually lost in the healthy lung; but in this disease, in almost every instance, the affection is entirely circumscribed; so that within a hair's breadth of it (I might almost say) the lung is perfectly healthy. The case is really one of severe ecchymosis; only that the blood is effused, not into the cellular membrane, (as it is in ecchymosis of the surface of the body,) but into the air-cells. That the blood is effused into the air-cells, and not into the cellular membrane of the lungs, is proved by the blood being spit up. If the blood were not in the air-cells, but in the cellular membrane, it could not be expectorated.

Symptoms.—The great symptom of this affection, during life, is spitting of blood. Besides the symptom of repeated and copious hæmorrhage, there is cough, difficulty of breathing, heat in the front of the chest, flushing in the face, and at length great paleness of it. There is also a tickling sensation in the bronchia;—just as when hæmorrhage comes from the air-passages.[b] We cannot tell whether the blood comes from the mucous membrane, or from the air-cells, by any of the *general* symptoms; but when it is effused in very large quantity, there is a *probability* that it comes from the air-cells. It is said that as much as ten pints of blood have been discharged from the lungs, in this way, in forty-eight hours; and Laennec says that he has seen thirty pints thus spit up in fifteen days.

Pulmonary Apoplexy.—The disease may exist in so slight a manner, that no external hæmorrhage takes place. I have known this state of the

[a] See Page 856. [b] See Page 864.

lungs to occur, without any spitting of blood. The blood has been effused into the air-cells, coagulated there, and produced the hard lumps I have described; and, not having been followed by subsequent attacks, no blood has been expectorated. Old persons, who were never known to have spit up blood, have died from other diseases; and this appearance has been found in their lungs. As this lesion evidently results from sanguineous exhalation into the air-cells, and perfectly resembles the cerebral sanguineous exhalations which produce apoplexy, Laennec has named it "pulmonary apoplexy."

I think all will agree with me, that this is an exceedingly absurd name. So far as there is great local congestion of blood and effusion, the phenomena are the same as are observed occasionally in apoplexy. But apoplexy is not a state of parts. It is a loss of sense and motion; occurring, for the most part, suddenly. Apoplexy is a stroke that causes persons to fall down senseless and motionless. In the words of Cullen,—"Motus voluntarii fere omnes imminuti; cum sopore, plus minus profundo; superstite motu cordis et arteriarum."[a] That is what we mean by "apoplexy." If a person be said to have apoplexy, and we ask the individual how he knows it, the answer is,—"He has lost all sensation and power of motion. There he lies in an insensible state; and we cannot rouse him." Apoplexy does not consist in the morbid state of the brain; but in the symptoms which we observe; and those symptoms will take place from depression of bone, or from an effusion of fluid. Any thing which compresses the brain will produce, not congestion of blood, but a loss of sense and motion. Nothing of this kind, however, occurs here. There is no loss of sense or motion in this disease; and therefore it cannot be apoplexy. Merely because apoplectic symptoms arise from a congestion of blood in the brain, or from hæmorrhage into it, Laennec has thought proper to call this state of the lung "apoplexy." Apoplexy will frequently arise from a secretion of *pus* pressing upon the brain, or from a secretion of mere *serum*;—without any congestion,—without any fulness of the vessels. This is the case when part of a vessel becomes ossified; so that it splits across, and allows the blood to escape into the brain. Thus we may have hæmorrhage without apoplexy; and we may have apoplexy without congestion, and without hæmorrhage. I cannot but think, therefore, that it is an extreme abuse of terms, and likely to cause great confusion, to call this disease "apoplexy of the lungs"; for there is no resemblance whatever between it and apoplexy,—properly so denominated.

History of the Disease.—It is not long that this disease has been known. Dr. Forbes, in his translation of Laennec, mentions (in a note) that, "in 1816, M. Léveillé appears to have read a memoir on this subject before the Academy of Sciences at Paris; and, in 1817, Dr. Hohnbaum, of Hildburghausen, published three cases of sudden and fatal effusion into the substance of the lungs."[b] He says, the lungs were found distended with dark-coloured blood, partly coagulated and partly fluid; and were almost too large for the chest. In one case, the same kind of blood was found in the bronchia; and in the other in the pleuræ. The cases appeared to be

[a] "The voluntary motions almost all diminished; with stupor, more or less profound; the motion of the heart and arteries remaining."—"*Synopsis Nosologiæ Methodicæ*"; *Classis* 2 ("*Neuroses*"); *Ordo* 1 ("*Comata*"); *Genus* 41 ("*Apoplexia*"). See Note (a) to Page 25.

[b] "A Treatise on the Diseases of the Chest, and on Mediate Auscultation; by R. T. H. Laennec, M.D. Translated by John Forbes, M.D." Part 1; Book 2; Chapter 5. (Third Edition; Page 192.)

nothing more than a laceration of the blood-vessels; and the patients appeared to die from the effects partly of internal hæmorrhage, and partly of oppression of the lungs, induced by the effusion of blood. They died of syncope and asphyxia. From the suddenness with which it occurred, and its appearing to arise from a laceration of the vessels of the lung, producing congestion, Dr. Hohnbaum gave the name of "pulmonary apoplexy" to this particular case. But we must consider, that neither sudden death nor effusion constitutes apoplexy; for apoplexy is nothing more than a loss of sense and motion. In apoplexy the motion of the heart may continue; but volition has ceased, partially or entirely. There can be no doubt, however, that Laennec was the first *on the Continent* who gave a full and accurate account of the disease; which he did in 1819. The disease was really not understood fully, till Laennec wrote upon it at that time; and he then pointed out the common connexion of this particular state of the parts, with profuse hæmoptysis. Yet it is singular, (and I may be excused for mentioning it, since there was no merit in it,) that I myself published an account of this affection, and gave the symptoms during life, and the appearances after death, some two or three years before that.

Case.—The case (which will shew the course of the disease very well) was that of J. G., aged 35, by business a gardener;—a mild and extremely steady man. He had laboured for two years under dyspnœa, pyrexia, cough, pain of the chest, and bloody expectoration. At length, profuse hæmoptysis came on. Various remedies were prescribed, but in vain; and he ultimately died exhausted. On opening the body, the surface of the lungs presented numerous hard, circumscribed, very dark patches, of various sizes,—from that of a sixpence to the size of a crown. A person not of the profession, would have supposed them so many mortifications. Blood, however, when accumulated in the small vessels, often causes (as Dr. Baillie has pointed out [a]) a counterfeit appearance of mortification in the stomach and intestines, and in many other parts. Such was the nature of these patches. On cutting perpendicularly through them, the hardness and dark colour were found extending into the substance of the lungs (an inch or less); in a form equally circumscribed as on the surface. The intervening spaces were perfectly healthy. This Laennec also remarked. Nearly the whole of the inferior lobe of the right lung had undergone the same change as the circumscribed portions in the other lobes. This change consisted in a prodigious congestion of blood, which could not be squeezed out, and which gave the dark colour and hardness. The slices were quite diaphanous; and of a beautiful red colour. No other change,—no disorganization, was in any part discernible. It seemed as if the most minute vessels in various parts, had become dilated, as in nævi materni; and had thus allowed the escape of the blood. Had the symptoms been those of acute inflammation, and the blackness not been in detached portions, there would have been nothing singular; nor would there, had the disease been simply chronic inflammation;—indicated by a frequent pain at the anterior and lower part of the chest, always yielding to blisters, and a large quantity of bloody fluid found in the cavities of both pleuræ after death. But it is surprising that this should occur in patches; and should have induced no suppuration,—no disorganization; but merely hæmoptysis and pain.

There was no great discovery here. I opened the man; the appearances were provided for me; and I described them. I pride myself on

[a] In his "Morbid Anatomy"; Chapter 8; Section 1.

one thing;—that I did not call it "apoplexy of the lungs." I gave it no name.[a]

Signs afforded by Auscultation.—The employment of the ear, in addition to the general symptoms, may be useful in this disease. It is always desirable, when a person spits blood, to know how much disease exists in the lungs; and it is desirable to know whether the blood comes from the bronchial membrane, or is the consequence of such a state of the air-cells as we have noticed[b]; because the latter form of hæmoptysis is far less manageable than the former. In this kind of hæmoptysis (called "pulmonary apoplexy"), when only a little effusion has taken place, there is a crepitous rattle; but in hæmoptysis from the air-tubes, there is not; and for this reason,—the blood is not in the air-cells. When it is in the *tubes* we have no crepitous rattle; for that always arises from an accumulation of some kind or other, in the *cells*. In effusion of blood in the air-cells we have crepitous rattle *at first*; but where the blood is more *abundantly* effused, we cannot have crepitous rattle; because no air can be admitted. The crepitous rattle, I have no doubt, arises from the air passing through the fluid; and from the air-bubbles bursting one after the other. When so much blood is effused into the different air-cells, that no air can be admitted into them, and the part becomes firm, there is no crepitous rattle nor, indeed, any rattle at all. No respiratory murmur, and no morbid respiration is heard; for no respiration can take place long in that part. All that can be detected by the ear is, that the part is not healthy. On striking over the part, it sounds dead; and on listening, there is no sound of respiration; and we learn very well, by the ear, what is the extent of the mischief. In the case I met with[c], the whole of the inferior lobe of one lung had become quite solid. In those days, the stethoscope was not invented; and therefore I knew nothing of the symptoms that would have presented themselves, if I had resorted to auscultation. But if I had employed the ear in that case, no respiration would have been heard over a great part of the chest; and on striking, there would have been no hollow sound; and therefore I should have known the extent of the mischief. The extent of mischief, in this disease, may be accurately learned. We may ascertain how much of the lung is solidified, by the extent of a *dead* instead of a *hollow* sound, on percussion; and the extent to which there is no respiratory murmur. With regard to the *treatment*, that must be the same whether the blood come from *one* part, or from *another*; and therefore it must be for the sake of the *prognosis* that we employ the ear, and make a distinction between the two cases;—the one being a manageable kind of affection, and the other extremely *un*manageable.

Causes.—[The effusion of blood in the tissue of the lungs, may arise from three classes of causes:—1. Circumstances obstructing the passage of blood through the lungs; such as diseases of the heart,—especially those impeding the passage of the blood through the left side of the heart, with hypertrophy of the right ventricle; tubercles or other deposits in the lungs, compressing the blood-vessels; violent acts of exertion. 2. A diseased state of the pulmonary vessels, or parenchyma generally; so that any temporary congestion from exertion, or the continued exercise of the voice, occasions a rupture: in phthisis there is often both this fragile state of the vessels, and an obstructing pressure on them; and the same combination of circumstances

[a] The work in which the case was published, was called the "Annals of Medicine and Surgery." I made an extract from it in my work on Diseases of the Heart (Page 32);—the original publication being now very scarce.

[b] See Page 865.

[c] See Page 867.

roduces pulmonary hæmorrhage, in some diseases of the heart and arteries. 3. A dissolved or scorbutic state of the blood, is another cause to which [a] should also refer come cases of pulmonary hæmorrhage; for I [a] have everal times, in fevers of a petechial kind, met with lungs presenting ircumscribed portions of their tissue quite infiltrated with black blood, with ffusions of the same kind under the pulmonary pleura;—there being no igns of inflammation, and the adjoining tissue being free from disease.[b]]

SECTION III.—TREATMENT OF HÆMOPTYSIS.

General Treatment.—On the immediate occurrence of hæmorrhage from he lungs, it is right to treat it as inflammation;—to bleed in the arm reely; and to set the patient upright, and keep him so; in order to make im feel as faint as possible. We should keep him in that position, instead f allowing him to lie down. It is safe to apply ice to the front of the hest; and this, I think, should always be done. There can be no impro-riety in it. As soon as we have bled, until ice can be procured, we ould throw cold water on the chest; and endeavour to produce a con-action of the end of the vessels;—in the same way as we proceed in the ase of the womb. But generally the bleeding soon stops; for a patient eldom dies of hæmoptysis at the time. Bleeding at the arm, throwing open ie windows and doors, and taking the clothes off the chest, answer very ell. The patient should not be allowed to move. He should be made asy and comfortable; but he should not be allowed to move, or to speak. have often made persons persevere, for a fortnight together, after danger-us hæmorrhages;—making them write for whatever was wanted. It is roper to starve the patient; to give him nothing but plain water, milk and ater, lemonade, or things of that description; and it is surprising how pa-ents, in this disease, bear cold. I know not a single instance of a person ffering inflammation of the chest, from all this exposure; notwithstanding at, in other circumstances, he would (in all probability) have suffered verely.

Acetate of Lead.—The best internal medicine, by far, is the acetate of ad; and this must often be given in considerable quantities, before it will op the hæmorrhage. Within a month, I have had three cases of hæmo-ysis; in which I have been obliged to give as much as three grains every ur hours, before I could fully stop the discharge of blood. It is always fe to begin with *one* or *two* grains, every *six* hours; but if the hæmor-age does not stop, but returns every day, it would be right to give such quantity as this every *four* hours; and if that does not stop it, we may ve *three* grains every *three* or four hours, with perfect safety. In all the three ses, the last mentioned doses were given; and no inconvenience was felt, cept from constipation; which was remedied, every day, by some laxative. we do not attend to the state of the bowels, and procure a motion every y, the patient may become the subject of colic; but by administering oton-oil, or castor-oil, or some purgative that contains no sulphuric acid, ere will seldom be any colic or pain of the bowels; which is very trou-esome. Some persons give opium, to prevent griping; but I have not ne so; because I have not found it necessary.

Mode of Administering Lead.—Some persons give the lead in a *liquid*,

[a] Dr. C. J. B. Williams.
[b] Dr. C. J. B. Williams, on Diseases of the Chest; Pages 145 and 146.

and some in a *solid* form. I have not exhibited it liquid, because it is ver nauseous; and it answers just as well solid. It mixes up with the extract o colocynth into pills, very well; and I have seen the stomach bear it, i given in a pill, much better than in the fluid form. That is the case wit all acrid and nauseous things;—the stomach can bear a pill the best.

Hydrocyanic Acid.—If the patient's stomach be disposed to reject it, i is useful to give one or two minims of hydrocyanic acid, three or four time a-day. If we are giving the lead only three times a day, then we migh give hydrocyanic acid three or four times; but if the lead be administere every four hours, then we cannot give the prussic acid so frequently. Th dose required to prevent vomiting, is exceedingly various. In some it wi be prevented by one minim, three or four times a-day, taken before th lead; and in other cases, two, three, or four minims, will be required. O all medicines to prevent others from irritating the stomach, I know of non equal to hydrocyanic acid.

Some apply blisters over the chest; and they are very useful in thes cases *at last*; but the application of cold, by means of ice, is better. If th means which I have recommended be adopted, we shall generally be abl to control the affection. Treat it, in the first instance, as an *active* inflam mation; and when the hæmorrhage is very considerable, treat it as a *pas sive* inflammation; or rather combine the two modes of treatment. Do al that can be done to prevent an excitement of the pulse, by bleeding fro time to time, and keeping down the circulation; and at the same tim adopt the treatment for passive inflammation, by producing a constrictio of the vessels.

CHAPTER IX.

FUNCTIONAL DISEASES OF THE LUNGS.

Before I describe *organic* diseases of the lungs,—those in which there is a new deposition, or a transformation, or lesions of the substance,—I will consider *functional* diseases of those organs. I will speak first of asthma, and then of hooping-cough. Asthma is often connected with bronchitis and hooping-cough; and very often with inflammatory diseases; but not *necessarily* so. Both asthma and hooping-cough are frequently unconnected with inflammation; nor is there any appearance, after death, that will explain the symptoms. They are frequently specific and functional diseases.

SECTION I.—ASTHMA.

Definition.—By "asthma"[a] is meant a spasmodic difficulty of breathing;—a spasmodic affection of the organs of respiration, below the larynx and trachea. It is frequently united with organic diseases, or with inflammatory states; and frequently it is merely the result of irritation; so that we may have it without any organic disease, or any inflammation at all.

Symptoms.—In a case of asthma,—pure, genuine asthma,—there is a violent sense of constriction of the chest, with a loud wheezing respiration;—heard without putting our ear to the chest, or employing a stethoscope. We hear a patient, at some distance, wheezing and breathing for his life. Such an attack as this, is soon accompanied by a short and difficult cough; but as the sense of constriction goes off, the cough becomes freer and deeper; and there is some expectoration.

During this attack, the face is pale, elongated, and pinched; the nose and extremities become cold; the pulse is found to be small and quick; and I have frequently observed it to be irregular. The skin, throughout the body, becomes rough,—from the retrocession of blood from it; horripilatio takes place; and the patient looks as if he were dying. He is cold and pale, and gasping for breath; and in such an agony, from the want of it, that one would think him dying; yet, in the greater number of cases, there is no danger whatever.

Usually occurs in the Night.—Such an attack as this, may last only a few minutes; or it may last several hours. It generally takes place in the middle of the night. The gout, when it first attacks an individual, generally does so in the middle of the night;—that is to say, at two or three o'clock in the morning; and this is generally the case, likewise, with asthma. When it first invades, the patient jumps up in bed; throws off

[a] From ἀσθμαζω, *to gasp for breath.*

the clothes; draws aside his curtains, if he have any; often goes to the window and throws it open also, as he does the door; and stands at the window, to get as much air as he possibly can. After a certain time, he finds that he breathes more easily; can take a deeper inspiration; begins to cough more deeply, and to expectorate; and then he goes to bed again, a great deal better. Very often, at the same time the next night, the scene is repeated.

Premonitory Symptoms.—When a person is subject to this occurrence very often, the breathing, for the most part, is not quite free in the intervals. It is generally difficult; the patient feels that all is not right; and, at the same time, there is generally a great degree of flatulence. A large quantity of wind undoubtedly is produced in the stomach. It could not be generated so rapidly by any chemical process;—for persons in this condition, just like hysterical women, become, in a moment, filled with wind; which comes forth in torrents, apparently interminable; and this occurs without any thing being in the stomach, to promote the production of it. I think there can be no doubt (and John Hunter was of this opinion) that air can be secreted like a liquid; for we see a woman in a moment, from a passion of the mind, swell out and pour forth torrents. I believe the wind, in these cases, is always inodorous. The gases from the alimentary canal, have been analyzed by the French; and their nature has been ascertained from the contents of the stomach and intestines. An account of this may be found in Majendie's work; but whether the wind just referred to has been analyzed, I do not know. I think it has not. At the same time, there is generated a very large quantity of liquid, which is quite pale;—containing very little saline or animal matter. They are as pure specimens, both of wind and water, as can be produced (I suppose) from the animal body.

Some persons have these attacks only at certain seasons of the year; and some only in particular places. If they be subject to the affection, they are rendered far more liable to it by eating what is ill-suited to their stomach;—eating articles which they have found not to agree with them. Sometimes indigestion precedes an attack of this description; sometimes there are symptoms of disturbance of the nervous system,—such as sleeplessness and headach; and sometimes there is a great itching of the skin. These circumstances occasionally precede the disease.

Attacks Persons of all Ages.—The occurrence of the disease is very various. Some have it only for a few nights; and some for many weeks. It is a disease which attacks all ages. I have seen it, over and over again, in infants at the breast; where, from the very slightest degree of bronchitis,—the slightest catarrh, they have been seized, at different periods of the day, with violent wheezing; and that wheezing has ceased almost as suddenly; and therefore I have no doubt it was asthma. I have seen several instances of it, as I suppose, in boys below puberty and above it; and very frequently it attacks young adults. Persons may be subject to a recurrence of this affection for many years; and then it may cease entirely, without being followed by any other disease. A patient may, at one period of his life, entirely cease to be asthmatic; and this complete cessation of the disease may occur at all ages. With some persons, asthma occurs only in particular seasons, from particular circumstances, and from particular states of the weather; but with some the tendency to it is so strong, that they are sure to have it wherever they are. There are always exciting causes sufficient to produce the disease in them;—so extreme is their liability to it.

Sometimes attended with Pain.—I have sometimes seen it attended with very great pain. There has appeared to be a violent spasm of the respiratory muscles;—so that patients have had violent pain; and yet, without any bleeding,—simply from stimulating remedies,—this pain has ceased.

Varieties.—Although this which I have now described, is the regular form of the disease, yet (like epilepsy[a]) it sometimes puts on very great irregularity. Some persons, in the fit, will make a crowing noise. Some will have a number of deep inspirations successively; and then they will suddenly cease to breathe. There is every sort of variety that can be imagined; but still, no doubt, they all deserve the name of "asthma."

Complications.—The disease is literally pure spasm, and does not necessarily depend upon any organic cause. But it may be combined with any inflammatory disease of the chest; and it may be combined with any *organic* disease of the chest. Even the slightest pressure, in some people, will cause this affection. Mr. Lawrence (as I before mentioned) has described a case, in which violent paroxysms of asthma were induced, simply by an aneurism of the innominata;—causing the least possible degree of pressure upon the trachea.[b] The disease with which asthma is most commonly united, is chronic bronchitis. When persons labour under the latter affection, besides constant difficulty of breathing, they are subject to great aggravations of this difficulty, from time to time;—particularly at night. As in this case they spit up a great deal, the affection is called, by the old writers, "*humoral* asthma." But we continually have chronic asthma without chronic bronchitis; just as we may have the latter without any tendency to a spasmodic affection. Sometimes asthma is united with pleuritis and pneumonia; and on bleeding such patients, we have buffy blood; but in a case of genuine asthma, it is rare for the blood to be buffy. I do not know that it *ever* is so. Asthma is frequently seen united with diseases of the heart; but then it is to be remembered, that nothing is more common, in organic diseases of the heart, than for *chronic bronchitis* to exist. The heart is seldom organically diseased, to any considerable extent, without the bronchia being more or less inflamed.

Diagnosis.—The disease is easily distinguished from hydrothorax. On striking all over the chest, we have a clear sound; and, on listening, we have respiration all over the chest;—which we cannot have if any part of the cavity be filled with water. It is distinguished from bronchitis, by the absence of sonorous and sibilous rattle, except in the upper parts. Down below, throughout the rest of the chest, we do not hear those peculiar sounds of bronchitis; or, if we do hear something like them, they suddenly cease; and then there is the sound of health; but while bronchitis lasts, we have sonorous and sibilous rattle; and these only subside either from the interference of art, or the disease itself ceasing. In general, a loud respiratory murmur is heard all over the chest;—louder than it should be. The absence of other diseases, together with the suddenness of the attack, the suddenness of its cessation, and its extreme aggravation from time to time, will enable us to form our diagnosis.

Prognosis of the Paroxysm.—The prognosis in this disease, so far as the *paroxysm* is concerned, is generally good; but I have seen people die from pure spasmodic asthma. I recollect a young man, who had been asthmatic, being brought to the hospital in a great fright; and, when I saw him, he was dying. He could only breathe while on his knees and elbows. No signs of any other disease were found during life. He was cold and pale,

[a] See Page 661.

[b] See Page 815.

and the pulse was not to be felt; and, in the course of two or three hours, he died. He had been accustomed to asthma; but this fit produced such a severe asthmatic state, that he did not survive. On opening him, no signs of disease were found; but the lungs were all distended;—had lost their contractile power, so as to be unable to collapse; and were as light as a feather. I have read accounts of death from asthma; but it is a rare occurrence indeed.

Prognosis as to its Termination.—The prognosis, however, must be unfavourable as to the *termination* of the disease. Some persons will be liable to it for life, if they live in particular situations, in spite of all that can be done. We have a prognosis to make as to the *paroxysm*, and one as to the *duration* of the disease. The one is favourable, and the other *un*favourable; but then the prognosis respecting the distant event, must depend upon the existence of other diseases. People labouring under asthma, often live to a great age; and the disease often ceases of itself. But we must always consider, in these cases, that there may be some other disease;—chronic bronchitis, chronic pneumonia, or disease of the heart; or there may be a tendency to phthisis; and all these things must be taken into the account, in forming a prognosis. Dr. Heberden[a] mentions two cases of the cessation of asthma, after it had existed some time; and he also mentions other cases of persons suddenly ceasing to be asthmatic; and never having another attack, though they have lived thirty years afterwards. I have myself known instances of its cessation, after having existed a considerable time. But we can never prognosticate this. If it turn out so, it is all very well; but I think we have no means whatever of *predicting* that it will thus terminate.

Predisposing Causes.—The predisposing causes of the disease are not known. Very often it attacks those who are thin and pale; but they have pure, simple, spasmodic asthma. It as frequently, however, attacks those who are short and full,—bulky; and these generally have a combination of asthma and chronic bronchitis. They expectorate a great deal;—have "*humoral* asthma." Of the real predisposition, however, we certainly do not know the nature. We know it is often hereditary. Asthma attacks many, whose parents (one or both) or whose grand-parents have had the disease. It runs in families.

Exciting Causes.—With regard to the *exciting* causes of the disease, they are (in general) cold and damp, and especially fogs. Some persons have it only in cold weather; others have it only in damp, foggy, moist weather; but there is a great variety in this respect. Some persons have it only in summer, and are all the better for cold weather; and some never have it but in particular situations. Most people are better in the country, if it be a dry place; but some are better in London; so that persons who have made their fortunes, and retired to the country, have become asthmatic; and have been obliged to return, and live in London again. I have read of cases, where parties have been obliged to go back to an old house in Thames Street. I recollect that particular street;—as damp and dirty as any in London.

Hay-Asthma.—In some persons, this disease is only induced (as it would appear) from particular exhalations from the vegetable kingdom;—the emanations from grass in flower. These are the people who have asthma only in summer; but by far the greater number have the disease aggravated in winter, and are pretty well in summer. Some, however, are never asthmatic till about May or June. I should think all these cases may be

[a] In his "Medical Commentaries"; Chapter 11. (First Edition; Pages 62 and 63.)

resolved into that particular form of disease, which has been called "hay-fever", or "hay-asthma." In some cases, there is a simple spasmodic affection of the breath; and in others, there is a violent catarrh, united with the spasmodic affection. This is a disease which has only been noticed of late years; and respecting which I have some curious facts to adduce.

History of Hay-Asthma.—Certain writers have spoken of what they call "a summer cold";—"catarrhus æstivus." The first medical composition that I read upon the subject, and the first that I ever knew to exist, was by Dr. Bostock, the celebrated chemist. It was from him I learned that some writers spoke of catarrhus æstivus; but I do not know to whom he alludes. Dr. Bostock states, in the tenth volume of the "Medico-Chirurgical Transactions" [a], that at a certain time of the year he begins to sneeze,—has a "running" of the eyes, and all the other symptoms of catarrh; and that these continue for a certain length of time, wherever he is, and whatever he does. In a second paper, published by him in the same work [b], he again refers to the subject; and relates his own case at considerable length. Before that time, I had heard people talk about "hay-fever" and "hay-asthma." I was told that certain distinguished personages had "hay-fever." It appears to be quite an aristocratical affection;—not at all visiting hay-makers, or those who have to do with hay and straw. I never met with such a thing in practice; and it appeared to me to be a highly gentleman-like, and indeed (I may add) *noble* affection. I could not tell what to make of it; and I disregarded it entirely;—supposing it to be a sort of aguish or hypochondriacal affection, of which those who had little to do, frequently became the subject. I happened, however, to be attending in a family, where the mother of the lady was said to have been the victim of it many years. She was a very sensible and superior woman; and she stated that, at a certain time of the year, when the grass came into flower, she was dreadfully distressed in breathing; and was obliged to leave her house, and go to as barren a place as she could find at the sea-side; and there she obtained comparative ease. She told me this had been the case for many years; and that she had tried every thing in vain; for nothing did her good. She was not the only member of the family afflicted with it; for an uncle, some of her nephews and nieces, and some of her cousins, laboured under it. It was decidedly an hereditary family-matter.

As there are some curious features in these cases, I alluded to them in a clinical lecture delivered at St. Thomas's Hospital. I knew that the course of which that lecture formed a part, was being published [c]; and I thought the shortest way to make the subject known, would be to mention it then. The consequence was, that I received several exceedingly kind letters, from gentlemen unknown to me; giving me facts upon the subject; and as the matter is very interesting, I will insert a few of them.

Mr. Gordon's Cases.—One of these letters was received from Mr. Gordon;—a surgeon residing at Welton, near Hull, Yorkshire. He stated that, in the "Medical Gazette", he had described the very same thing. I was not aware of it at the time; or I should have felt it a great pleasure, as well as my duty, to refer to it. He says:—

"I have this evening received Number 186 of the "London Medical Gazette", dated June 25 [1831]. [d] It contains [e] the report of a clinical

[a] Page 161.
[b] Volume 14; Page 437.
[c] In the "London Medical Gazette"; Volumes 7 and 8.
[d] Volume 8; Page 384.
[e] At Page 411.

lecture which you delivered at St. Thomas's Hospital, in March last [a], on the subject of hay-asthma.

"In consequence of your expressing a wish to receive information on this extraordinary complaint, I have taken the liberty of troubling you with this letter. I beg leave to state, that I have witnessed several instances of hay-fever, and hay-asthma; and, in the eighty-seventh number of the 'London Medical Gazette', bearing date August 1, 1829 [b], I published a short account of the nature, symptoms, causes, and treatment, of these curious disorders. In that memoir I have observed, that the best preservative against their attack, is the cold shower-bath. For the last two seasons, however, while employing this, I have administered the sulphate of quinine, with the sulphate of iron:—the former in doses of two or three grains, the latter in doses of one grain, three times a-day. The success which has attended this prophylactic treatment, has exceeded my highest expectations. With two of the most severely afflicted of my patients on whom it has been tried, it has answered so effectually, that both of them have this year [1831] been able to walk through a rich meadow, without suffering in the slightest degree; although formerly, if they had ventured out into such a situation, they would have brought upon themselves all the agonies of spasmodic asthma.

"The symptoms I have related, were taken principally from the cases of * * * * * * *. These two gentlemen have been annually attacked with hay-asthma, for the last fifteen or twenty years. They consulted Dr. B., and most of the eminent English physicians, as well as several practitioners on the Continent; but derived no relief from what was prescribed for them. By means, however, of the shower-bath, the quinine, and iron, they have, for the last two years, obtained a complete emancipation from their tormenting disorder."

Another Description of Hay-Asthma.—Another letter is from a practitioner at Bristol, who says,—"I knew nothing about hay-fever, as any definite disease; but your description of it is, with little exception, a very accurate detail of what I have suffered, every June, for several years."—Here was a gentlemen who had been ill every summer, for several years, without being aware what his particular complaint was.—"Were I not", he proceeds, "at the present time annoyed by this troublesome affection, I should probably not have found leisure to give you the trouble of reading any thing on this subject.

"The attack generally begins, with me, at the latter end of May; with great itching of the eye-lids;—particularly at the inner canthi; from which I regularly, during this month, extract some cilia, which grow very near the cornea, and increase the irritation. My most troublesome symptom is sneezing. It is of a violent kind; and often continues eight or ten times. The defluxion from the nostrils is most copious at these periods of the day; while, in the intervals, I have no catarrhal symptoms. Expectoration of clear mucus is also considerable. My sneezing attacks are sure to come on while I am visiting my patients;—to my great annoyance. This comfortless state generally continues five or six weeks; but is never sufficient to interrupt any of my employments, or render any confinement *necessary*; though I am always free from it when in the house. How far grass or hay has any thing to do with this affection, I cannot satisfactorily determine. There certainly are several hay-fields within a quarter of a mile of my

[a] March 31, 1831.

[b] Volume 4; Page 266.

house. The *air* seems to make me worse; and an open window is my abhorrence, while I am thus indisposed. Last week I spent an hour or two in a friend's hay-field, with a party of ladies; but the syllabub, the ladies, and the pastoral sports, had no amusement for me; and I was glad to get to a corner of the park, where my streaming eyes and nostrils, and noisy sternutations, might escape both remark and commiseration. Certainly, during that afternoon, in the hay-field, was the worst attack I have had; but whether it was the *air* which was cooler than usual, or the *hay*, I could not tell. I must however confess, that my *fancy* on the subject has always leaned more to the effect of some subtle particles, of an irritating nature, than to the ordinary causes of catarrhal affections. My lungs are rather asthmatic;—formerly I had a good deal of asthma. I have never found time to try any remedies; but shall certainly bear in mind yours, should I have this visitation next year."

Dr. Bulman's Case of Hay-Asthma.—I have another letter from Dr. Bulman, of Newcastle-upon-Tyne. He has given me several cases; of which the following is one:—"D. B., aged thirty-six, is of a spare but robust habit, and free from any constitutional or hereditary affection;—except, perhaps, the gout. He has been liable since his seventh year, if not sooner, to annual attacks of the disease so ably described by Dr. Bostock, under the name of 'catarrhus æstivus.'[a] The disease invariably commences (about the second or third week in June) with a sense of uneasiness, heat, and itching in the 'tunica conjunctiva'; but the itching is more particularly severe along the tarsus, and in the 'caruncula lachrymalis.' On examination, this membrane is found to be considerably inflamed; but, except in the severer attacks, the inflammation does not extend to the eye-ball. The symptoms before mentioned are attended with watering of the eyes, increased secretion from the Meibomian glands, a sense of fulness or rather distension of the eye-ball, intolerance of light, and weight in the forehead. The itching gradually increases in violence, till it becomes almost insufferable;—compelling the patient, notwithstanding every resolution to the contrary, to rub his eyes; by which it is always considerably allayed.

"In the course of a few days, but sooner if the patient has exposed himself to the sun, the inflammation extends to the Schneiderian membrane of the nose; and is attended with itching and stuffing of the nostrils, increased secretion of mucus, and violent paroxysms of sneezing; which are also excited by dust of any kind, exposure to the heated external air, effluvium of new-made hay, and the odour of the bean-flower;—perhaps, also, by other odours. As the disease continues to advance, the membrane of the fauces and lungs is affected;—giving rise to a sense of dryness and extreme itching or pricking in the throat, to slight cough, with tightness of the chest, and difficulty of breathing; but there is little or no expectoration.

"There are several paroxysms daily; commencing with intolerable itching and tingling of the eye-lids, and followed by the most violent fits of sneezing, accompanied by a copious discharge of mucus from the nasal passages. After this the patient obtains a longer or shorter respite; for the paroxysms occur at uncertain intervals; save that one invariably takes place about an hour after rising in the morning. The tightness of the chest and difficulty of breathing, though sufficiently distressing, have seldom been very urgent; but on two occasions they rose to such a height, that the patient conceived himself in danger of instant suffocation. In severe attacks the

[a] See Page 875.

eye-lids become œdematous. During the whole course of the disease, the patient is languid and listless; and, though restless, is averse to motion. His temper is more irritable than natural; but his pulse is scarcely, if at all, affected. His bowels are regular, and his appetite rather increased than diminished.

"The disease continues till about the end of July, or the beginning of August; when it almost imperceptibly declines; and it is remarkable, that the patient is then able to expose himself to the hottest sun, without the recurrence of any of the above detailed symptoms";—shewing, of course, that it does not depend upon the temperature;—"and indeed, during the violence of the disease, exposure to the open air early in the morning, and in the evening after sun-set, causes but little inconvenience. The patient has had attacks of this disease in France, Switzerland, and Italy. In the two former countries it was as severe as in England, but not more so; and it is extraordinary, that in Italy, notwithstanding he was daily exposed to the powerful sun of Rome, in the month of June, the disease, though it began earlier, was nevertheless considerably milder, and also of shorter duration, than elsewhere.

"Most of the internal remedies mentioned by Dr. Bostock[a], have been tried; but in vain. Bathing in salt water, both cold and tepid, has been had recourse to. The former is apparently without effect; the latter has seemed serviceable only so far as it has relieved the tightness of the chest, and the difficulty of breathing. Of *local* remedies, the only one which has proved of any efficacy, is the Unguentum Hydrargyri Nitratis, properly diluted. This, though it occasions considerable pain when applied to the eye-lids, has always greatly allayed the itching and smarting; and has even seemed (probably by being carried into the nostrils with the tears) to diminish the irritability of the Schneiderian membrane, and hence to lessen the violence of the sneezing;—a most distressing symptom. The Vinum Opii was tried, many years ago, without any benefit; as in the case of Dr. Bostock.[b]

"With respect to a residence at the sea-side, it may be observed, that the only instance of the disease attacking the patient previously to the usual period, was in the last week of May, 1829, during hot weather;—while he was residing, for a few days, in an airy house, situated on a cliff overhanging the German ocean. The attack, however, was slight, and lasted for two days only; but again returned at its usual period in June. As to diet, the patient is decidedly worse when living low.

"The above detail was written some months ago, and I am happy to state, that the patient almost entirely escaped the disease this year [1831];—by merely commencing, some time previously to the expected period of attack, to anoint the eye-lids at bed-time with the ointment; and by bathing them occasionally, during the day, with a collyrium composed of rose-water and acetate of zinc; and, after this had dried, smearing them with simple spermaceti-ointment;—to remove the stiffness left by the collyrium.

"I have only heard of one example of this curious disease, in this neighbourhood.[c] The patient is a gentleman of fortune; and the instant he approaches a hay-field, he is attacked. I have never been able to hear of the disease in the lower walks of life; though my situation, as physician to two extensive charities in this town[d], has afforded me ample opportunities

[a] "Medico-Chirurgical Transactions"; Volume 14; Page 445.

[b] "Medico-Chirurgical Transactions"; Volume 14; Page 446.

[c] Newcastle-upon-Tyne.

[d] The "Newcastle-upon-Tyne Infirmary", and the "Newcastle-upon-Tyne Dispensary."

of meeting with it, did it exist among them. I may add, that none of the patient's family,—that is to say, neither his father, mother, brothers, nor sisters, though originally amounting to thirteen,—were ever affected in the slightest way by this distressing complaint."

Mr. Poyser's Case of Hay-Asthma.—There is another case, with which I have been favoured by Mr. Poyser, of Wirksworth:—"Mrs. H., of middle age, of a full and rather corpulent habit, has been subject for many years to this periodical complaint. The attack generally commences about the middle of June,"—the old time,—"sooner or later; according to the heat or closeness of the weather. A sensation of heat and irritation is first experienced in the eyes and nostrils; accompanied with sneezing, fever, and restlessness. These symptoms (if the complaint increase) are succeeded by a sense of constriction about the chest; aggravated very much by exertion; and increasing, towards night, to a regular asthmatic paroxysm. In the severer attacks of the complaint, there is a permanent wheezing and difficulty of breathing; with an inability of moving, or of remaining in a recumbent position; and accompanied by pain, fever, quick pulse, and a great degree of general indisposition; lasting for some weeks; and leaving great debility, with an œdematous state of the feet, ankles, &c. The treatment has been conducted on general principles."

To shew the hereditary nature of this affection, I will introduce another extract from Mr. Poyser's letter:—"Mrs. P. A., also the mother of a large family, has had this complaint several years. The symptoms, in her case, resemble very accurately those described by Dr. Bostock [a]; namely, a sensation of heat and fulness in the eyes, accompanied with redness and discharge of tears. These sensations go on increasing; and a fulness in the head is experienced, with irritation of the nose and violent sneezing. To the sneezings are added a farther sensation of tightness of the chest, and difficulty of breathing; with a general irritation of the fauces and trachea. These symptoms are worse by paroxysms, and are often traced to changes of the weather and other causes; they do not, however, as in the instance of Mrs. H., go on to regular asthma. The complaint wears itself out toward the middle of July. This lady decidedly considers the cause of her complaint to be an emanation from the flowers of grass. It begins when grass comes into flower. There is a perceptible increase, or paroxysm, when she is exposed to these effluvia; and when the flowering time is over, she can go into a hay-field with impunity; which she could not previously do.

"The father of this lady is immediately seized with violent and continual sneezing, and inflammation of the nose and eyes, when he goes into or approaches a hay-field; but the symptoms go off when he is removed from the smell of the hay. He therefore carefully avoids the exciting cause, and escapes the disease. Three of the sons of Mrs. A. are also subject to this disease; and their symptoms are similar to hers, though less severe. One of these young gentlemen is now at Geneva; and had the complaint there this summer [1831]. A younger son (a boy about ten years old) is made asthmatic by the smell of Guinea-pigs."

We see, therefore, what the character of this complaint is;—that it is not merely spasmodic asthma, but excessive irritation of the mucous membrane of the eyes, nose, and the whole of the air-passages. It is a combination of catarrh and asthma.

I have no doubt whatever, that it arises from vegetable matter diffused in the atmosphere; that it is derived from the flowers of some plants; and

[a] "Medico-Chirurgical Transactions"; Volume 14; Page 437.

that, in a great number of instances, it comes from grass. The lady to whom I have referred [a], wrote me a letter, in which she details the whole particulars of her case; and, as it contains many interesting facts, I subjoin it:—"I was first affected with the disease in 1798; and from that period have annually suffered from it more or less. It usually attacks me about the latter end of May, and continues till the middle of July, and sometimes till the close of that month; but this has occurred when the weather has been unfavourable, and the hay-harvest has been particularly late. I have never suffered after the hay has been got in.

"The first symptoms are irritation of the nose, violent sneezing, and all the usual attendants of 'a cold in the head.' These are succeeded by spasms affecting the breath; which have often been so severe as to threaten my life, and are the most distressing part of the disease. Violent irritation of the eyes, throat, and the whole interior of the head, has been experienced when passing by fields where hay was making; which symptoms have all disappeared very soon after entering a room, and excluding as much as possible the external air.

"I believe the complaint with me to arise principally, if not entirely, from the farina of the grass. It has commenced sooner or later according to the season; and my first symptom has generally occurred when walking in the fields, and not till the grass is *in flower*; and from that time till the hay-harvest is completely finished, I suffer whenever I am exposed to the air.

"I have tried the sea-air, and also London. The former I found most beneficial; although the latter was productive of considerable relief. Ramsgate and Harwich have suited me best; which I attribute to the small quantity of grass grown in the neighbourhood; and to the bracing air, which has invigorated my general health. At all places by the sea, I have been immediately sensible when a land-wind blew, and felt instant relief when it came off the sea again; and two years ago, when this was the case at Harwich, during nearly the whole of the six weeks I spent there, I suffered scarcely any inconvenience. I walked out daily; went frequently on the water; and bathed regularly in the sea. During other seasons, I have been obliged to shut myself up entirely in the house; and not to allow a window to be opened, or to permit any one who had been into the air to come near me.

"My children, in approaching me after being in the hay-field, have often brought on a fit of sneezing, or a spasm of my breath; and this was once effected by their sitting down by me to tea, after playing in the barn where the new made hay was stacked, some time after the season was over. Once, at Harwich, when walking on the shore, I became suddenly affected; which occasioned some surprise, as no grass was apparently near; but, on the following day, I found that hay had been making on the top of the cliff, at the time I was walking under it.

"At Cromer, two years since [1829], I was suddenly seized with shortness of breath, &c., after the complaint had subsided, and all the hay in the immediate neighbourhood finished; and upon going into my bed-room, I saw an immense stack making, in a yard near the house, with hay which had been brought there from a field five miles distant. In 1817, I was perfectly well till the grass was cut in our own fields; when my breath became so seriously affected, that it was thought necessary to remove me directly from the infected air; and I was with difficulty taken from my bed to the

[a] See Page 875.

arriage which was to convey me to Harwich, twenty miles distant; but vhen I arrived there, I was so much relieved by the change of atmosphere, hat I walked with ease up two pair of stairs to bed; and had no return of llness that season.

"In packing baskets with hay, I have frequently had fits of sneezing, nd tingling in my hands; and have every reason to believe, that the seeds f the grass are poisonous to me. I have long ceased to have medical dvice for the complaint; and, by avoiding the exciting cause as much as ossible, and using palliatives on the first attack, I have of late years uffered less than formerly. I always confine myself entirely, while the ay is making near me; and at other times I walk with salts, or some ther pungent scent, in my hand. When I feel the irritation commencing, I snuff it up, I can frequently keep off a fit of sneezing. My breath is elieved by sedatives; and smoking stramonium will always check the sthmatic spasms.

"My uncle (Mr. * * * *, of * * * *) and his son, were affected bout the same time as myself;—the former with sneezing only, and the tter with all the symptoms. They both attribute it to the grass; and the on is obliged to come to London when his hay is making. A cold season uits me best, and the symptoms are aggravated by a close air; which may erhaps arise from the obnoxious particles hanging in the air, and being us inhaled in larger quantities. I have no disposition to asthma at any ther period of the year; and scarcely ever have a cold, or occasion to use pocket-handkerchief. My habit is relaxed; and I am always benefited y a cold bracing atmosphere. I have occasionally found my breath con-derably relieved by going out of the air, into a crowded assembly; and om our own house in the country, to one in a narrow street in the middle f a town."

The disease has certainly increased rapidly during the last twelve years; nd has attacked persons of all ages. Most of those with whom I have onversed on the subject, believe it to be occasioned by the farina of e grass, or something poisonous to them, which floats in the air at at time; and which comes when the grass begins to flower, and de-arts when the hay-harvest is over. It is conceived, by some persons, at it is the sweet-scented grass which is productive of this affection; at ast, many persons have decidedly been affected when they have gone near veet-scented grass in flower; and some ascribe the greater prevalence of the sease now than formerly, and consequently the notice of its occurrence, to e introduction of some new species of grass into this country.

Treatment of Hay-Asthma.—Seeing that the emanations from the grass he pollen, in all probability) is a compound, though I do not know its nstitution, I fancied that it might be destroyed by the chlorides;—in the me way as some animal matter. I therefore requested a gentleman ho had the disease to try it; and he did so with the most perfect success. his was the first case that I ever saw of the disease. A gentleman came consult me upon it, about three years before I saw the lady. I told m, at once, that I knew nothing of the affection; and I sent him away he came;—so that neither he nor I got any thing by the interview. I ld him that I had heard of such a thing as hay-fever, existing among dis-nguished lords and ladies, but I could not conceive what it meant, and erefore I could give him no advice. I casually met him, after I had ad Dr. Bostock's paper[a];—and I requested him, as a favour to myself, to y the effect of a solution of chloride of lime or of soda. I directed him

[a] See Page 875.

to place it in saucers about the bedroom; to have rags dipped in it and hung upon the backs of chairs; to wash his hands and face with it, night and morning; and to carry a small bottle of it with him; and to smell it repeatedly in the course of the day. He complied with my request; and the result was highly satisfactory. The irritation of the ears, (for in his case *they* also were affected,) the tingling and smarting of the eyes and nose, all ceased; and by using this precaution, he got through the summer exceedingly well. Whether the chloride acted by destroying the emanations, or by lessening the irritability of the mucous membrane, or of the skin, I do not know. The chlorides, if well diluted, diminish the morbid irritability of the surface; and therefore they might, in this case, have acted in that way. The treatment, however, was perfectly successful. The lady [a] said that she had used every thing, but in vain; and I could not prevail upon her to try the remedy.

In consequence of making this known in the clinical lecture to which I before referred [b], it is said by Mr. Poyser [c], that one of the sons of the lady affected with the disease [c], employed the chloride of soda. Mr. Poyser says,—"The chloride of soda has been of great use to this gentleman; removing, at once, the sensibility of the nostrils and eyes; and thus allaying the sneezing, cough, and inflamed and watery state of the eyes." But he adds,—"Mrs. P. A. [c] has not experienced any perceptible advantage from the chloride." Three out of four, however, did. When persons are also subject to spasmodic asthma, I should recommend them to breathe through water impregnated with the chloride; and a larger quantity ought then to be employed about the bed-rooms, than when they have hay-fever alone.

Ipecacuanha a Cause of Asthma.—Some persons are peculiarly affected by other substances. Many persons have a peculiar susceptibility of ipecacuanha;—this is by no means uncommon. If ipecacuanha be powdering in a chemist's house, some persons will be seized with a violent paroxysm on entering it. I have known an instance or two of this description. I heard a physician say that there was a case related on which he could depend,—though I would not myself vouch for its accuracy,—of a person who had such a susceptibility of ipecacuanha, that on entering a room and being seized with asthma, he declared that there was ipecacuanha about. It was at first denied; but at last some one recollected that there was a box of ipecacuanha-lozenges in a table-drawer. That was going very far; but it is a fact that some persons are seized with asthma, if ipecacuanha be near them.

The Smell of Different Animals.—As I shall not have another opportunity of doing it, I may mention here, that other persons are peculiarly susceptible of various things. Some are affected by the emanations of an animal. Shakspere alludes to some men who cannot bear a gaping [d] pig [e]; and some cannot bear a cat;—they are made miserable if a cat be near them. It does not produce asthma; but the emanation from a cat has such an effect upon them, that they are quite wretched. Mr. Poyser (as I mentioned [c]) states, that the son of a lady who had hay-asthma, is made asthmatic by the smell of guinea-pigs. When he is in a room where they are, he is immediately seized with difficulty of breathing. I have a note from a gentleman, in which he informs me that a nobleman with whom he is acquainted, is affected by sneezing and asthmatic affections, by coming in contact with a hare, or rather the *fur* of a hare; and remains ill for

[a] See Pages 875 and 880.
[b] See Page 875.
[c] See Page 879.
[d] Squeaking.
[e] "Merchant of Venice"; Act 4; Scene 1.

several days afterwards. He experiences great suffering, whether the hare be dead or alive.

Dr. King's Cases.—I have another letter on the subject of hay-asthma, —from Brighton; but I will only give a portion of it. Dr. King says:— "I know a member of parliament, who has come to Brighton every summer for some years, in order to avoid the disease at home. A lady also comes from Clapham, for the same purpose; and with the same good effect. The lady, however, whom I saw with it, told me that she knew a cobbler's wife who had it; and that several persons of the lower orders, to her knowledge, had the disease. Last year [1830] I met, at Lewes, a farmer's wife, subject to the same complaint; and obliged, every hay-season, to take refuge in a town. She bears up against it as long as possible; and shuts herself close up in her room, till a sense of suffocation comes on,—as in common asthma; when she is obliged to throw open the window, by which a fresh dose of poison is let in; and the same routine is gone over again, till she is obliged to fly. On quitting the regions of hay, she experiences immediate relief. I dined lately in company with a lady, who went into convulsions as soon as her plate was put before her;—owing to its containing some peas which had been boiled or dressed with mint. We carried her out of the room; and she did not feel quite well all the evening. Her daughter, who sat next her, was not similarly affected."

These are circumstances worth knowing; because, if we were not acquainted with them, we might ascribe cases of this description to whim and fancy. It would be very odd if they were confined to the higher orders only. It is a thing exceedingly improbable. The fact is, the lower orders consider the hay-fever as merely a common cold; and they do not apply for medical advice unless they are seriously ill. They do not think of applying to a public charity, because they are seized with a violent sneezing; or if they do, it is a solitary case, and is treated as asthma;—the nature and causes of the disease not being known.

Cases recorded by Laennec.—Laennec had no idea of it; but he mentions one or two curious circumstances. The following fact, he says, was communicated to him by one of his colleagues;—as affording a curious instance of nervous affection, in a man not subject to asthma:— "A man, forty years of age,—slightly hypochondriacal, but otherwise in good health,—wished to go on horseback to pay a visit some leagues distant from his house. As soon as he left the town where he resided, which is situated in an extensive plain, he felt an immediate oppression on the chest, from the impression of the country air. He took no notice of this at first; but the dyspnœa having greatly increased, and being now attended by a sense of faintness, he determined to return. He had scarcely turned his horse, when he found himself better; and in a few minutes he recovered both his breath and his strength. Not suspecting any relation between this momentary uneasiness and his journey, he once more attempted to advance; and was again soon attacked with the dyspnœa and faintness. On turning towards the town, these passed off. After having made repeated attempts to proceed, and always with the same result, he finally returned; and in just as good health as when he set out. I have lately met", continues Laennec, "with a case very analogous to the one last related; only that in this the symptoms were more severe, and the cause was different. Count H——, a man of robust constitution, and although now eighty-two years of age, still possessed of a degree of vigour unusual even at the age of sixty,—has been subject from his infancy to attacks of asthma; and is habitually somewhat short-breathed. Since his

fiftieth year, he has had a slight cough; and in the morning a pituitous expectoration, intermixed occasionally with some yellow sputa. The asthmatic attacks have always been unfrequent with him; but they have invariably come on if any person has inadvertently shut his bed-room door, or if his night-lamp has by any chance gone out. As soon as either of these accidents occurs, he immediately awakes with a feeling of oppressive suffocation; and after a few minutes he becomes insensible. On the occasions alluded to, the attack is got rid of by opening the doors and windows, lighting the candles, and carrying the patient into the open air." I presume it is the smell of the lamp which causes it; and perhaps the emanations from his own body,—the smell of his own perspiration when he is shut up.

We find, therefore, that in many instances of asthma, there is a violent external exciting cause; but it varies much in its power in different individuals. A predisposing cause, in many persons, is bronchitis; and, in others, various organic diseases of the chest. In some persons, without any external excitement at all,—without moisture, or coldness, or confinement from the air,—there will be an asthmatic paroxysm;—simply from an irritable state of the mucous membrane, and from organic disease. I have already alluded to one case where, from the mechanical pressure of a small aneurism, a paroxysm came on, independently of all external circumstances.[a]

Treatment during the Paroxysm.—The treatment of this disease may be divided into two parts;—one part relating to the treatment during the fit; and the other to the way of preventing its recurrence. In the fit, if the patient be plethoric, it may be well to bleed; but in general this is not necessary. One of the best things that can be done is to give the patient a full dose of opium. Frequently a very large quantity is borne;—on account of the exceedingly deranged state of the system. Forty, fifty, or sixty drops of laudanum, are frequently not more than sufficient to relieve the fit. I once had an extraordinary case of this kind; where such a dose was given without any effect. A drachm was then given, but still without any effect; and so also were two drachms. Seeing this to be the case, the medical gentleman who was attending the patient, grew out of patience, and gave half an ounce; which was merely sufficient to get rid of the paroxysm. When the next paroxysm came on, however, that dose failed entirely; and six drachms were given, and produced tolerable relief; but not enough; and at last many drachms were given for a dose, with no more effect than that of putting a stop to the paroxysm. These are states of the system, in which ordinary doses are of no use; but, in general, from forty to sixty drops are borne very well; and are sufficient. It is useful to combine the laudanum, in these cases, with a dose of æther; and if we mix them up with ammonia, or with musk, or assafœtida, we shall generally add to their good effect. But opium generally answers the purpose. Should the patient be plethoric, however, and have chronic bronchitis and fulness of the chest, it would be very wrong to give a large dose of this description, lest it should produce apoplexy; and it would be right to take away a certain quantity of blood. Some patients are relieved by cupping, and some by *dry*-cupping.

Treatment after the Paroxysm.—When the paroxysm is over, we may endeavour to prevent its return, by giving a dose of some preparation of opium, together with æther; but in a smaller quantity than in the former

[a] See Page 815.

case. Some persons have told me, that they have seen very great relief from cantharides, in this complaint and in hooping-cough. Whether they really are beneficial I cannot tell; but the advantage of opium, æther, musk, and assafœtida, is unquestionable. Some have found very great relief from smoking stramonium. I have seen many persons, who have derived benefit from smoking the leaves and stalks of stramonium, chopped up together. Some have found the smoke of *tobacco* serviceable; but far fewer than those who have derived benefit from stramonium. It is of very great use to make patients drink strong coffee, without milk and sugar. It is an old remedy, but a very good one. There ought to be no grounds in it, because they may disturb the stomach; and that organ, in this complaint, is generally much disposed to indigestion. If it should so happen that a paroxysm comes on from a hearty meal, it will be found very serviceable to give a good emetic, either of mustard or sulphate of zinc;—something which will not nauseate the patient long, but will empty the stomach as quickly as possible.

I am supposing, all along, that the patient is free from chronic bronchitis;—has simple pure asthma. If, however, there be any chronic bronchitis present, squills, digitalis, colchicum, and ipecacuanha, will all be useful;—some by increasing the flow of urine, and others by increasing the secretion from the air-passages. Some have found relief from opium and prussic acid, and others from hyoscyamus and conium; but if an immediate effect be desired, I think there is nothing equal to opium and stramonium. There is no rule for these things; for some persons are relieved by *one* article, and some by another. It is right to consider this as a spasmodic disease, which may be removed; and if it can, it should. It may arise from a full stomach; and then an emetic is the best remedy. It may arise from grass; and then the chlorides scattered about the room, I conceive would be the best remedy.[a] But if we cannot remove the exciting cause immediately, or at all, then the best mode of treatment is to employ venesection and opium.

Prophylactics.—With regard to the *prevention* of the disease, besides the remedies just mentioned, and besides removing the patient from the exciting cause if it be known, it is of great use to pay attention to the stomach and bowels. Every body knows, that if the abdomen be distended, the diaphragm cannot descend freely, and we can scarcely breathe; and asthmatic people suffer, in these circumstances, to a very great degree. Dr. Wilson Philip has spoken highly of galvanism in this complaint, and no doubt it does good; but we cannot expect it to be universally efficacious, when we consider that asthma is often united with organic affections, and with chronic bronchitis. When persons are very weak, tonics are necessary,—particularly iron. Dr. Bree used to exhibit the sesquioxide of iron particularly in the disease[b]; but I have not found it useful, except as a *tonic*. With regard to the inhalation of chlorine, it may be had recourse to in every form of asthma. We may impregnate water with it, and make the patient breathe through it, and in that way inhale it. The same means may be adopted with regard to prussic acid and conium. Some have found benefit from tar; and others from tanners' liquid, put in one corner of the room. Another way of giving persons the advantage of these things, is to impregnate water with them; and to make patients breathe through the water, three or four times a day.

[a] See Pages 881 and 882.

[b] "Practical Enquiry on Disordered Respiration; distinguishing Convulsive Asthma, its Specific Causes, &c. By Robert Bree, M.D."

SECTION II.—HOOPING-COUGH.

Synonymes.—The next disease which I shall describe, and which (in some respects) is very much allied to the last, is hooping-cough. The disease is so called, from the peculiar noise attendant upon the cough. Sometimes it is called "*chin*-cough", because it particularly attacks children; and "*chin*" (I suppose a corruption for "*kind*") is the German for "*child.*" In Latin it is called "tussis",—"cough"; or, to shew its intensity, "pertussis",—"*much* cough."

Symptoms.—This disease is easily known when it has been once seen. There are occasional fits of violent coughing, with short expirations,—a volley of them; and then one deep, long, hooping, crowing inspiration; and these are many times repeated. A quantity of viscid phlegm is spit up; and very often the child vomits. The cough is exceedingly severe; every muscle is put into action; the face grows red; the eyes "run"; and then the child, although unable to stand, and apparently about to be strangled, runs about and plays an instant afterwards, as if nothing were the matter with him. This is very commonly seen; and the cough will come on day after day. At first, there is generally some catarrh and bronchitis with it; and these are of various intensity, as is also the cough. Sometimes the bronchitis is very considerable; so that the child has a constant difficulty of breathing, a constantly quick pulse, and constant heat; and is exceedingly ill. The disease, although to a great degree spasmodic, and sometimes almost entirely so, is occasionally, on the other hand, inflammatory in a high degree. When it has been inflammatory, and the child recovers, the spasmodic cough will frequently continue, even for months after the inflammatory state has subsided.

Premonitory Symptoms.—The first notice of the disease, is generally occasioned by the extreme violence of the cough, or by a hoop. Very frequently it is not noticed at all, till the child hoops; and then there is no doubt of the nature of the disease. In fact, we are never justified in saying that the disease exists, till the child hoops. If the disease prevails in the neighbourhood, and the child coughs more violently than usual, in all probability, it will "turn" (as people say) to the hooping-cough. But if the disease be not fully formed, one cannot say with certainty that it is the disease, unless the child hoops.

Duration and Prognosis.—If the bronchitis be violent, or if it continue for a great length of time, though not violently, the child may die. As a mere spasmodic affection, hooping-cough does not generally destroy life. In the greater number of cases where children die, there is a violent or extensive bronchitis, and a violent or extensive inflammation of the substance of the lungs.

The disease may destroy a child in two or three weeks, or it may not destroy it for many weeks; but after the disease has lasted six or eight weeks, it generally gives way. It seldom continues longer. Children, however, from the very slightest cold, are apt to hoop again. Some will hoop occasionally during the greater part of a twelvemonth; and some, when they have once had the disease, will be observed to hoop at a more distant period even than that, if they catch a severe cold.

When a child vomits, it is generally considered a good sign. If there be no vomiting with the cough, it is observed by those who have most experience, that the child gets worse. Dr. Gregory knew a lady, who never hooped in the disease; and therefore it was hardly "*hooping*-cough."

The disease prevailed in the family, and she had as violent a cough as the rest; but at the time she ought to have *hooped*, she always *fainted*.

The danger is in proportion to the other symptoms;—that is to say, the symptoms of affection of the head, and of bronchitis and peripneumonia. The younger the child, the greater the danger. It is a very dangerous disease when it occurs in infants. Those who suppose that the disease arises from contagion, consider that it remains latent, from a few days to a few weeks; and they suppose that the disease itself, when it occurs in an individual, is not capable of communicating contagion beyond a month or six weeks;—just as is the case with other contagious diseases. Gonorrhœa, for example, after a certain lapse of time,—although nobody will venture to fix the period,—is not contagious.

Morbid Appearances.—On opening children who have died of this disease, we occasionally find very little the matter in the lungs. The child may have died from something else; for the disease has a great tendency to produce hydrocephalus, convulsions, and various affections of the head;—such affections as we see in children.[a] It is one of the great calamities attending the disease, that the effects of it are so fatal. There is such continued difficulty of breathing, and such violent cough, that the vessels of the head are over-distended; and the consequence is such congestion and irritation of the head, that hydrocephalus continually occurs. I know that violent coughing will overstrain the vessels of the head, and produce great mischief; for I saw an infant that had never been well from the moment it had coughed violently. It was so strained, that the parents (from time to time) fancied it would die. From the instant of the coughing, the head drooped, and convulsions came on; of which it ultimately died; although, till seized with this violent cough, it was comparatively well,—having nothing the matter with the head; and having only a common cough at first;—such as other children in the family had. Thus children die from hooping-cough; or from the *effects* of it, rather than from the disease itself; and yet, after death, we can discover very little wrong in the lungs. But frequently, indeed *generally*, on examining the lungs, we find a large quantity of mucus in the bronchia. The mucous membrane is red, soft, pulpy, and increased in thickness; so that there is clearly bronchitis. Frequently, also, the lungs are very solid. The air-cells have become inflamed; and the lungs are very much hepatized. I have opened children who have died from hooping-cough; and nearly the whole of the lungs have been like liver. They did not collapse; and, on pressing them, we could scarcely diminish their bulk in the least. When bronchitis takes place, on listening to the chest, the common signs of that disease are found to be present;—there is the sonorous rattle which occurs in the breathing of adults; and we hear the respiratory murmur excessively loud and rough throughout the chest.

Causes.—By far the most frequently it affects *children*; but it also af-

[a] I (Dr. Elliotson) was suddenly called to an infant in convulsions, which had begun some hours before. It had been labouring most severely under hooping-cough for a month. I instantly took away a large quantity of blood from the head by leeches, but was too late: the convulsions, insensibility, squinting, &c., never ceased; and the child died in two hours. On cutting into the brain, innumerable large orifices of blood-vessels appeared, and the arachnoid membrane of the ventricles was an uniform scarlet tissue of vessels. Although the hooping-cough was violent to nearly the last hour, the lungs and trachea were perfectly free from the smallest mark of inflammation or any other disease; a little mucus only was found in the ramifications of the bronchia. This case explains why prussic acid is so generally serviceable in hooping-cough. Convulsions are a common effect of hooping-cough, and here arose from it as a disease purely spasmodic.

fects *adults*. I heard that the late Archbishop of Canterbury[a] had it, a short time before he died. It is frequently an epidemic disease. It does not, in general, occur more than once; except in a mere spasmodic form;—when the parts are thrown into such a condition as to produce hooping, although the real disease does not return. Hooping-cough is supposed, by some, to depend on a specific contagion. Some deny this; but others assert it. I was always taught that this was its source, and I never thought of doubting it; but others have done so, and I suppose they have a reason for it. Any irritation whatever will provoke a paroxysm, when a patient has the disease. If a child be put in a passion, or we move it about quickly, or give it any thing stimulating, then a paroxysm will take place. There may be various exciting causes of a *paroxysm*; although the peculiar exciting cause of the *disease*, I presume, is only one;—either a specific contagion, or something peculiar.

Pathology.—[There has been great diversity of opinion respecting the nature and essential seat of pertussis. Cullen, Guibert, Hoffmann, Hufeland, and most other German authors, consider the disease as essentially nervous;—depending on irritation (not inflammation) of various parts of the nervous system, particularly the phrenic and pneumogastric nerves; and causing spasmodic action of the larynx, diaphragm, and stomach. Leroi, Webster, and Begin, ascribe the disease to inflammatory irritation of the brain and its membranes. Watt, Badham, Dawson, Dewees, Guersent, Laennec, and most other French authors, hold the disease to be essentially bronchitic or catarrhal, with the addition of convulsive action of the diaphragm and larynx; excited, according to some, by an excessive sensibility of the inflamed bronchial membrane. A third view, particularly maintained by Desruelles, is that hooping-cough depends on inflammation of the bronchi, speedily causing irritation in the brain; whence is reflected convulsive excitement of the diaphragm, muscles of the larynx, &c.; which gives to the cough its peculiar character. Dr. Copland[b] considers the disease to be essentially a nervous irritation; commencing in the respiratory surfaces, and (through the nerves, chiefly the pneumogastric) transferred to the "medulla oblongata"; whence it again affects the respiratory apparatus, and sometimes the stomach; and that predisposing or concurrent causes may readily convert this irritation, at either of its seats, into inflammation.

In reference to these different views we[c] may remark, that in many instances they do not sufficiently regard the physiological character of those morbid motions, which form the chief feature of hooping-cough. Thus we find much ascribed to the phrenic nerve and diaphragm; when it is obvious that these agents of inspiration are little, if at all, concerned in the motions which constitute the cough. We[c] regard hooping-cough as originating in a specific irritation (almost always inflammatory at first) of the lining membrane of the upper portions of the air-passages. This irritation is in the first stage constant, and accompanied with cough and expectoration, like those of common inflammatory catarrh; but in the second stage it peculiarly increases the irritability of the laryngeal constrictor and bronchial muscles; and of the nerves which excite the contractions of these, as well as of the expiratory muscles which are sympathetically associated with them;—those, in fact, which are concerned in the act of coughing. The peculiar cough of pertussis, resembles that excited by a foreign body directly irritating the glottis; in fact, it is properly called "*per*tussis"; for it con-

[a] The Rev. Dr. Manners Sutton.
[b] "Dictionary of Practical Medicine"; Volume 2; Page 242.
[c] Dr. C. J. B. Williams.

sists of an exaggeration of all the actions of an ordinary cough, and of nothing more; and there is no more reason for seeking its cause in the brain or spinal marrow, than there is for referring excessive vomiting or dysenteric straining to this seat. It is unnecessary to go further than the respiratory apparatus, for an explanation of the phenomena of hooping-cough. The irritation which at first extends to the vessels and is more constant, becomes afterwards purely nervous; and, like other local nervous affections,—such as neuralgia, spasms, nervous colic, &c.,—manifests its effects only occasionally, perhaps under the influence of some additional exciting cause. The various complications which so much increase the danger of hooping-cough, we would regard chiefly as the effects of the violent cough; sometimes assisted by predispositions to particular diseases, or by co-operating causes. Any one who has witnessed the severe paroxysms of hooping-cough, can scarcely wonder that it may produce in the head, in the lungs, and in the abdomen, serious congestions: which previous tendencies, or additional exciting causes, may readily convert into inflammation and its effects;—hydrocephalus, pneumonia, and intestinal disease.[a]]

Treatment of the Inflammatory Stage.—The treatment of hooping-cough is twofold;—accordingly as it respects the *inflammatory* or the *spasmodic* condition of the parts. The most important thing, by far, is to remedy the inflammatory state;—the bronchitis or peripneumonia. If it be found that there is a constant oppression of the breathing, with spasmodic attacks of increased difficulty, and occasionally a violent cough, and that there is an accelerated pulse, and pyrexia, together with sonorous, sibilous, and crepitous rattle,—it will be evident that there is inflammation of the bronchia, or the substance of the lungs;—the air-tubes, or the air-cells, or both. Of course that inflammation must be remedied in the usual way. We might give all the antispasmodics, all the narcotics, and all the other medicines that are supposed to have a direct influence over the spasm, and yet do no good. In fact, we should make the patient worse; and if nature were not to get the better of us, and cure the individual, there is every probability that great mischief would be done. It is therefore highly important to ascertain the existence of inflammation; and to remedy it, if possible, in the usual way;—by taking blood from the neighbourhood of the chest; occasionally by bleeding in the arm, if the patient be old enough; but particularly by *local* bleeding, and the exhibition of mercury, and of emetics.

Emetics and Leeches.—In the greater number of cases, the inflammation is such as will yield to the application of a few leeches, and the exhibition of emetics; but it is of great use, at the same time, to clear out the bowels by calomel,—provided the inflammation is severe; and to give it steadily in small and repeated doses. The inflammation is frequently not so severe, but that an emetic every day, or night and morning, will be found sufficient for all the purposes of remedying the bronchitis; still I would not trust to it in severe cases.

In this, as in most diseases of children, the warm-bath is of essential service. It is thought by some, that the friction of tartar-emetic-ointment over the chest, is more useful than the application of blisters. I rather feel disposed to think that this is the case; and that blisters are not of very great utility in the affection.

Regulate the Diet.—It is of great importance not to allow children to overload the stomach; for the cough is generally much more troublesome after meals than before. When there is any inflammation, the food should

[a] "Library of Medicine"; Volume 3; Pages 97 and 98.

(of course) be exceedingly light;—affording scarcely any nourishment; and the patient should not be allowed to distend the stomach with liquids. During the whole period of the disease, even when the inflammation is gone, the food which is given should be very compendious,—not bulky. It is also of great use, in this disease, to prevent children from moving about a great deal; for running will frequently excite the cough; and it is also of great use to keep the child quiet mentally; for a fit of passion will bring on a violent cough. The bronchitis will sometimes continue for a great length of time. The breathing will be difficult for some weeks; there will be more or less feverishness; and the child will waste away; but by the steady employment of antiphlogistic regimen, with a moderately open state of the bowels, many cases will do exceedingly well;—notwithstanding the bronchitis may continue, though not in a violent degree, for some time.

Treatment of the Spasmodic Stage.—Next to the employment of emetics, narcotics are of very considerable use. Emetics will not cure the disease; because there is, in many cases, violent inflammation, and we must treat that in the usual way; but there is hardly a case of hooping-cough, that will not be much mitigated by the continued use of emetics. In the first instance, a large number of cases may be trusted to them, and to the administration of narcotics. Prussic acid is very useful in this complaint; not in subduing inflammation, but in subduing the tendency to cough. We may give it to the youngest child; but of course it should be in a small quantity. If the child be young, we may put one minim to one or two ounces of almond-emulsion; and one tea spoonful of this mixture will sometimes be found as much as is proper. This is one of the most convenient modes of exhibiting it; and from the sixteenth to the fourth of a minim may be given, three or four times a day. After the disease has lasted some time, opium is more or less useful, given in a small quantity. "Dover's powder" is one of the best forms. The extract of conium and hyoscyamus may be given in small doses, rubbed up in mixtures or emulsions; but I think prussic acid is one of the best things. It will not cure the disease; it has no specific power over it, any more than any other narcotic; but it does remedy spasmodic irritation of the air-passages, exceedingly well; and very often better than other narcotics.

Tonics.—After a certain time has elapsed, and no bronchitis exists, or so slight a degree of it that it requires no inflammatory treatment,—when there is debility and irritation of the air-passages, rather than any thing else,—tonics may be given. Various *metallic* tonics have frequently been employed. I do not know that any one is so good as iron; it seems to me to be the best we have. The sulphate is a form in which the medicine may be given to children very conveniently, dissolved in various mixtures; and, as they are fond of sweet things, the sesquioxide mixed with treacle, may be very easily given them. I am not aware that it exerts a particular power over the cough; but, when the disease has existed some time, such remedies are very useful.

Friction.—Some persons place great reliance upon friction, with some external application; and narcotics are frequently applied in this way. I believe that a very good remedy is a quack medicine, called "Roche's Embrocation." Any stimulant not sufficient to abrade the cuticle, and produce inflammation, if it have united with it a quantity of opium, will be found exceedingly serviceable. Friction along the spine is particularly recommended.

Cold-Bath and Change of Air.—After a time, there can be no doubt of the use of the cold shower-bath; but one of the best things is change of air. Every old woman says so; and I believe she is perfectly right. I

have known (as every one must) many cases, where the cough continued in spite of all the medicines that could be given, and all the physicians that could prescribe them, till the residence was changed; and then the cough speedily diminished. This will not do good at the beginning. It is only when the disease has existed some time, and is disposed to cease, that a change of air will cause it to disappear, better than any thing else.

Inhalation of Tar or Chlorine.—The inhalation of tar-fumes has been recommended; but as these are acrid, it would be a wrong practice during the inflammatory stage; though when the disease becomes merely spasmodic, they may be of use. The mode of employing the tar, is to put it in a pipkin in the room, and to let the fumes ascend so as to impregnate the air. In doing this, great care should be taken that the fumes are not too strong; or they will *cause* irritation, instead of *subduing* it; but, with proper precautions, it is a remedy that is of great use. I dare say chlorine, used about the room in the same way, would be beneficial; but great care is required not to use these things to the degree of producing irritation.

Hooping-cough is a very troublesome disease to treat. We may save life by subduing inflammation; but with regard to removing the complaint, we may find ourselves very much baffled. Much good, however, may be done, with respect to the spasmodic part of the affection, by good management;—by giving light food, and a very moderate exhibition of narcotics. Of all these prussic acid is the best; for although its exhibition is not very satisfactory, I am persuaded it is *more* satisfactory than that of any other narcotic.

CHAPTER X.

PHTHISIS PULMONALIS.

I SHALL now describe an *organic* disease of the lungs, for which unfortunately we can do little or no good; and which causes more destruction in this country, than any other affection whatever. It is "consumption." I shall commence by describing, not the symptoms, but the changes of structure which takes place in the lung itself.

Definition.—This disease is called, in *common* language, "consumption", or "*pulmonary* consumption"; and, in *medical* language, "phthisis pulmonalis", or simply "phthisis";—"*pulmonalis*" being understood. The word "*phthisis*" is derived from φθιω, *to consume*. This disease is apparently of a scrofulous nature. The substance which is deposited is precisely that which takes place in those parts which are said to labour under scrofula. Some have made varieties in phthisis, as being tubercular or not; but by "*phthisis*" is now meant, not an *ulceration* of the lung, but a *scrofulous disease* of the lung; which *may* produce ulceration; and which *will* produce ulceration, if it continue long enough. But ulceration not connected with this disease, is not called "consumption." An abscess may be formed from common inflammation, rare as it is: but that is not called "phthisis";—it would be called simply "an abscess in the lungs", or "a vomica." By "*phthisis*" is meant a deposition of a scrofulous substance in the lung; and all the organic changes to which its presence, or the state which produces its presence, gives rise.

SECTION I.—PATHOLOGY OF PHTHISIS.

Deposition of Tubercles.—The deposition, in this disease, takes place in minute granules; which are greyish, semi-transparent, and pretty firm; lying close to each other, over a certain space in the substance of the lungs. Although at first they lie distinct from each other, yet they are close. They increase in size; and they likewise increase in number; and, as they increase in this twofold manner, they of course approximate. The space between them diminishes; till they coalesce, and form a mass. When they increase in size and number, they possess less semi-transparency;—they become opaque and yellow. This change is first observed either at the centre, or on some part of the surface; and from the point at which it commences it gradually pervades the whole "tubercle", as it is called.[a] When the tubercles are few, they seldom exceed the size of an almond each; but the masses produced by their aggregation, may be very large. I have often seen the whole of one lobe of the lung, and I once saw the whole of one lung, converted into a solid tubercular mass.

[a] See Page 212.

Laennec conceives that, in such a case as this, the tubercular deposition has taken place in a diffused manner;—that there has not been a formation of distinct separate tubercles, but that the substance was diffused in the texture of the lung; and he calls this mode of deposition "tubercular infiltration."[a] Whether he is right or not, I do not pretend to say.

Their Shape and Situation.—The shape of the tubercles is round, and rather oval; and this might incline us to suspect, that their situation is the air-cells. That they may be formed within the air-passages, is proved by the dissection of glandered horses by Dupuytren and Andral. The bronchial tubes were filled with granules, mixed with pus and tubercular substance. Hence it is clear that these substances may be found in the air-passages; and Andral says, that he also found a tubercular mass in the minute twigs of the bronchia, where no ulceration existed; of course, therefore, the deposit may be formed in the air-cells. Many have said that this deposition takes place in the cellular membrane of the lungs; but when we consider its situation, and consider that it is found in the minute bronchial twigs, and not leading to ulceration, it is probable that it is formed in the air-cells. Cruveilhier says that, after injecting mercury into the bronchia of a living animal, he found each globule of the metal surrounded by a concrete substance, formed of white granules, in various parts of the lungs. By injecting the mercury into the bronchia, it reached the air-cells; and he afterwards found granules, formed of tubercular substance, around the globules of mercury. Still it is to be remembered, that a similar effect is produced in the cellular membrane, by injecting mercury into an artery; and that flakes, precisely similar to those in the lungs, are seen in the spleen, and in the cellular membrane of various parts. I will not, therefore, take upon myself to pronounce, whether tubercles exist in the one or the other. They may exist in both; but there are arguments on both sides.

Softening of the Tubercles.—After a longer or shorter time, the tubercular mass softens,—generally first in the centre; and the greater part becomes a fluid, resembling pus, in the midst of which are seen particles of the original solid and friable deposit. The membrane which is often found around the deposition, likewise secretes pus. Long after the tubercle is gone, the membrane which surrounds it continues to secrete pus; and the cavity enlarges by ulceration. The openings of the bronchia, which had been lost by the deposit surrounding them, blocking them up, compressing them, and causing them to ulcerate,—are seen opening into the cavity of the abscess, on all sides. Bands of pulmonary substance, and blood-vessels (shrunk and obliterated), are seen leading across the cavity, with tubercular deposit upon them; while a great number of blood-vessels are completely obliterated, and run flattened along the sides.

Usually Commences at the Superior Part of the Lung.—While some tubercles are advanced to this degree in one part, others are less advanced; and others, again, are exceedingly minute (having been recently formed); both at a distance, and in the neighbourhood. We see them in all states, in the same lung; but it is an established fact that, in by far the majority of instances, the greatest deviations from a healthy structure, exist at the superior part of the lungs; and the first tubercles are, in the greater number of instances, deposited there. The reason why there is the greatest devastation at the upper part of the lung, is because the tubercles are first deposited there. In proportion to the duration of the tubercle, in general,

[a] See Dr. Forbes's Translation of Laennec's Treatise on Diseases of the Chest; Part 1; Book 2; Chapter 7. (Third Edition; Pages 278 and 282.)

is the change it has undergone; and if tubercles, therefore, be deposited in the upper part first, we may expect the third stage to be arrived at there, sooner than at the other parts. The reason of the tubercles being first deposited in the superior part, is not known; unless it be that the superior part of the chest is more exposed to the vicissitudes of temperature, than other parts. It certainly is a fact, with respect both to males and females, that the upper part of the lungs is less covered by dress than the lower. In ladies, and in women of all ranks, the neck is bare; and so is the upper part of the chest; and with regard to ourselves, we have the breast more open than the lower parts; except when close square waistcoats are worn. But whether this will explain the circumstance I have mentioned, I will not pretend to say.

Some have made observations upon which lung is most affected with tubercles. Laennec says the *right*, but the majority of authors say the *left*; and therefore I suppose that one side is as much subject to them as the other. I have never made any observations on the matter.

[The upper and back part of the lungs is the most common seat of tubercle, and the left side is more frequently affected than the right;—an observation first made by Stark, and corroborated by Carmichael Smyth from an examination of the cases recorded by Bonetus and Morgagni, and more recently by Louis from his own experience. The last author found tubercles exclusively confined to the right side in two cases only, and in five to the left: of thirty-eight in which the upper lobe was totally occupied by large excavations and tubercles, so as to be impermeable to air, he met with twenty-eight in the left and ten only in the right lung; and in eight of perforation of the pleura, he found seven on the left and one only on the right side. When to these observations we add the result of Reynaud's experience,—who, of forty cases of pneumothorax, found twenty-seven on the left side, and thirteen only on the right,—I consider that there is sufficient evidence to confirm the conclusion, that the left lung is most frequently affected.[a]]

State of the Lung around Tubercles.—The intervening portions of the lung, dividing the tubercular deposition, are not always healthy;—being frequently turgid with blood, and with a bloody serous fluid; and sometimes they are indurated, and of either a red or a grey colour. The bronchial membrane, on being slit up, is frequently found red; and evidently smeared with a far greater quantity of mucus than in health. Thus there is evidently peripneumonia,—inflammation of the substance of the lungs, in many cases; and likewise bronchitis. I think there can be no doubt, that by far the greater quantity of expectoration in phthisis, is derived from the bronchial membrane;—much more than from the abscess; and the fluid secreted by the bronchial membrane is, as in common bronchitis, of all degrees of consistency, and of all degrees of quality.

Dr. Stark's Researches on Phthisis.—Admirably as the morbid anatomy of phthisis has been investigated by the French, I am bound to do justice, on this subject, to one of our own countrymen; as I formerly did[b] on the subject of the enlargement of the air-cells, to Sir John Floyer, and Dr. Baillie,—a truly eminent physician of the last generation. In the "Medical Communications"[c], there is a very admirable paper on the Morbid Anatomy of Phthisis, by Dr. Stark; who was a very clever young man,

[a] "A Treatise on Pulmonary Consumption. By Sir James Clarke, Bart., M.D." Pages 128 and 129.

[b] See Page 850.

[c] "Medical Communications, by a Society for the Promotion of Medical Knowledge."

and fell a victim to his ardour in investigating Morbid Anatomy. Dr. Stark, more than fifty years ago [a], pointed out that phthisis was essentially a tubercular affection;—a fact which, though known to Hippocrates, had been passed over by almost every other ancient writer,—Greek, Roman, and Arabian; and by many of the moderns. Sydenham himself considered tubercles and abscess, as rather the *effect* of disease, than the actual disease itself. Boerhaave was not acquainted with the subject. Dr. Stark, in his paper, traced the tubercles from their original minuteness and solidity, to their enlarged and softened state. He asserted that the chief seat of the affection, was the superior and posterior part of the lungs; and particularly, he says, the *left* lung;—agreeing therefore with a great number of writers, in opposition to Laennec.[b] He stated that the bronchial ramifications were never obstructed or obliterated, but opened into the cavity; but that the blood-vessels suddenly became constricted near the orifice; and even obstructed by a coagulum; so that an injection would not pass into the abscess from the large blood-vessels, or flow into the blood-vessels around the abscess. He found that the injection rendered the surrounding parts quite hard; so that the diseased parts which appeared firm before, became soft by contrast. He also mentioned, that the parts unaffected by the tubercles, but immediately around them, are generally red and firm; so that he found, between the effects of the tubercles and this induration, that about one quarter only of the lungs, in extreme cases of phthisis, remained fit for duty. He ascertained that the tubercles generally have a capsule; and that adhesions of the costal and pulmonary pleura, generally exist where an abscess is within. We find, on opening persons who have died of phthisis, and when the tubercles exist near the surface,—especially if they be softened down,—that there are adhesions on the outside of the surface of the lung, attaching it to the pleura. This is a provision of nature, to prevent the escape of the contents of the abscess into the cavity of the membrane. The care taken by nature to prevent sudden and speedy death,—which would take place, if the blood-vessels were not filled up by a coagulum, and flattened down upon the sides; and the equal care taken to prevent sudden death from inflammation of the pleura, occasioned by the escape of pus from any of these abscesses,—is certainly very striking; but both circumstances were pointed out long ago by Dr. Stark. The French are not aware of his existence; having, till of late, read but little of English literature.

SECTION II.—SYMPTOMS AND PROGRESS OF PHTHISIS.

The symptoms of phthisis vary, according to the progression of the tubercles. This is the case both with the general symptoms, and with those which are to be learned by the ear. When the tubercles are only in a solid state, and are not united together into groups, we can learn nothing of their existence from the ear. We can only *presume* their existence, from the general state of the patient; and therefore cannot be *sure* that tubercles are formed. When they are sufficiently numerous to constitute groups, then, on striking that part of the chest, we hear a different sound from that which is audible, when nothing but air is present. When the part is softened, and a cavity is produced, various other sounds will be heard. The part will sound different from what it would, were there no cavity at all, and no unnatural state of the parts; but where the air enters

[a] In 1788.

[b] See Page 894.

a healthy part, and leaves it again. From what I have said respecting the morbid anatomy[a], the cause of the different symptoms I shall have to detail will be evident. There must necessarily be more or less pain, cough, expectoration, and at last hectic; and we shall see that the sounds in the chest must all perfectly correspond.

General Symptoms: Hæmoptysis.—This is, for the most part, a very slow and insidious affection. Long before any other symptom occurs, it is very common for the individual to be seized with hæmoptysis,—"spitting of blood." This, as I mentioned when speaking of hæmoptysis (or "hæmoptoe"[b], as it is sometimes called), is usually from the bronchial membrane.[c] The blood is of course frothy, scarlet, and mixed with air. Occasionally it is in considerable quantities; but, for the most part, it is not to any great amount. The patient frequently has several returns of this, before any other particular symptom of phthisis presents itself. When phthisis occurs, there is then, for the most part, little or no more spitting of blood.

Cough.—Whether this has occurred previously or not, one of the first symptoms noticed is a short tickling cough;—such a cough as the patient denies even to exist. It is observed by his friends, while he himself for the most part complains little of it; or, if questioned on the subject, denies it altogether. The cough is short, tickling, and hacking, rather than very severe. With this cough there is generally spit up only a little mucus;—either at the same time, or soon after its commencement.

Stitch in the Side.—It is very common to hear the patient complain of "a stitch in the side", generally low down; and one would think it was a slight pleuritic affection; only that sometimes the stitch is undeniably felt beyond the chest in the parieties of the abdomen. I have known a very violent stitch, before any other symptoms of phthisis, low down in the abdominal muscles, out of the way of the chest; so that these pains, though they are occasionally pleuritic, are, I have no doubt, very frequently muscular.

Cough increases at Night.—The cough is generally worse when the patient gets into bed; owing, I presume, to the coldness of the sheets; or when he rises in the morning;—from the coldness of the atmosphere of the room, compared with the warmth of the bed. There is felt a little shortness of breath on motion;—on any exertion, the patient finds that his breath is not so good as before; and he complains of languor.

State of the Surface.—The flesh becomes soft; so that on taking hold of the arm of a patient, even at this time, we find it is flabby. The hair loses its strength; so that it cannot be kept in order as before. This occurs particularly in females. There appears to be a softness of the hair; which will not allow it to remain in the way in which it has been placed.

Feverishness.—There is also observed, about this time, a little feverishness. The pulse is found to be quicker than natural; and this comes on particularly after the least exertion. An exertion which before would quicken the pulse only perhaps ten beats, will now quicken it twenty or thirty, in a minute. On falling asleep, it is very common for patients to find that they sweat in some one part of the body;—in the calves of the legs, for instance, or upon the chest. The power of resisting external temperature is diminished; so that the patient complains of chilliness.

Character of the Sputa.—The expectoration, although only mucous ori-

[a] See Pages 892 to 895.

[b] From *αἷμα, blood*; and *πτυω, to spit.*

[c] See Page 863.

ginally, now becomes sanguineous. Perhaps the patient never had hæmoptysis, but the complaint has begun with the general symptoms I have mentioned [a]; but he tells us, on one of our visits, that what he has spit up was brown, or tinged with blood. That is another form, in which a discharge of blood takes place. Very frequently there is the hæmorrhage which I before mentioned [a]; but more frequently, perhaps, there is no such thing as any decided hæmoptysis; but the mucus, after a time, becomes a little streaked with blood.

Second Stage.—There is now more cough, more dyspnœa, and more debility than before; and the patient begins to find, that he lies more easily on one side than on the other. The patient finds his strength decrease; or, if he do not himself allow it, yet it is evident to others. He cannot make the same exertion as before; and it is also pretty evident that he loses flesh. Occasionally there is a sharp pain in the side, of a pleuritic character;—so as to make it necessary to take away a little blood. There is clearly inflammation of the pleura. If the patient be a female, menstruation is almost sure to decline. The catamenial discharge loses its natural redness; becomes paler than it should be; and, as well as being thus impaired in quality, becomes more scanty in quantity; and, more frequently than not, ceases altogether.

Incurvation of the Nails.—Generally, as these symptoms proceed, the ends of the fingers become enlarged. The last joints of the fingers look broader than they did before; the whole appear tumid, and the nail is particularly prominent. The eyes, too, become very clear. There is a whiteness and transparency of them, which did not exist before;—the sclerotica looks of a more intense white than natural. The nails sometimes become very considerably incurvated. The whole nail is more convex than before; and, I believe, rather softer,—like the hair; and that part of the nail which is unattached to the cutis, is in many instances very much bent. The hair, which at first is only soft, and with difficulty kept in order, now generally falls off.

Change in the Character of the Sputa.—The expectoration, from being mere frothy mucus, now becomes a little green, or a little yellow, and more abundant; and, instead of being long and stringy,—like the expectoration of health,—it becomes short between the fingers. Now and then the expectoration becomes fetid, the strength very much declines, the sweating at night becomes very profuse, and the expectoration decidedly sinks in water; whereas, before, either the whole of it or the greater part swam. Shreds are seen in it, whiter than the rest; like curdy lumps, or fragments; and, in some few instances, we may observe earthy matter in it. The latter is, by no means, so frequent an occurrence as the former; but it occurs now and then.

State of the Tongue.—The tongue will sometimes remain in a healthy condition; but in most instances it becomes loaded with mucus, and is foul and yellow, on the one hand; or becomes red at the edges and tip, on the other. Sometimes it is of an intense redness all over; so that it looks like a piece of beef.

Third Stage: Hectic.—There is now an increase in the pulse at two periods, at least, in the day;—that is, in the middle of the day and in the evening; but decidedly in the evening. There is a great exacerbation of it, together with heat of the body, after every meal. The pink sediment

[a] See Page 896.

of hectic [a] appears in the urine; and the pulse is constantly much quicker than it should be; perhaps seldom below ninety, and frequently above a hundred. The mind and the appetite remain unimpaired. Persons labouring under this disease, will frequently eat heartily to the very last;—have a perfectly good digestion; and their mind is as alive and active as it ever was;—perhaps more so. Patients generally have hope. They will not believe they are in a dangerous state;—they do not think that their case is consumption. On the other hand, when people are not active, and think they are labouring under phthisis, in nine cases out of ten there is no danger whatever. A remarkable feature in the disease is this hope. Even medical men, who have fallen victims to phthisis, have insisted, up to the day of their death, that they had not ulceration of the lungs; and that they should get well. This has been observed in intelligent men, as well as in those who were most stupid. It is not a matter of judgment, but of feeling; and hope is quite characteristic of this disease, though it is by no means an *invariable* circumstance. Now and then persons despond;—being quite aware that the disease is well established and confirmed; but, in a much greater number of instances, there is the most lively hope.

Colliquative Purging and Sweating.—In the greater number of cases, the intestines suffer very much. Perhaps, at the beginning, the intestines are a little dormant; but as the disease proceeds, and especially at the last, the intestines fall into a state of diarrhœa; and the purging very frequently alternates with the sweating. The purging is so severe, that it may be said to melt down the patient, and therefore is called "*colliquative* purging"; and the sweating is so profuse, that it is called "*colliquative* sweating." The expectoration becomes more yellow and green than before; and it also becomes more abundant. The cough becomes more severe; the legs become œdematous; and the body wastes exceedingly. The hectic flush is seen, decidedly, upon the cheeks and palms of the hands [b]; and the exhaustion is such, in some cases, that the patient frequently faints. He feels exceedingly languid. The patient is, at last, confined to his bed in all cases; but, in some instances, there is great tendency to syncope, and dyspnœa from debility; so that stimulants are required. Just before death, the brain is sometimes affected; so that there is frequently delirium, three or four days before death.

Varieties in the Symptoms.—The progress of all these symptoms, is exceedingly various. Sometimes only a few weeks, but in other cases, many years elapse before the patient sinks under the affection. I am convinced that I have seen cases, where there were no symptoms of phthisis; and yet the patient has died from ulceration of the lungs, in the course of three months. I recollect one instance of this particularly. On account of some anomalous symptoms in the abdomen, the patient was frequently examined by me. He was two or three miles from London; and, on carefully examining his chest, I found that he was free from cough, and from all the symptoms of phthisis generally; as well as from those symptoms which can only be learned from auscultation. He then began to expectorate, shewed signs of phthisis, and died. On the autopsy we found ulceration. All this occurred in the course of two months. The public at large are aware of this state; and they give to such cases as these, the epithet "*galloping consumption.*" On the other hand, the disease will last, there can be no doubt, for very many years; that is to say, persons will have cough,

[a] See Page 304. [b] See Page 98.

and expectorate; yet it will not increase, but decline from time to time; and so they will go on, till at last they expectorate a great deal, and die in the usual way. Dr. Gregory, of Edinburgh [a], used to say that he knew a case, where a person was in a state of consumption for fifty years; but it is impossible to say that the patient laboured under *phthisis* all the time; it might have been only *bronchitis*. But it is a fact, that there is very great variety as to the duration of the disease. It is generally quickest in those who have the finest skins, and are nearest the period of puberty; or who are not very much beyond that period. The disease is frequently suspended, on the other hand, by pregnancy, and by suckling; and now and then it has been suspended by other diseases, as by ague or insanity. These, however, are only occasional circumstances.

Auscultatory Signs.—We are now prepared to understand those symptoms, occurring during the progress of this disease, which are acquirable by the ear. At the first period of phthisis, there is nothing (in my opinion) to be learned by the ear. It is from the general appearance of the patient, and from the general symptoms of which he complains, that we suspect the presence of phthisis. At the onset, it is at most only a matter of *suspicion*. We cannot be *certain* of it. It is easy to perceive that this must be the case, when we consider that, in the first instance, the tubercles which constitute this disease, are exceedingly small and exceedingly few; —leaving a large portion of pulmonary structure perfectly healthy. It is only when the tubercles increase to a certain size, and approximate,—so as to form a mass, or when a considerable portion of the pulmonary structure is beset with tubercular deposit, that we can expect to discover any audible change.

Percussion in the First Stage.—The parts in which the symptoms acquirable by the ear may be noticed, in the first instance, are below the clavicles. This may be observed before the tubercles have softened; but when they become sufficiently large and numerous to occupy some space, on striking over the part where such deposit exists, we do not find the hollow sound of health, but a greater degree of dulness than there was before. In proportion to the size of the tubercular deposit, is the dulness of the sound; and we may save ourselves a great deal of trouble, by beginning our examination at the clavicle, and immediately under it. Still, if we have any suspicion, and yet the parts below the clavicle sound well, we should examine other parts; because now and then the deposition, instead of taking place there, occurs in other situations. In the great majority of cases, however,—I may say in nine cases out of ten,—the change takes place just below the superior portion of the lungs; and therefore we should commence our examinations there.

Stethoscopic Signs in the First Stage.—Besides this dull sound on percussion, if we listen with the stethoscope, and make the patient speak, we find the voice resound there in an unnatural manner. The solid substance of the tubercles, is so much better a medium of conveying sound, than the loose structure of the healthy lung, that the sound is louder where these tubercles exist than elsewhere. The voice will not come through the tube, as if the patient's mouth were at the other end of it, speaking to us; but we hear the sound echo; and it is louder than natural. There is no pectoriloquy; but we have what is called "bronchophony";—the same sound that is heard on putting the stethoscope over the large bronchia.[b] But it is to be remembered, that the voice naturally sounds louder under the

[a] See Note to Page 270.

[b] See Page 805.

clavicle than elsewhere, on account of the large tubes being there; and therefore we should not depend on this symptom alone. It should be united with the dead sound on percussion, in order to satisfy us that there is bronchophony dependent upon tubercular deposition. It is well to compare the sound on each side; for the deposition generally takes place more on one side than on the other; and frequently it occurs *only* on one side; and our suspicion will be increased, as to the really unnatural loudness of the voice, if we hear it louder on the one side than on the other. The difference of the two is frequently very manifest.

Pectoriloquy.—But when the tubercular mass softens, and a portion is discharged,—so that the cavity is emptied, or nearly so,—a new symptom occurs. The bronchial tubes, we know, enter this cavity; and as the air enters it, the same state of parts exists there as in the trachea;—that is to say, there is a large space, into which, on inspiration, the air enters; and consequently, when the patient speaks, the same sound is heard that occurs on putting the stethoscope over the trachea. If we place the stethoscope over the trachea, we have the voice traversing the tube, as though the mouth were at the other end; and just the same occurrence takes place, when we put the stethoscope over a cavity in the lungs;—we have the phenomenon called "pectoriloquy."[a] If we make the patient cough, a mucous rattle is heard;—the same sound as if air were forced through soap-suds. It is a gurgling sound, arising from air agitating a viscid fluid.[b] But as the contents grow less and less viscid,—as the curdy matter of the scrofula is more and more spit up, and mere mucus forms more and more the contents of the cavity, the gurgling is heard louder, and is found to be freer. Then, if we make the patient breathe quickly, and at the same time rather deeply, we hear the same sound that we do if we make him breathe quickly, and put the stethoscope over the trachea. In the latter case, we have the sound of the air evidently going through a large space; and the same circumstance occurs in the former instance;—merely arising from the part being of the same description as the trachea. We have the same phenomena with respect to simple respiration, the same phenomena with respect to the voice when the patient speaks, and the same phenomena when we make him cough, that we have when we place the stethoscope over the trachea;—that is to say, we have pectoriloquy. We may, however, have the same symptom of pectoriloquy in the most perfect health, if we listen over a certain part of the chest;—especially in thin persons. On placing the stethoscope between the clavicles of a person who is thin, we have pectoriloquy; because the large bronchia going to the lungs, emit the sound of a tube, even if the individual be healthy. We must not, therefore, pronounce a person in a state of phthisis, simply because there is pectoriloquy between the clavicles; but when it is heard decidedly in other parts of the chest, then there can be no doubt as to the nature of the case.

Percussion in the Second Stage.—When the disease has reached this stage, we no longer have the dull sound on percussion, that we had in the first instance.[c] The tubercular solid mass, which gave the dull sound on percussion, no longer exists; and consequently there can no longer be the phenomenon which it produced. That phenomenon was a dull sound, from the part being solid. The part is now hollow; and, on striking over it, we find the sound as hollow as in health, and perhaps *more* so.

[a] See Page 805. [b] See Page 801. [c] See Page 899.

Pectoriloquy does not Indicate the Nature of the Cavity.—It is to be remembered, that though we have pectoriloquy, and thus have a large space which ought not to be there, yet the phenomenon does not shew the nature of the cavity; and it is only from the general symptoms, that we are satisfied it is the cavity of phthisis. In gangrene of the lung, a part of the latter is sometimes separated and discharged; leaving a cavity which may give rise to pectoriloquy. But then we know that it arises from gangrene by other circumstances;—such as the great debility of the patient, and the fœtor of the expectoration. In chronic bronchitis, the bronchial tubes may be very much enlarged at one spot;—as large as the bronchia themselves, or approaching to their size; and in that case we shall have pectoriloquy; but then there will not be present the general symptoms of phthisis, and thus we may suspect the nature of the case. No reliance, then, is to be placed on the ear alone: the symptoms which are *audible*, are only to be taken in conjunction with those which are *general*. Persons find fault with auscultation unjustly, who suppose it is employed to the exclusion of attending to other symptoms. No person who uses his ear, is justified in making so absurd an application of it. He ought to be careful in adopting all the means of making observations within his power. A person may be labouring under ulceration of the lungs; and yet he may not afford the sign of pectoriloquy. If the cavity be near the surface of the chest, and the walls of the cavity be very thin, and if the bronchial tubes that open into the cavity, have mouths so small as to bear no proportion to the cavity itself, we may have a large cavity, and yet no pectoriloquy at all. Here, again, is an instance of the fallacy of the observations made by the ear alone, to the exclusion of the other symptoms. Like every body else who has attended to these matters, I have over and over again opened patients, and found a large cavity after death; where, before the fatal termination of the case, there had been no pectoriloquy at the affected spot. The walls of the cavity must be a certain thickness, for the phenomenon of pectoriloquy to be produced; and the bronchial tubes opening into the cavity, must bear a certain proportion to it; for when the cavity is near the surface of the lung, and the substance of the lung has been entirely destroyed, so that there is merely pleura forming the parietes of the cavity, we cease to have pectoriloquy. If, however, we had seen the patient before the cavity became so large, as to be out of proportion to the bronchial tubes opening into it, and the walls became so much diminished, then we should have had pectoriloquy. But we may not have been called in before the patient arrived at this state; and therefore may not have had an opportunity of observing the successive changes.

Metallic Tinkling.—When an excavation is very large indeed, we sometimes have another phenomenon;—which is called "metallic tinkling." By this is meant a sort of silvery, ringing, metallic sound, when the patient coughs, speaks, or breathes; but particularly when he coughs;—a clear metallic ringing, which can hardly deceive us. But the sound is not peculiar to this affection; for when the surface of the lung is ulcerated, and air escapes into the pleura, that being a very large cavity, it just gives us the same phenomenon. When air enters into the pleura, we have metallic tinkling, from the presence of the air and fluid together; but if it so happen that there is a large cavity in the lung, that will come to the same thing; and the air and fluid entering into it, will give rise to the same sound. The cavity, however, is seldom so very large as to produce it.

Value of Auscultation in Phthisis.—We seldom examine a patient at that point when much information is to be derived from the ear. In the

first stage of the disease, there is nothing to be learned from it; and as the disease proceeds, the case is generally perfectly clear, without the use of the ear; but if a set of symptoms do present themselves to the ear, they are as worthy of being observed as those that present themselves to the eye; and the mere trouble of examining them, can be no excuse for not observing them. Unfortunately, in the great number of instances, the case is too severe to render such examination necessary; but cases do occur where the disease is not so severe; and some will say that the affection is *bronchitis*, while others assert that it is *phthisis*. Persons are said every day, by those who do not use the ear, to be in a state of phthisis, when they are not; and *vice versâ*. Now if the ear be used after a certain time, and we ascertain the existence of a cavity; this, in conjunction with the other symptoms, will render the case clear. The examination must not be too late; or the phenomenon of pectoriloquy may have ceased. It is of great importance to be able to say that there is pectoriloquy; for a practitioner may have said that it is not phthisis at all, and he will stick to it; but if, on listening, we hear pectoriloquy, we may be sure that he is wrong; and may be able to convince him of it. It is a fact that some practitioners who have taken a predilection for other organs,—particularly the liver, or the viscera of the abdomen,—may declare that there is no such thing as phthisis present; while it is evident enough that the patient's lungs are rotten. Now if, in a case like that, we can induce a person to listen to us, and can shew him the difference between the sounds in health, and those in this disease, we may open his eyes, and bring forward such an argument as cannot be resisted. It would be unphilosophical not to know these things; and not to attend to them if they do exist.

Complications.—Besides those morbid appearances and those symptoms which I have now mentioned, as occurring in phthisis, a variety of others occur in different patients. Some have very great disturbance of the digestive organs; some have tenderness of the epigastrium, tenderness of the abdomen where the small intestines lie, and tenderness likewise of the liver. Some have very little appetite; but a large number have an *excellent* appetite; and eat and digest well, to the last moment of their existence. It is very common for a fistula to form by the side of the rectum; and it is very common to find, after death, a considerable inflammation of the mucous membrane of the intestines. It is by no means uncommon to find the intestines ulcerated; to find a scrofulous deposit in the mesenteric glands; and to find the liver more or less diseased. The French have attended, very minutely, to the proportionate occurrence of these different morbid affections of other parts. We find in the work of M. Louis (a physician now living in Paris), the most accurate information on this point.[a] It is

[a] We subjoin the following summary, from Louis's admirable Work on Phthisis (translated by Dr. Cowan), of the various complications which occur in phthisis, and their relative frequency:—

"Tubercles and pulmonary excavations were, in one-tenth of the cases, coincident with recent inflammation of a portion of one or both lungs, of the pleuræ; or with the effusion of a notable quantity of limpid fluid in the thoracic cavity.

The trachea presented ulcerations, often of considerable size, in rather less than one-third of our [M. Louis's] observations. Its mucous membrane was merely reddened, sometimes slightly softened or thickened, in one-fifth. The larynx was ulcerated in rather more than one-fifth, and the epiglottis in a nearly similar proportion.

The pericardium contained a marked quantity of clear fluid in one-tenth of the cases, and presented traces of chronic or recent inflammation in many others. The heart was pretty frequently softened; the aorta was red in the majority of young patients, and its structure more or less modified after the age of forty.

In one-twelfth of the patients the stomach was dilated, and situated lower down than natural. Its mucous membrane was red,

very common to find the trachea ulcerated;—to have a scrofulous deposit in various part of the trachea; particularly about the larynx. In some instances there is soreness, violent cough, and every other mark of chronic

sometimes mammillated, a little softened, and thickened anteriorly, in nearly the same proportion. In one-fifth it was more or less extensively thinned. We found it in the same proportion very red, softened, and sometimes thickened in the great cul-de-sac; it was ulcerated, of a more or less greyish tint, and mammillated in many others, &c.; so that it was only healthy in one-fifth of our examples.

In the small intestine there were ulcerations, varying in number and extent, in five-sixths of the patients. They were nearly as frequent in the large intestine; of which the mucous membrane, often red, and in one-half of the cases thickened, was either wholly or partially of the consistence of mucus; so that we have only three times seen it perfectly healthy.

The tuberculization of lymphatic glands was less frequent in the neck, loins, meso-colon, and axilla, than in the mesentery; where it existed in various degrees, in one-fourth of the cases.

The liver had become adipose in one-third of the examples. The parietes of the gall-bladder were occasionally thickened and ulcerated; and when this was the case, as also in some other circumstances, it contained calculi.

The spleen was softened, and under or above its natural volume, in a great number of instances. It was tuberculated in one-sixth. This last alteration was nearly equally frequent in the kidneys, where we sometimes discovered cysts.

In many individuals the prostate was tuberculated; in one of these there was an example of tubercular exhalation in the interior of the vesiculæ and seminal ducts. We have once seen the internal surface of the uterus converted into tuberculous matter.

From one to six pints of clear serous effusion in the abdomen existed in one-fourth, and a small quantity of pus, or some false membrane in the pelvis, in four of these instances. We have seen several cases of tubercular peritonitis. In one the great omentum and the meso-colon presented a mixture of grey, bluish, semi-transparent and tuberculous substance.

The cerebral arachnoid was often partially thickened; presenting more or less numerous granulations in its upper portion, especially near the falx. In two cases it was lined by a yellowish and soft false membrane. The tissue uniting it to the "pia mater" was infiltrated, and the ventricles distended by a very appreciable quantity of serum, in three-fourths of our examples. The same fluid was found in the inferior occipital fossæ; but less frequently, and not so abundant. In one-seventh the brain was injected; in one-twentieth, its consistence was generally diminished, and in one instance to a remarkable extent. Its partial and pulpy softening was observed in the same proportion. All the serous membranes were thus very frequently the source of effusion; and it is in the lateral ventricles of the brain that this was most generally observed. The same membranes were also liable to acute inflammation, coming on towards the close of life; and this was most frequently the case for the pleuræ.

In some instances, many of the morbid states just glanced at,—as the softening and thinning of the gastric mucous membrane, and the ulcerations of the intestines,—were sufficient of themselves to have caused death, independently of the lungs. The period to which the commencement of these different alterations could be referred, was very variable. Pneumonia, pleuritis, softening and redness of the great cul-de-sac of the stomach, pulpy softening of the colon, peritonitis, arachnitis, partial and pulpy softening of the brain, could all originate a few days previous to death. The greater part were the result of inflammation;—plainly proving that *weakness*, so far from being an obstacle, is (on the contrary) favourable to inflammatory action. The other alterations, dated much further back, sometimes to the very commencement of phthisis; as, for instance, softening with diminished thickness of the mucous membrane of the stomach; and, in some cases, the large intestinal ulcerations.

These various morbid changes admitted also another division; some were peculiar to phthisis, others were not so; but were present in different degrees, after a variety of other chronic affections.

Among the first class may be enumerated ulcerations of the larynx, and more especially of the trachea and epiglottis; ulcerations of the one or both intestines (principally of the small); and the adipose state of the liver: so that by seeing an ulceration in either of the organs mentioned, &c., we should be able to assert, independently of all farther investigation, that the patient had died of phthisis. These ulcerations, wherever they were situated, in their mode of production presented many points of resemblance. When the mucous membrane was destroyed, the sub-mucous layer gradually thickened, and became uneven; after a time, it ulcerated, and then the muscular coat in its turn began to thicken: this was, like the former, subsequently destroyed (though its

disease of the larynx; whereas, in other cases, there is no hoarseness, or other sign of affection of the larynx or trachea; except a little inflammatory irritation, indicated by an excessive secretion of mucus. Now and then, scrofulous tubercles are found in the brain, or at least under the "pia mater"; but, for the most part, the head remains perfectly free.

SECTION III.—DIAGNOSIS AND PROGNOSIS.

Diagnosis.—With regard to the *diagnosis* of the disease, it must be made out by general observations respecting the patient;—general observation as to predisposition, and as to constitution. Then, again, as to the *progress* of the disease, if a person has had, for a great length of time, cough, which has generally increased; if there has been a falling away in flesh; and the individual has not passed the middle period of life, but is between eighteen and thirty;—if these symptoms occur, and there has been phthisis in the family, we have still greater reason to suspect the formation of tubercles. If, in females, there be a suppression of the menses;—if, in males or females, the ends of the fingers become enlarged, and there are frequent attacks of hæmoptysis, together with a continual cough,—the case will be rendered still more suspicious. By means of the stethoscope we may ascertain, after a time, whether there is a cavity or not; but the diagnosis of this disease is too easy, after the affection has once formed.

Prognosis.—The prognosis, in these cases, must always be unfavourable. If only one part of a lung be beset by tubercular deposition, it is possible that the substance may soften, be expectorated, the part heal, and the patient do very well. It is possible that, notwithstanding the presence of pectoriloquy, and other signs of confirmed phthisis, yet the patient *may* recover. Such things, however, are exceedingly rare. I doubt whether it is a common thing for these excavations to heal; but it is a far more uncommon thing for the patient to get well; because, in general, the disease is constitutional; and if one excavation should heal, a crop of tubercles occurs in some other part, and goes through successive changes; and under these the patient will sink. On opening a patient who has died of phthisis, we almost always find tubercles in various stages; and if we could heal one lung entirely (as it has been proposed to do, by making an opening into the chest, and causing the lung to collapse) I doubt whether we should do much

total destruction was extremely rare); so that in proportion as one of the coats of the intestine became ulcerated, the succeeding one thickened; and, by thus opposing greater resistance to its destruction, protracted the fatal termination.

The last morbid alteration peculiar to phthisis, were *tubercles*, wherever they might be found. We [M. Louis] have never observed them in *a single* instance in any organ, without their existing in the lungs; so that their presence in these last viscera, seems a necessary condition for their development in other parts. Another fact which strengthens the idea of this dependence is, that, with one single exception, we have always seen the tuberculous matter more advanced in the lungs than elsewhere; and when tubercles existed at the same time in different parts of the body, these were always at the *same degree of development*; and it would be difficult to conceive this uniformity, in parts so distant from each other, and so various in structure, unless we admit the influence of one and the same cause, acting simultaneously on a great number of organs; thus making tuberculous deposition quite independent of those occasional causes, which we are apt to suppose active in certain cases.

As our object, however, is not to support one opinion more than another, we [M. Louis] will remark, that we have found one exception to the law we have established. It was in a case of typhus. No tubercles existed in the lungs; and yet there was a small quantity of tuberculous matter in the mesenteric glands." (Pages 115 to 118.)

good; because the other lung is generally beset with tubercles, which will regularly go through their stages in the same way.

Cicatrization a Rare Occurrence.—Laennec says, that he has frequently seen a cicatrix in the lungs;—that a cavity had existed and healed; that the sides had come together; and the part become solidified and hardened; —just as is the case with a cicatrix on the surface of the body. The appearance spoken of by Laennec, as indicative of a healed cavity, is a depression, or puckering, on the surface of the lung; just as in a cicatrix on the surface of the body, when there has been an abscess below. If there be merely superficial ulceration, we know that a scar is left; but in proportion to the depth of the ulceration on the surface of the body, and in the parts immediately below the surface, so is the depth of the cicatrix and of the puckering. This appearance is sometimes seen on the surface of the lung; and Laennec says that, on cutting down on such a part, we find below it induration, to a greater or less depth. My reason for doubting this is, that we see exactly the same appearances upon the liver. Almost every month, if we open many bodies, we find a puckering on the surface of the liver;—a depression, with a puckering all around it; and, on cutting into it, the substance of the liver appears unnatural as to colour. But there is no ulceration; in fact, there *could* have been no ulceration,—no suppuration; for there are no signs of there having been any matter. The peritonæal surface of the liver will fall into a state of chronic induration; here and there it will become indurated and hard, and it is commonly puckered; and there we have the appearance of so many scars. The same thing will take place in the lungs. They may seem puckered, and the pleura may be very hard there; but that is not a sufficient reason, to my mind, for believing that there is a cicatrix. It is common, when there has been a slow thickening of the pleura,—to say nothing of inflammation,—to find the lobes glued together, and the pleura between the lobes thick, and almost cartilaginous. Sometimes there is a puckering on the surface; and, on cutting down, we find a cartilaginous hardness to some depth;—from cohesion of the different lobes. Independently of that, the pleura will fall into the same sort of disease as the peritonæum over the liver; and will produce just the same appearances. On reading Andral, I find that he has come to the same conclusion as myself; and I have no doubt that others have done so likewise. It is said that, now and then, a cicatrix may be produced; but I am sure it is a rare occurrence.

Evacuation of the Tubercular Deposit.—But sometimes people, without any cicatrix, get rid of this tubercular deposit. When it has occurred only at one spot, an open cavity remains; and the patients live for a long time. It is so common, however, for tubercle after tubercle to take place in the lungs, and go through successive changes, that people generally do not live. It certainly does happen, sometimes, that the lining membrane of these cavities becomes hard, secretes a quantity of mucus, and so remains during the rest of life. No further mischief is done; pectoriloquy is always heard; and the patient is only troubled with cough and expectoration. But this is comparatively rare.

Terminating in Pneumato-Thorax.—Now and then,—but this likewise is an uncommon occurrence,—death will take place from ulceration extending outwards through the pleura. In cases of this description, the patient is generally seized with a sudden difficulty of breathing. On striking the chest, there is a very clear sound; and (as may be supposed from the air escaping from the lungs to the pleura) the lungs become more and more collapsed. If it occur on the left side of the chest, the force of the air

will be such, as to drive the heart to the right side. This is called "*pneumo*-thorax"; but, as I shall afterwards point out, it should be termed "*pneumato*-thorax." I shall describe this more particularly, when I come to diseases of the pleura; but it is to be remembered that, now and then, ulceration is not confined to the lung itself; but that the pleura becomes ulcerated, or is rendered so thin, that it gives way; and then we have air and fluid in the pleura. In general, nature prevents this,—however near to the surface the cavity may be,—by causing adhesions. I mentioned[a] that when a tubercle is near the surface of the lung, the pulmonary and costal pleuræ (one or both) throw out lymph, and become glued together; so that ulceration may go on within, and yet neither air nor fluid can escape into the pleura. But now and then nature fails. A tubercle exists near the surface; the ulceration goes on; no adhesions take place; a perforation is produced by the ulcer; and the phenomenon of air and fluid in the pleura occurs.

SECTION IV.—CAUSES OF PHTHISIS.

Hereditary Predisposition.—There can be no question, that the disposition to this disease is frequently constitutional, and frequently hereditary. Those who are most subject to it, are usually fair persons; with light hair, a sanguineous temperament, soft skin and hair, and long pointed fingers. Their flesh is flabby,—not firm; and the pupils of their eyes are large. They are frequently thin and tall; but whether they are tall or not, persons of this description are slender, with a long neck. Frequently, too, such persons have been subject to hæmorrhage from the nose when young. There is another description of persons subject to phthisis;—comprehending those who are not tall, but short; and who have not light hair and a fair skin, but are rather swarthy, and have dark hair and dark eyes. These also have large pupils; and their skin is rather soft; and, instead of having *long*, they have *short* fingers and nails. Like the others they are of a lax fibre;—their muscles being flabby; and persons of this latter description, generally have a tumid upper lip. There are, therefore, two descriptions of persons most liable to phthisis. Both, in general, have a soft skin, soft hair, a flabby fibre, and a pale look; but those of one set, if they be not tall, are slender; and generally have light hair and a florid complexion; and are disposed to hæmorrhage; whereas the others are short, with dark hair, a tumid upper lip, and short truncated fingers. This form of body is (of course) constitutional; and it likewise may be hereditary.

Age.—A certain age is more liable to the disease than any other. In this country, scrofula is more likely to occur, in the lungs, between the age of eighteen and thirty, than at any other period. When it occurs later than this, it is perhaps more frequently the result of unfavourable external circumstances, acting upon constitutions moderately disposed to it, than of the mere intensity of the predisposition.

Food, Temperature, and Clothing.—There can be no question that it is greatly predisposed to by bad food, bad lodging, and bad clothing. Many would escape the disease, were it not for their being exposed to wet and cold, being badly protected in the way of lodging or of clothing, and not fortified with the means of resisting wet and cold, by good food. The latter keeps up a good fire within; and compensates, in a great measure, for the unfavourable state of the atmosphere. Hence the disease is much

[a] See Page 895.

more frequent in countries which are wet and cold, than in others; and it is more frequent in countries which have cold and wet alternating with warmth, than in those which are simply cold. For example: I believe it is not so common in Russia, as in many other warmer parts.

Alternations of Temperature.—Alternations of temperature, especially cold and moisture (united) alternating with a warm temperature, seem to have the greatest effect in exciting the disease; and to be the great predisposing cause,—next to hereditary, constitutional disposition; or the want of food, clothing, and lodging. It is far less frequent in *tropical*, than in *temperate* climates. Indeed, it is said that real strumous phthisis is unknown in the tropics, or is confined to European settlers; who bring the disposition to it from unfavourable climates. It is a disease seen, more or less, in all parts of the world, or nearly so; either occurring among the inhabitants, or among those who come from countries where it is very common. Some ascribe the comparitive rarity of the disease (I only say "*comparative* rarity") in Russia, to the circumstance of the people having good clothing; —being clad with furs and other warm materials, and eating plenty of animal food. All the inhabitants of cold climates, eat a large quantity of animal food; while those who inhabit warmer regions, care little about it, and live principally on vegetables. The diets of Italy and Russia are completely different. To show the effect of clothing upon the disease, it is said that it was unknown in Scotland, before the people changed their dress from woollen to cotton. I suppose that is an exaggeration. It is alleged, that formerly, in Scotland, the people were all dressed in woollen, —as the Romans were; but that since they have changed it for cotton, the disease has become very prevalent. The disease is said to be the least prevalent among butchers, fishermen, and fishwomen (in Scotland, called "fishwives"). The cause is said to be, that these people eat plentifully of animal food.

When the predisposition is very strong, the most favourable external circumstances can scarcely keep away the disease. We see a family, brought up with every care in guarding against cold,—having good food, good clothing, and good lodging, and attention paid to the slightest indisposition; and yet, one after another,—especially if they be females,—they become the victims of this disease. On the other hand, where the disposition is not so strong, by taking great care to avoid vicissitudes of temperature, to dress very warmly, and to be well nourished, people escape it. If persons who have this disease in their respective families, who themselves are disposed to it, and perhaps afterwards (one or both) die of it, intermarry, the affection is almost sure to be transmitted to the offspring. Every one must have seen instances of the death of children, whose mother died some years before of the same disease. Where two first cousins marry together, the predisposition derived from this unfortunate mixture becomes so powerful, that a very phthisical offspring is generally the result. Whoever belongs to a phthisical family, should endeavour to "cross the breed", by marrying some one that is not phthisical; because, although it is delightful to marry a lady delicately beautiful to all appearance,—having white teeth, a fine skin, soft hair, and so on,—yet misery is almost sure to be the consequence. The disease is almost certain to begin; and the offspring perish one after another.

Exciting Causes: Cold and Wet.—The immediate exciting cause of the disease, when one is apparent, is generally that of any common inflammation,—any common cause of catarrh. Exposure to cold, more particularly cold and wet, especially when applied partially, and (again) especially when

the body is over-heated, is the most common exciting cause. Persons with a strong predisposition, catch cold from the slightest causes;—from something that would be insufficient to give another individual cold; and what would be mere *catarrh* in one person, becomes in the other the commencement of *phthisis*. Sometimes tubercles have already existed in the lungs; and these merely produce inflammation in the organ. In other cases, inflammation is induced in the air-tubes; and, the disposition being strong, the debilitating effects of the inflammation lead to the production of the tubercles.

Mental or Physical Exhaustion.—Whatever exhausts the body, may produce the disease. When persons are predisposed to it, they will have it come on without catching cold at all; but simply from over-exertion of the body, or over-exertion of the mind. But where there is mental exertion, there is almost always anxiety. It is seldom that a person is occupied mentally without anxiety; and therefore anxiety may, in a great degree, be the cause of the disease. There can be no doubt that the depressing passions will produce the disease. I have seen a case where, in a predisposed family, an individual has become the victim of phthisis, decidedly from the very time that some great source of grief occurred to him.

Powdery Substances.—Powdery substances in the atmosphere, have excited this disease;—not simply in cases where there was a strong predisposition to it;—but where the powdery dry substance is of a hard nature, (such as portions of metal, or of stone,) the disease is produced with scarcely any discoverable predisposition. There are certain occupations, in which fine particles of stone are diffused through the atmosphere; and others in which fine particles of *steel* are so diffused; and the persons exposed to these, very frequently die of phthisis; so that, in some parts of the country, where these trades prevail, few men, who work at them, live beyond forty; and many die much before that time.

Contagion?—It has been supposed that the disease will arise from contagion; but it is in foreign countries that this idea prevails. It is believed in Languedoc, Spain, and Portugal; and the clothes of patients who have died of this complaint, are there burned by the civil authorities. Morgagni was so frightened at the contagiousness of this disease, that he never opened the body of a person who died of it; but that was evidently the result of a little nervousness, rather than of his better judgment. It is mentioned as being contagious by Morton, a writer on this disease in our own country; but it was not so considered either by Hippocrates or Celsus. I do not believe that it is in the slightest degree contagious. Like others practising medicine, I have seen hundreds and hundreds of cases of the disease, but I never saw an instance, in which there was a shadow of probability for the doctrine of contagion. I have seen husbands nurse their wives, and wives their husbands; and I am quite sure that where the survivor has become phthisical, the proportion has not been greater than we might expect, where a disease is so prevalent as phthisis. It is not uncommon for persons in the same family to fall into it, where there is great anxiety. I hardly recollect a case where the husband has died of phthisis, and the wife has fallen a victim to it immediately afterwards, where there has not been a predisposition to it. I have seen so many hundreds of examples of the reverse, that I do not think the proportion is greater than it would be, if it were a matter of absolute certainly that the disease is not contagious at all.

The Presence of other Diseases.—The presence of other diseases will ex-

cite this. It is very common for phthisis to come on after inflammation of the lungs, and after severe bronchitis, peripneumonia, or pleuritis; but it is certainly very often the case, that the inflammatory disease which has preceded it, has been the result of a general predisposition to disease in the region of the chest.

Sedentary Occupations.—Sedentary occupations, of all descriptions, must be unfavourable in this disease; because, in sedentary occupations, there is a want of fresh air, as well as of due exercise. In such occupations, too, there are generally many persons collected together; and unhealthiness, of all descriptions, must be engendered.

Great Respiratory Exertion.—With some, the exciting cause has been great respiratory exertion;—such as excessive public speaking, excessive reading aloud, excessive blowing of wind-instruments; and some have had symptoms of phthisis, which have declined after giving up the flute, or some other wind instrument.

Mercury.—The disease has frequently been excited by mercury. It is very common for us to see persons who have been in the foul wards of an hospital, and undergone a considerable administration of mercury, fall into a state of phthisis.

Excessive Venery.—Excess in venery is likewise, by no means, an unfrequent exciting cause. I have seen many young men die of phthisis, a twelvemonth after their marriage; although they have shewn no signs of it before.

We sometimes have an abscess of the lungs;—sometimes an abscess of the *liver*, making its way, and producing an adhesion to the diaphragm, and of the diaphragm to the lungs, and so on; but all this is not *phthisis*. Where, however, there is a great predisposition to the disease, this may be the exciting cause.

Statistics.—It is said by Dr. Young, in his work on Consumption [a],—and I dare say we may depend pretty much upon his estimate,—that one-fourth of the inhabitants of Europe die of phthisis. Dr. Young's Treatise is a sort of Bibliographia Phthisica; for the author refers to every work on the subject written previously to his own. Years ago it was calculated, that fifty thousand persons died of the complaint, in Great Britain, every year. The mortality in this country is greater than in Paris. Whereas one in *four* dies of this complaint in Great Britain, only one in *five* dies in Paris, and at Vienna, only one in *six*.

SECTION V.—TREATMENT OF PHTHISIS.

The *treatment* of the disease must be totally different in different circumstances. Very little can be done, in general, after it has gone on to a certain length. We can then do something to alleviate suffering, it is true; but before it has occurred, unless the predisposition be very strong, I think we can do much in preventing it;—provided the person's situation enable him to follow our directions.

Prophylactics.—The great mode of preventing phthisis, when there is a predisposition to it, is by invigorating the body as much as possible;—by taking care that the individual shall have plenty of fresh air;—shall go out every day; have just exercise enough, without producing fatigue; have a

[a] "A Practical and Historical Treatise on Consumptive Diseases. By Thomas Young, M.D., F.R.S."

good portion of rest at night, and never be deprived of it; eat plenty of animal food of the best quality; and take malt liquor, or a certain portion of wine, if it can be borne. Malt-liquor is the most invigorating; while, for the most part, wine merely stimulates, and in most cases does harm. The state of the mind is also of very great importance; and the utmost care should be taken to commit no excess in study, exercise, venery, or any thing else; so as to do nothing that can do harm, and yet maintain all the functions of the body.

Warm Clothing.—The utmost attention should be paid to clothing. A large number of females, in this country, fall into consumption chiefly through their own fault. The poorer classes cannot dress well,—cannot be expected to take that care of themselves which they ought; because they have not the means; but the rich, and the middle classes, do every thing they can to fall into consumption. They do not wear sufficient petticoats. They wear silk stockings, and the thinnest shoes, and so walk out; or if they do not walk out thus attired, they stand on the steps of the door, and often go some yards on the pavement, before they get to their carriage. They will go from the hottest rooms without any thing about their feet. They take little sleep; have party after party every night; and then, at last, fall into a state of consumption. Neither themselves nor their friends will believe, that this want of rest and this extreme excitement have been the cause of it; but I am quite sure they have. I think I have saved the lives of several young ladies, by insisting on their following my advice of wearing plenty of flannel;—flannel-drawers, flannel-waistcoats, and high dresses. I have seen several who appeared to have every disposition to phthisis; but who, by wearing flannel next the skin, from their collar-bones to below their knees, have passed that age at which phthisis (in all probability) would have begun; and they have ultimately done well. I have taken care to add to this good living. Many wish to make themselves look slender and genteel; and therefore they starve themselves, as well as dress in thin clothing. They should take meat once or twice a-day; and an allowance of malt-liquor.

Cold Shower-Bath.—If we can do all this, we may in many cases prevent phthisis; especially if, in addition, we can make patients use the cold shower-bath. Many cannot bear a cold shower-bath, at first; but they can bear a shower-bath *tepid*; and by degrees they can bear it *cold*. I saw a young gentleman, whose brother died of phthisis. He expectorated blood at the same time as his brother; and they appeared equally disposed to phthisis. In one, the disease ran on very fast; and he died. The survivor was spitting blood continually; and the pupil of his eye was large. I prevailed upon him to begin the use of the shower-bath; and he has done so all the winter. The result is, that he has lost his cough, spits no more blood, and is now a strong young man. No doubt, if he take care of himself, and commit no excess of any description, he will go on well. I do not know any means so powerful in "hardening" the body, as the use of the cold shower-bath; but it is to be remembered, that we cannot "harden" *every* person, and that we may kill many in the attempt. Some ladies, in order to strengthen themselves, will go out of doors in the most frosty weather; and by that means often injure themselves. We may make the most delicate hot-house plant hardy, by lowering the temperature gradually: but what will *harden* one, will *kill* another; and what will not "harden" *one* person at all, would be quite sufficient to "harden" *another*; and therefore the greatest care should be employed. Some try to "harden" themselves by having the window open; and they

glory in having snow on their coverlet. Some can bear it; but a great number never could bear any thing of the kind. Still, I am sure, it is proper treatment to "harden" people as much as can be borne.

Some persons are so disposed to an inflammatory state, that it is not at all admissible to give them wine, beer, and meat. The utmost we can do is to clothe them well, make them guard against catching cold, and order the shower-bath. Some persons are so disposed to hæmorrhage,—hæmorrhage from the nose, and then hæmorrhage from the lungs,—that nothing stimulating can be allowed. There are such cases; but I know that, in the greater number of instances, by fortifying the constitution well, and adjusting the means used to fortify it to the state of the constitution, we may do great good.

Maintain a Uniform Temperature.—When the predisposition is very strong, it is not only necessary that the patient should most carefully avoid catching cold, by wearing warm clothing when he is out of doors, and by avoiding all danger arising from wet feet, but the temperature of his room should be prevented from falling too low. In many cases it is necessary that the bed should be warmed; but others, not so delicate as that, should have a fire in the room, either when they go to bed, or when they get up,—once in the twenty-four hours,—for the purpose of thoroughly warming it. Some persons are so delicate,—so disposed to phthisis, that we can hardly allow them even to go out during the winter; and a certain degree of artificial temperature must be maintained in their rooms; but these are cases where the predisposition is extreme, and the debility very great.

Removal to a Warm Climate.—It is also of great use where there is a strong predisposition, to send patients to a warmer climate than our own,—to a thoroughly warm climate. One of the best places to which they can be sent is the West or East Indies. If that be too far, one of the best places is the south of Spain, or the south of France. Many parts to which people are sent, are very objectionable. Lisbon, for example, is very cold in the winter; and both Venice and Naples have high mountains in the neighbourhood; and therefore are not good. If we cannot send patients to the East or West Indies, the south of Spain and the south of France are certainly among the most proper places. But many cannot go even there; and for them the warmer parts of England are the only situations left. I need not mention, that parts of Cornwall and Devonshire are the most suitable; and I believe Penzance is particularly so. Nearer to London, one of the best places is Hastings. Many persons have an idea that if, instead of living in London, they go to Brompton, they are more protected from the disease; but I do not know whether there is any thing in that opinion. I have heard practitioners found fault with, for allowing their patients to live in London, and not sending them to Brompton.

But all this must be done before the disease is fully formed; for when it is once established, to send patients away from home, and thus expose them to all the misery of the journey, is not only very absurd but very cruel. It is horrible to see the grief it occasions; and the patient dies of consumption after all. It is much better, when the disease is once formed, to allow patients to remain at their own home, where there is every comfort around them.

Iron.—[In a letter addressed to the Royal Academy of Medicine, M. Foster announces that (from certain experiments) he hopes to prove that:—1. It is possible, even in the face of predisposing causes, to prevent the deve-

lopment of a tubercular diathesis. 2. Even where the formation of tubercles has commenced, their progress may, in a great number of cases, be arrested.

The following are a few of the experiments, upon which M. Coster has built his hopes:—Two years ago he placed a number of dogs, rabbits, &c., in the circumstances most favourable for the development of the scrofulous diathesis. Thus, many of the unfortunate animals were shut up in dungeons, without light, incapable of moving; and exposed to a moist cold, by means of wet sponges which were hung up in the cages. Some of the animals placed in these conditions, were fed on their ordinary diet; others were fed with ferruginous bread, containing half an ounce of carbonate of iron to the pound. All the former became ill,—the greater part tuberculous; but not one of those fed on the bread containing iron, presented a trace of tubercles.[a]]

Antiphlogistics.—When the disease has formed, the treatment must be very different in different circumstances. We generally have to subdue or mitigate inflammation. There are frequent attacks of pleuritis, bronchitis, and peripneumonia. The pleuræ, or the lungs (including the air-cells and bronchia), or both, are commonly found in a state of inflammation. Persons are continually seized with violent "stitches in the side"; and it is necessary to take away a little blood;—four or six ounces, sometimes more; or to cup the part, or to blister it. We find the blood buffed, and have to treat the case, for a time, as one of inflammation of the chest, but conjoined with little power of the constitution. In these circumstances, of course it is necessary that the diet should be low. If patients be seized with hæmorrhage, it is often necessary to treat them in the same way. It is generally necessary to bleed the patient, to some little extent; and to keep him on low diet. When there have been attacks of inflammation or of hæmorrhage, it is necessary, for some days, to pursue antiphlogistic diet; but these may all subside, and we may have recourse to nutritious diet again, or now for the first time, if we have not resorted to it before. It is right, however, not to take alarm at every pain which a phthisical patient may have in the side; for many such attacks will go away, without any strong antiphlogistic measures; and many will go away from the application of a blister, or of a mustard-poultice, which is one of the best things. If, however, that will not remove it, it is requisite to bleed; and to treat it in the common antiphlogistic manner.

Emetics.—[From an early period in the history of medicine, emetics have been employed in the treatment of consumption; and, although they were prescribed with various views by different practitioners, their beneficial effects, when judiciously exhibited, have been generally acknowledged. Some considered them chiefly useful in unloading the stomach and biliary system; some used them as the means of suppressing pulmonary hæmorrhage and inflammation; while others, without attempting to explain their mode of operation, regarded them as capable of curing consumption in its early stages.

The extent to which vomiting was carried by the advocates of the practice, may well surprise the practitioners of the present day. Reid says, that an emetic may be taken every morning and evening, with perfect safety, for months; Richter gives the case of a woman, aged forty, who took six hundred emetics in ten years; and Robinson states the case of a consumptive patient, subject to repeated attacks of hæmoptysis, who was kept

[a] Braithwaite's "Retrospect of Medicine"; Volume 1; Page 19.

alive for eight years, by taking three ipecacuan emetics every week during that period. There can be no doubt that the physicians who employed emetics thus extensively, were fully assured of the advantages which they produced; and their patients, we may conclude, must have been equally sensible of the benefit derived from them; otherwise it is scarcely credible, that a practice so disagreeable would have been prescribed or persevered in. But if such beneficial effects were obtained from the employment of this remedy, it may well excite surprise that it has been allowed to fall into disuse; for at present emetics are merely used as palliatives to relieve particular symptoms, and are by no means generally considered of importance in the cure of consumption. Two causes may be adduced in explanation of this fact: the first, the disagreeable nature of the remedy; the second, the want of firmness and decision on the part of the physician in enforcing a practice, the value and operation of which he could not satisfactorily comprehend. If I [a] can succeed in removing the latter objection, by showing how emetics may prove the efficient means of preventing phthisis, the former difficulty will be easily overcome.

It is stated, as the result of Dr. Carswell's researches, that tuberculous matter is first deposited on the free surfaces of mucous membranes, in all those organs into the structure of which they enter. In the lungs, the extreme branches of the bronchi and the air-cells, form the primary and principal seat of tuberculous matter: from the structure of these parts, also, it is most likely to be retained. To prevent such accumulation and retention, is a matter of the greatest importance. Now the power of emetics in augmenting and ejecting the bronchial secretion, is well established; we can conceive, therefore, how the repeated action of emetics may prevent the deposition, or at least the retention, of tuberculous matter in the bronchial ramifications and air-cells; and thus prevent the *localization* of the disease, and give time for the correction of the constitutional disorder. The utility of emetics in cases of threatened consumption, may be thus partly explained.

But although I [a] regard the action of emetics on the pulmonary system as one of their most valuable effects, I am not disposed to limit their influence to this; but consider that their determining the circulation to the surface, and promoting the biliary secretion, constitute very important parts of their operation. They restore the secretions which are usually deficient in the tuberculous constitution, tend to diminish abdominal congestion, and equalize the circulation; hence they may be ranked, as Dr. Reid justly observes, among the most powerful alterative medicines which we possess.

The choice of emetics, the period of employing them, and the frequency with which they may be repeated, are not matters of indifference. Ipecacuan is, perhaps, the safest emetic for repeated use, although uncertain in its operation;—often owing, I [a] fear, to a difference in the quality of the drug. The emetics which act most quickly,—such as the sulphate of zinc and sulphate of copper,—would be the kind of emetics best suited for consumptive patients. The emetic should be so managed, as to produce a very gentle effect; and only a small quantity of fluid should be taken, to promote its action. For this purpose, tepid chamomile-tea is particularly well suited. When the biliary system is much loaded, an antimonial emetic may be useful in the first instance; as it appears to possess more power than other emetics, in promoting a free discharge of bile.

Morton thought it best to administer the emetic towards evening; and to

[a] Dr. Clarke.

repeat it every third or fourth day, three or four times, when the patient could bear it and its repetition was indicated. Simmons, Marryat, and Reid thought the morning the best time; and when it is considered that the bronchial secretions accumulate during sleep, there are certainly good reasons for coinciding in their opinion, as a general rule; although circumstances may occur to render evening the proper time for the exhibition of the emetic: if given before going to bed, it may in some cases prevent fever, and promote sleep.

The repetition of the emetic must, in my opinion, be regulated according to the nature of the case. When it is given with the view of preventing the deposition of tuberculous matter, it may, perhaps, be sufficient to repeat it once or twice a week. When the case is more urgent, and the patient is threatened with the deposition of tuberculous matter in the lungs, or when its presence is already suspected, emetics may be much more frequently repeated: but in all cases it will be necessary to watch their effects on the gastric system, and to suspend the use of them the moment they appear to excite irritation there. During the intervals between the emetics, ipecacuan, alkalies, and other medicines which have the effect of promoting the bronchial secretion, should be given; and this practice may also be adopted in cases in which emetics are not admissible. One of the most important effects of this practice, is an increased secretion from the bronchial membrane. This, in Dr. Carswell's view, is the great object to be aimed at; as the more free and fluid the bronchial secretion is, the less will be the chance of any deposit being retained in the air-cells or extreme bronchial ramifications.[a]]

Diet.—Supposing, however, that there is no inflammation or hæmorrhage to subdue; and that the patient is free from pain, and has been so for some time,—then we have to support him as well as we can, and to lessen the irritation. It is often indispensable to give meat and malt-liquor. Many persons, in phthisis, are the better for having meat. Wine (as I said before[b]) has a tendency to stimulate; and therefore should not be given; but ale will often be proper. In a great number of cases, we have to consider that the patient is just in the same situation as an individual having a large abscess in the extremities; which abscess, from pouring forth an immense quantity of fluid, has exhausted him. In that case, we must allow meat and beer, in order to support the patient; and we must administer opium, to lessen the irritation; and, in phthisis, the treatment must be conducted precisely in the same way.

Tonics.—In this state of things it is very useful, when there is no inflammation,—no hæmorrhage, to give tonics; and of all tonics iron is by far the best. The use of what is called "Griffiths's Mixture"[c] is well known. There was a Dr. Moses Griffiths, who made a mixture of iron and myrrh; which is a very good form. But the myrrh is nauseous; and, after making a number of trials, I am satisfied that the iron will do as well *without* the myrrh, as *with* it. The sulphate of iron answers exceedingly well; and when it is recollected how often in this disease there is cough, out of proportion to the regular irritation that takes place, we may see that the iron may relieve the cough, even to a greater extent than it supports the constitution. I mentioned before, that many cases, which have been supposed likely to end in phthisis, have given way to the exhibition of iron.[d] If the sulphate purge the patient too much, or excite the pulse, we may

[a] Dr. Clarke, on Consumption; Pages 341, and 345 to 351.

[b] See Page 910.

[c] Answering to the "Mistura Ferri Composita" of the Pharmacopœia.

[d] See Page 834.

give the sesquioxide; which is rather the milder form of the two. If we exhibit two or three grains of the iron, three times a day, patients will gain strength up to a certain point; and their cough will diminish. The relief, it is true, is only temporary; but we do good for a time; and it is our duty to protract life, without considering whether it is useful to the patient or not. We are to follow the invariable rule of saving or protracting life, whenever it is in our power to do so.

Sponging or Bathing.—Though we may not be able to use the shower-bath, we may do great good, and produce great comfort, by sponging the patient well with vinegar-and-water, cold or tepid. We may even thus check the hectic sweats, better than by any other means. When the disease is fully formed, a *tepid* bath is frequently borne, though patients cannot bear a *cold* bath.[a] Tepid sponging is very beneficial; and it is said to be better, if vinegar be mixed with the water. Many persons, when they have expectorated pus, have, from *tepid* sponging, come to bear *cold* sponging; and have found the greatest relief from it. That is to say, when hectic heat is upon them, they find it very comfortable; and the feelings of the patient should always be consulted.

Anodynes.—Among the means of lessening irritation, opium is one of the very best. I need not say, there are other things used for that purpose; —such as hyoscyamus, conium, and extract of lettuce; all of which do a certain portion of good, and are very often even more eligible than opium; because the latter may disagree. I believe the best preparation of opium, is muriate of morphia; for it has seldom more than one unpleasant effect; namely, constipation; and even that is often a good thing in phthisis, because there is generally a disposition to relaxation of the bowels. A quarter of a grain of muriate of morphia, is equal to a grain of opium; and is more certain in its operation, than any other form of that drug. A solution of it is very cheap.

Inhalations.—We may sometimes lessen the irritation, by making the patient inhale the vapour of various drugs;—by having a vessel three parts filled with warm fluid, and making a patient inhale through it. There must be two tubes to the vessel,—so that the air may pass through the body of the fluid by means of one, while it is drawn out by means of the other. The tube which admits the air must go to the bottom of the liquor,—so as to convey the atmosphere through it; and the tube to be inhaled from, must be fixed above the liquor.[b] The agents which have been chiefly tried are, first, a very minute quantity of iodine, mixed with hydriodate of potassa; and, secondly, chlorine. I have seen more *mitigation* from the chlorine than from the iodine; but I have never seen a case *cured*. I have used them both perseveringly; but I never saw a case of phthisis cured by

[a] See Page 910.

[b] The particularity of this description is by no means uncalled for; and a medical man, when he orders a patient to inhale vapours, must give his personal attention to the manner in which it is performed, if he wishes to have his intentions efficiently carried out. On one occasion, in a large hospital, when a patient with ulcerated sore-throat had been ordered to inhale steam, I found him with the tin-inhaler comfortably tucked under the bed-clothes, with a cork stuffed into the air-tube. The consequence of this was, that the patient was obliged to remove his mouth from the instrument after every inspiration; and, after all his laborious efforts, the supply of steam was very insufficient. The nurse (in every respect an excellent one), on being questioned as to the use of the cork, very naturally replied that it was "to keep in the steam"; and added, that she had been in the hospital eleven years, and never saw an inhaler used in any other way. There is nothing surprising in all this. Nurses are not expected to understand the principles of pneumatics. On instituting an inspection of the other inhalers in the hospital, every one of them was found duly provided with a cork!—*Dr. Rogers.*

these means; and I do not believe that a case ever *was* cured. I have known a single drop of tincture of iodine, put into a pint of fluid, produce great irritation; but chlorine is borne much better. The mitigation afforded by it, however, is but temporary. The mode of using it is this:—into three-fourths of a pint of water, drop four or five minims of a saturated solution of chlorine. It is best to begin with one or two minims, and to increase the quantity gradually, as the patient can bear it; but if we at last arrive at a quantity which he cannot bear, we must then desist, and go back to what he can bear. Some have recommended the exhalations of tar. Tanners, as well as butchers, are said to escape the disease; and I have employed the liquor from tan-pits, in which there is an infusion of oak-bark. I have made people inhale it; and some have found considerable relief. Others, however, have found the smell so unpleasant, that they could not go on with it. I have not used it long; but as to its curing the disease, I should imagine that is out of the question. I believe that no means whatever will effect so desirable a purpose.

Removal of Urgent Symptoms.—The great indication, when phthisis is once established, is to subdue inflammation if we can;—whether it occur in the form of pleuritis, or bronchitis, or peripneumonia. Besides this there is an indication, on the other hand, to support the strength by nourishing food and tonics; and a third indication is to subdue irritation by narcotics. It is necessary to attend to another indication;—the removal of urgent symptoms of various kinds.

We continually find a person sweating so profusely, that his strength is thereby greatly diminished; and this may often be subdued by washing him all over with tepid vinegar and water, several times a day; or by the exhibition of sulphuric acid; and sometimes, again, by acetate of lead. We also frequently have to subdue another evacuation; which is purging. This, of course, is to be accomplished chiefly by astringents and opium. Unfortunately, the more we subdue one evacuation, the more we increase the other. Frequently, when we check the sweats, the purging becomes more intense; so that while lessening the sweating by tepid ablution (with vinegar-and-water, for example) it is safe to give astringents, lest diarrhœa should suddenly begin. Diarrhœa is one of the most tiresome symptoms in consumption; and very frequently astringents and opiates do not succeed in arresting it,—on account of the inflammatory state of the mucous membrane; and yet the patient is too weak to bear leeches; and suffers so much altogether, that it is very painful to apply blisters. In many cases, fomentations or poultices of bran applied to the abdomen, will be as good means as can be adopted. Frequently the largest doses of opium (such as will produce great stupor), and the largest quantity of astringents (such as almost overload the stomach), have no tendency to check the diarrhœa. For a long time they may succeed; but at last, in most cases, the diarrhœa becomes so severe and obstinate, that they lose their effect. A remarkably large quantity of astringents and opium may be given, with little or no benefit. However, we must do our best; and astringents and opium are certainly the best modes of checking the diarrhœa. Frequently there is ulceration of the intestines; and, among the astringents, sulphate of copper answers better than any other. It has a tendency to produce sickness; but that may be subdued by hydrocyanic acid. If we exhibit sulphuric acid, it is generally necessary to guard it by laudanum; for its acrimonious qualities, when given by itself, tend to increase the affection of the bowels.

Empirical Remedies.—Certain remedies have been boasted of as being capable of curing consumption; but there is no reliance to be placed on any

of them. We are continually asked about the propriety of Iceland-moss, and things of that description. There is no harm in them. On the contrary, they are good so far as they are nutritious and bitter; and are very proper things to be given; but there is no hope of saving a patient by them. It has been stated, that a large quantity of vinegar has cured the disease. Some persons give, in the course of twenty-four hours, about seven ounces of vinegar mixed with seven ounces of water, and sweetened with two ounces of refined sugar; but fair trials have been made with it without success. The balsams have also been recommended; but sometimes they heat the system exceedingly, and increase the inflammatory state. Myrrh has been recommended by some; but I believe it does no more good than any other tonic. We have also had the sulphate of copper strongly recommended; and it does alleviate the symptoms. I think I have seen it, when guarded by opium, not only check the diarrhœa, but diminish the copiousness of the expectoration; but it has no specific virtue. Some have recommended us to give a person an ague; but so many persons who have ague die of consumption, and consumption is so common in aguish parts, that there is no reliance to be placed on this; and it would be great cruelty to give a person another distressing disease (such as ague), for the mere chance of doing good once, perhaps, in a thousand cases. Little more can be done than to lessen inflammation, support the strength, lessen irritation, and subdue urgent symptoms; for, after all that can be done, persons generally die of the complaint. The disease goes on progressively, and we can lessen suffering; but that is all; although, as I have already said [a], the disease may, no doubt, be *prevented* by great care.

Elongation of the Uvula.—Symptoms arising merely from elongation of the uvula, have very often been mistaken for real phthisis. This is a little point worth knowing. When the uvula is elongated,—hanging from the pharynx,—it sometimes produces constant cough; and this leads to a constant expectoration of mucus, and in some cases to emaciation. It happens, now and then, that extreme emaciation has been the consequence of an elongated uvula. Patients, from the constant cough and expectoration, have become emaciated; the tongue has become white; flying pains have taken place in the chest; loss of appetite has occurred; the pulse has become small and unequal; a pain has been felt in the larynx, from constant efforts being made to expel the mucus;—all of which symptoms have arisen from an elongated uvula: and therefore, whenever we are consulted by a patient labouring under these symptoms, it is right to look into the pharynx.

Treatment.—The complaint may be promptly remedied by snipping off the lower half of the uvula, with a pair of scissors. The pain is but momentary; there may be a little bleeding; but the operation is perfectly safe.

It is very seldom that such severe symptoms will occur as to be mistaken for phthisis; but sometimes such a circumstance has taken place. Very often, however, persons have a tiresome cough, which has been mistaken; so that blisters have been applied to the chest, when the symptoms have arisen from nothing more than an elongation of the uvula. With regard to local applications, the best are those which unite astringent with stimulating properties; but in cases where these fail, the operation of curtailing the uvula should be had recourse to.

[There are few subjects within the range of medical science, that modern investigation (powerfully aided by the stethoscope) has more strenuously sought to elucidate, than that of which we have just completed Dr. Elliot-

[a] See Page 909.

son's masterly exposition. The fearful ravages of pulmonary consumption; the insidious nature of its approach; the rapacious cruelty with which, as if in bitter mockery of our dearest sympathies, it loves to select the young and the beautiful for its victims; and the little avail hitherto attending our exertions to wrest the prey from the merciless spoiler;—all this has combined to impart to its investigation no ordinary share of interest.[a] Nor have the difficulties attending the pursuit caused the zeal of its followers to relax; for obstacles in the path of the real votary of science, instead of paralyzing exertion, only lead to greater effort. It is a heartless apathy, equally unworthy of the philanthropist and the physician, that can look at the mass of disease yet unsubjected to the control of medicine, without humiliation at its extent, and anxiety for its diminution! And who shall say that its diminution, nay its final extinction, may not ultimately be accomplished? There are depths in science, and in medicine too, of which our present means of investigation only serve to show the profundity; but who will venture, either in the one case or in the other, to set bounds to the future advancement of knowledge? With the recollection of what has been already done, is there one in the whole range of diseases, against which the power of medicine shall be declared for ever unavailing? A conquest so noble as this, however, is not to be attained at once. It must be the result of patient and laborious investigations; of multiplied and varied experiments; of impartial and repeated observations. We must be content to ascend the steps, if we would ever attain the summit. It is on this account that every devoted student of medicine must hail, with pleasure, the light which has been thrown on this and kindred subjects, by the French school; and to those who have devoted their lives to an unflinching warfare with disease and death, and to the grateful task of soothing the pangs of suffering humanity, will be adjudged, by every properly constituted mind, a higher meed of applause, than to heroes and conquerors the most successful and renowned.[b]]

[a] Various points of interest relative to this subject, are discussed by Dr. Graves, in two lectures which form part of one of his clinical courses;—courses distinguished no less by attractive vivacity of style, than by intrinsic excellence of matter. See the "London Medical and Surgical Journal", for March, 1833. (Nos. 61 and 62; Volume 3; Pages 230 and 262.)

[b] Dr. Rogers.

CHAPTER XI.

DISEASES OF THE PLEURA.

SECTION I.—ACUTE PLEURITIS.

I NOW proceed to consider diseases of the pleura; and, in th first place, the most common affection of it,—*inflammation*.

General Symptoms.—When the pleura is inflamed, there is (of course) pyrexia. If the inflammation be idiopathic,—if it be consequent on some local irritation, it usually begins with shivering; and is followed by quickness of the pulse, and all the symptoms of pyrexia. The pleura is a serous membrane; and therefore, in most cases, we have a firm hard pulse;—not invariably, but generally. Then, as to the *local* symptoms, we have almost always severe pain,—an acute, stabbing, sharp pain;—the least attempt at a deep inspiration augmenting this pain exceedingly. This pain is not increased on the *least* pressure. We may press the integuments down upon the ribs, without aggravating it; and we may press moderately between the ribs; but if we press very firmly between them, and still more firmly upon the ribs themselves, we (of course) press upon the pleura, and then the pain will be increased. In severe cases there is extreme pain, so that hardly any pressure can be borne; and I have known persons unable to lie on the side, on account of the pressure exerted by the part against the bed.

Distinguished from Rheumatism.—A case must be very severe, for pain to be felt on *slight* pressure. In truth, we may generally distinguish pleuritis from rheumatism of the muscles of the chest, among other means, by this;—that in the latter case the least touch causes pain and soreness;—such a pressure as will not affect a patient labouring under pleuritis;—pressure on or between the ribs, and at the back or front of the chest. In acute rheumatism, for the most part, there is profuse sweating;—such as there is not in pleuritis; but there is not, in rheumatism, that general disturbance of the constitution, which occurs in pleuritis. In pleuritis, the whole constitution is very much disturbed; and there is not, by any means, that severe pain which there is in rheumatism. In general, we can make out the difference of the cases very well. The pain, in pleuritis, is only felt at the lowest part of the chest; or, at least, low down in the chest;—not in front, nor at the back; but towards the side. I suppose the disease has had its name ("*pleuritis*") from the pain being observed to be situated in the side (πλευρα); and not from the pleura being inflamed.

The respiration is rapid in this disease, because the patient cannot make a deep inspiration; and, to compensate for the want of depth, he breathes the more quickly. The pain is increased by coughing, and by speaking. Sometimes, on account of its severity, patients cannot speak at all. In general, we make out the nature of the disease sufficiently, without listening to the chest. This affection is one of the best marked of any with which

I am acquainted. There can be no difficulty, except in distinguishing it from rheumatism; and, in general, by attending to the points just referred to, no difficulty will be met with, even on that head.

Varieties in the Symptoms.—The seat of the pain will sometimes vary in the course of the disease. It will sometimes cease on one side, and be felt by the patient on the other; and it is said that, now and then, the pain is not felt in the part which is found inflamed after death. The pain is felt in the opposite side during life; and opposite to that in which we find marks of inflammation after death. It is said, though I do not recollect seeing such a case myself, that sometimes no pain has been felt at all; and the practitioner has been surprised to find, at the autopsy, violent marks of inflammation. Usually the patient lies best on the opposite side; but sometimes he can lie most easily (or lie *only*, indeed) on the affected side. The cough which attends this disease is usually dry, and not very frequent; and sometimes it is altogether absent.

Auscultatory Signs.—On listening to the affected part, we generally find less respiration there, than there should be. The part is not much expanded in respiration. The ribs, at that part, do not move so much as in other parts of the chest that are healthy. Less respiration occurs there; and, on that account only, there would be less respiratory murmur; but there is sometimes considerable effusion of lymph or of serum; and that, of course, will obscure the respiratory sound. After a time, effusion takes place in a decided manner; and then we have a dull sound upon percussion, and no respiratory murmur is heard at the part. There is no *crepitous* rattle heard, as in pneumonia[a]; and no *sonorous* or *sibilous* rattle, as in bronchitis[b]; and therefore—with this absence of sound, and the acuteness of the pain—there is in general no difficulty in saying, that the patient is labouring under inflammation of the pleura. Now and then, pleuritis is united with pneumonia and bronchitis; so that we have the crepitous rattle as well as acute pain; or we may have a sonorous and sibilous rattle; but the acute pain, which is unknown in pneumonia and bronchitis, sufficiently shows that those affections are complicated with inflammation of other parts.

Ægophonism.—When effusion takes place, we may always ascertain it to a certainty by the presence of ægophony. Sometimes the patient loses his pain, and may even say he is a great deal better; but notwithstanding that, on listening to the chest, we may ascertain that he is in considerable danger. Indeed, in such cases, we may be satisfied,—from the quickness of the respiration, or the difficulty of it,—that all is not going on well. But if, in every case of pleuritis, we make a point of examining the chest by the ear, we may ascertain to a nicety when effusion takes place, and to what extent it has occurred. In cases unattended by danger altogether, this effusion may occur; although a person who does not use his ear, would not know that it existed. When effusion is present, there is a dull sound on percussion, and a want of respiratory murmur; and, besides that, if the effusion be inconsiderable, we have in most cases a very peculiar phenomenon; which is called "ægophonism"[c] (from φωνη, *sound* or *voice*; and αιξ, *a goat*);—the sound of a goat. When once heard, this sound can never be mistaken. It is a sound which but few persons have heard; because, in general, people do not listen to the chest in this disease; and when it is heard, it is only in a *moderate*, not in *great* effusion. The symptoms at large are not severe at the moment it is heard; and therefore those

[a] See Page 854. [b] See Page 838. [c] See Page 806.

who are not in the habit of using their ears, in this particular disease, do not think it worth while to examine the chest at that period. We hear it best by applying the stethoscope firmly to the chest; and then applying our ear lightly to the stethoscope. The voice does not run through the tube, as in pectoriloquy. It does not, by any means, take place to the same degree. It rarely, indeed, enters the tube at all. There is no difficulty in learning these signs. Laennec says he noticed it in every case of pleuritis that he examined, for five years preceding the publication of his second edition.[a] Where the effusion is very moderate indeed, then it is not sufficient to produce the sound; and if it be excessive, the phenomenon cannot take place at all. Laennec says he has observed it, where there did not exist in the chest above three or four ounces of fluid.[a] It will occur, not merely when there is *serum* effused in the pleura; but also when the serous membrane pours forth *pus*; as it sometimes will. Altogether it is a variable symptom; because it can only occur when the effusion is moderate.

Cause of Ægophonism.—This phenomenon is explained, by Laennec, to be owing to the compression of the bronchial tubes by fluid, conjointly with the transmission of the sound of the voice through a thin *layer* of fluid. If the layer be very thin, it is not sufficient; for the sound must pass through a certain body of fluid; and, indeed, a very thin layer of fluid would not be sufficient to compress the bronchial tubes. It must reach a certain amount, both in order to compress the bronchial tubes, and to be the medium of this sound; for if there be great effusion, the bronchial tubes are so compressed, that there is but little air in them; and then the sound cannot be heard. Whether Laennec's explanation is correct, I will not pretend to say. By changing the level of the fluid, we change the seat of the ægophonism. If the patient be upright, it will be of course over the highest portion of fluid; but if the patient be lying down, then it is heard where the layer of fluid is the thinnest.

Morbid Appearances.—If we inspect the part after death, we find nothing more than I mentioned, when speaking of inflammation of serous membranes in general.[b] Sometimes there is diffused redness; sometimes there is a *striking* redness, and an effusion of lymph on or within the pleura; and sometimes there is serum, occasionally quite clear, but for the most part turbid, and of a yellow colour, with more or less flakes of lymph swimming in it.

Causes.—The disease arises, in almost every instance, from cold and wet. It will sometimes arise from a local source of irritation; for example, from wounds, from the effusion of substances into the pleura, or from ulceration of the part; but by far the most common cause is the application of cold.

Treatment.—Upon the treatment I need not dwell. It is nothing more than that for any common inflammation.[c] Bleeding, mercurializing, starving, and purging, will cure it;—just as easily as any other inflammation.

Blood-letting.—[The most desirable object is to destroy the inflammation at its very onset, before the signs shew that the effusion is considerable. For this purpose, the most effectual remedy in severe cases is a full general bleeding, carried (if possible) to such an amount as to remove all pain on full inspiration; or, if there be little or no pain, until all hardness of the pulse ceases. This should be followed by free leeching or cupping of the

[a] Laennec, on Diseases of the Chest; translated by Forbes. "Preliminary Essay"; Chapter 4; Section 2; Subdivision 3. (Third Edition; Page 42.)

[b] See Page 113.

[c] See Page 124.

affected side. We[a] think leeches generally preferable; but they should not be applied sparingly; and they should be immediately followed by a large warm poultice covered with flannel, or by a succession of warm dry napkins. These depletory measures must be repeated, if within a few hours the pain return, or the pulse resume its hardness. Of internal remedies, those are the most useful, in the first instance, which assist the blood-letting in producing an impression on the circulation; especially brisk purgatives containing mercury and antimony, which act fully on all the secretions. Calomel and James's powder, followed by an active draught consisting of salts and senna, generally answer best. Tartarized antimony is less effectual in this than in other inflammations of the chest: it may do harm if it excite vomiting; but in doses short of that effect it may prove useful.

Mercury.—It commonly happens that such measures take off the edge of the disease without destroying it entirely; or, at least, without removing its products; which must be a work of time: and although the pain, dyspnœa, and cough be much relieved, they are not removed; and the physical signs show, that effusion has taken place to a greater or less extent. In these circumstances, the proper means are those which promise to fulfil both indications;—to reduce the remaining inflammation, and to promote the absorption of the matter already effused. The most powerful of these is mercury; which may be combined with ipecacuanha and opium;—to lull the pain, and to prevent the calomel from passing off too freely by the bowels. These remedies should be given in pills every three or four hours; and to them may be added digitalis or colchicum in a saline mixture, with an excess of alkali;—to keep down the action of the heart and arteries, to determine to the kidneys and skin, and to lower the inflammatory condition of the blood. The beneficial influence of mercury is sometimes apparent when it does not affect the gums, especially in young subjects;—its operation being only manifest on the hepatic and alvine secretion; which is green, dark, or high-coloured,—from different conditions of the bilious matter in it: but in most cases the gums exhibit the effect of mercury before these secretions are produced.

Leeches and Blisters.—Venesection can seldom be repeated with much advantage after the first few days; unless on the occasion of a fresh access of pain, or other symptoms which denote the renewal of acute inflammation. Occasional leechings continue to be useful; but, after the inflammatory fever has been reduced, the most effectual external remedies are blisters; which should be large, and not left on too long: from six to eight hours is generally time enough to make them vesicate without inflaming the tissues too deeply, or irritating the system by the absorption of their serous discharge. Where the effusion is abundant, a succession of blisters will be necessary; or they may be varied by a suppurating counter-irritant;—such as the tartar-emetic ointment or solution.

Diet and Regimen.—The diet must be of the most spare kind, in the early stage of acute pleurisy; and the patient should remain as quiet as possible in bed. But when the inflammation is subdued, sitting-up, and (if the strength will permit it) using a little exercise about the room, will be beneficial in promoting the absorption of the fluid.

In limited varieties of pleurisy,—such as those of a mild or partial kind, those excited by tubercles, and those which occur in combination with typhoid or asthenic symptoms,—the antiphlogistic measures above described must be reduced to suit the nature of the case, and the amount of

[a] Dr. C. J. B. Williams.

the general strength. Circumscribed pleurisies may sometimes be removed by cupping or leeching only; and in conditions of the system depressed by febrile or other morbid poisons, or reduced as in phthisis, blisters or sinapisms may be the only antiphlogistic means which can be borne. In continued fever, besides these external means and the usual salines, mercury in combination with opium is, according to our[a] experience, the most appropriate remedy.[b]]

SECTION II.—CHRONIC PLEURITIS.

Pleuritis is sometimes a *chronic* affection; and here it is that the particular sign called "ægophonism"[c] is essentially serviceable. When pleuritis occurs in a chronic form, it is every day mistaken for phthisis. I have seen instances of this over and over again. Sometimes the *acute* form of the disease degenerates into the *chronic*; but more frequently the latter is a very insidious affection; and creeps upon the patient slowly.

Symptoms.—The general symptoms so much resemble consumption, that the patient is supposed to have gradually fallen into that affection; for this chronic form of the disease is frequently attended by no pain, or only by *obscure* pain; and yet the patient has pyrexia, cough, and expectoration. He will become hectic, and waste away; the pulse will be constantly quick, and he will die. On opening the body, a large quantity of pus will be found in the pleura; while the lungs themselves, perhaps, are entirely sound. Very frequently, when chronic pleuritis exists, tubercles exist in the lungs at the same time; but frequently they do not; and at any rate, if they do, it is very common for pleuritis to have been the sole cause of death;—none of the tubercles having proceeded to ulceration.

Adhesions; Effusion.—In this chronic form of pleuritis, adhesions are not formed to any great amount. In the *acute* form, the effusion leaves adhesions. Sometimes the whole side is adherent;—the "pleura *pulmonalis*" to the "pleura *costalis*"; but in this *chronic* form the collection is often altogether, or the greatest part of it, pus; and any adhesions that form, are frequently slight portions of lymph that have been effused. They are so soft, that they are not capable of becoming organized; but, as they are mixed with serum, we find (after death) that the two substances are united; or, at least, that the one is mingled with the other. This fluid—this turbid serum, or *puriform* serum, or this absolute pus—augments daily, till the lungs are compressed towards the spine, and towards the mediastinum; and sometimes they are so reduced, that, on a careless examination, they have been said to have disappeared altogether.

Empyema.—Sometimes the affected side of the chest grows large; and if it be the left side in which the disease resides, the heart is pushed to the right;—so that it beats on the *right*, instead of the *left* side. The disease is then called "empyema", if the fluid be pus; but it makes no difference whether it be pus or serum. In these circumstances, the ear may not be necessary in order to recognise the disease; for the side is visibly increased in size. It appears, to the eye, to be larger than the other; and, on measuring it, we find one side of the chest half an inch, perhaps, or an inch, larger than the other. Sometimes we can discover fluctuation,—just as in other instances of a collection of pus; but now and then there is no enlargement of the chest, and no fluctuation to be felt.

Signs afforded by Auscultation.—When effusion takes place, there is a

[a] That of Dr. C. J. B. Williams. Pages 123 and 124.
[b] "Library of Medicine"; Volume 3; [c] See Pages 806, 920, and 924.

dead sound on percussion; and no respiratory murmur is heard. This is the natural result of the part being no longer filled with air, but with pus; which has driven the lung aside or upwards, and compressed it below. When a lung has become solid from air, we have this same auricular phenomenon. If the lung become solid from inflammation,—if the substance be converted into something like liver, so far as the solidity is concerned [a],—we must have a dead sound on percussion, just as if fluid were there. No more air exists in the lung when it has become solid, than when fluid abounds in the chest; and in these circumstances we have equally no respiratory murmur; because the lung, being solid, is unfit for its functions. But when a lung thus becomes solid from inflammation, it becomes so solid throughout, that there is no respiratory murmur at the *root* of the lung; for that part is equally inflamed with the rest; whereas when the dull sound of the chest, and the want of respiratory murmur, arise from a collection of fluid, it rarely so compresses the lung, but that we may hear respiration at the posterior part; that is to say, along the sides of the spine, about three fingers' breadth from the vertebral column. Respiration also continues there when fluid is collected. However great the effusion may be,—even if the lungs be so compressed as to be found with difficulty after death,—still I believe that the respiratory murmur is heard at the back and root of the lungs, in the situation I have just stated. This murmur, too, is heard before the effusion is very considerable; and it is heard for a length of time under the clavicle, at the highest part of the chest;—before the collection of fluid mounts so high. When the want of a hollow sound on percussion, and the want of the respiratory murmur, arise from the lung becoming solidified through inflammation, we may very rapidly cease to hear the respiratory sound under the clavicle. The inflammation may so quickly solidify the lungs, that we may hear no respiratory murmur on either side of the spine; because all parts of the lungs may be inflamed.

Ægophonism.—Ægophonism certainly does now and then occur; but still it is to be remembered, that if the fluid fill up the side of the chest, or nearly so, we cannot expect this phenomenon. It is only in a *moderate* collection that this sign is present; and therefore a person may have the pleura full of pus without it; but if we have attended the patient from the beginning of the complaint, and have been in the habit of noticing all the symptoms to be learned by the ear, in conjunction with the general symptoms, it is easy to find that ægophonism has appeared and disappeared; and we know it has disappeared, not from an *absorption* of the fluid, but from an *augmentation* of it, because percussion of the chest gave a dull sound, just in proportion as the ægophonism declined.

The part of the chest where we should first listen for ægophonism, is from about one to three fingers' breadth from the lower angle of the scapula, towards the nipple. The reason why it is most frequently heard there is, that the fluid generally accumulates below that part; and if the whole lung be covered with effusion, still the thickness of the body of the fluid is always less at the posterior part. We can hear this phenomenon here, when we can hear it nowhere else; because the fluid cannot accumulate so extensively in this situation, as in other parts. After the phenomenon has declined in the *front* of the chest, from the great accumulation of fluid, it may still be heard at the *back*, in the particular part I have indicated.[b]

Displacement of the Liver.—In mentioning that the accumulation of

[a] See Page 854.

[b] See the last Paragraph but one.

fluid in the left pleura, sometimes pushes aside the heart,—so as to produce the extraordinary phenomenon of the heart beating on the right side[a], —I might have stated, that before auscultation was known (but after percussion had been introduced to the medical world, and treated with neglect in this country), I saw a case that puzzled me completely. In a case of this disease, the liver was so pushed down, that it was felt below the navel; and I, being young in practice (though, however young a practitioner might be now, he could not make such a mistake), had no idea of the nature of the disease; but supposed that the man had an enormously enlarged liver; and so did every body else that saw him. The man had a very enlarged abdomen. After death, the liver was found perfectly healthy; but, like the heart in other cases, it was not in its "right place." A vast accumulation had taken place in the right pleura; which actually pushed down the diaphragm, and the liver along with it;—so that the case was completely misunderstood. If auscultation had been then devised,—if all the phenomena that are known *now*, had been known *then*, the matter would have been very clear. We should have ascertained that there was no enlargement of the liver, from this circumstance;—that there must have been a dull sound on percussion, all up the right side of the chest; and, on listening for respiration on the right side, there would have been none heard. It would have been perfectly clear, that the right side of the chest was occupied with something else instead of air; and if the case had been observed throughout, of course there would first have been noticed ægophonism; and afterwards it would have disappeared;—so that no mistake could have been made. An operation might have been performed, and the man might have recovered; but, as it was, he died. There was a large collection of liquid in the right side of the chest; and every one was quite surprised to find it there. I was not at the inspection; but such was the result. An accumulation in the right side of the chest, therefore, may push down the liver in an extraordinary manner;—just as accumulation in the *left* side, may push aside the heart. Even now, cases of chronic pleuritis are every day mistaken for phthisis.

Dyspnœa not very Great.—In this chronic form of the disease, as the accumulation takes place slowly, respiration is not so difficult as might be imagined. The other side of the chest gradually does more and more duty; and the patient feels the inconvenience increase so gradually, that it is not such a source of distress to him as we should imagine. In *acute* pleuritis, when the effusion is very considerable, respiration is necessarily rapid[b]; and there we have infinitely more difficulty of breathing, than if the same quantity of fluid were effused in a *chronic* form. There is nothing more than an instance of a general fact;—that when any thing peculiar comes on slowly, and is increased moderately, it is not productive of half the excitement, that it would be if it came on quickly.

Effect of Compression on the Lungs.—When the fluid has thus compressed the lung, although nature may cause its absorption, or although a medical man may occasion its escape by an operation, it is possible that the lungs may never expand again; and this want of expansion may occur, either from the great compression they have undergone, or from the production of such firm adhesions, that they are effectually bound down. Inflammation may not only have induced the accumulation of fluid; but may have produced such an effusion of fibrin, as to form firm bands,—binding down the lungs; and, from either of these circumstances, the lung may

[a] See Page 923.

[b] See Page 919.

never recover its elasticity. Laennec declares that, on inspection, he has uniformly found these firm adhesions; and he calls them "fibro-cartilaginous";—not "fibrous", as we generally see adhesions; but "fibro-*cartilaginous*." However, as the lungs have been known to expand again in some degree; and as the chest, which was sunk in, in consequence of the compression of the lungs, has in some degree recovered its form,—we can hardly suppose that the lungs, in every case, are prevented from expanding merely by adhesions. Of course, if the lungs do not expand, the chest will become flattened on the sides, from the pressure of the air; but it has been known that the chest, after it has become flattened, has enlarged again,—from the lungs having recovered their powers; and if the want of expansion in the lungs, for a great length of time, arose from fibro-cartilaginous bands, it is not likely that they would ever have yielded, so as to allow of the expansion of the lungs again. The extreme compression of the lungs, seems to me to be quite a sufficient cause for the want of their subsequent expansion, without having recourse to the supposition that, in every case where they do not expand again, there must be firm adhesions. The whole lungs are so compressed,—so squeezed together, and become so fixed, that they resemble muscles;—muscles with fibres too minute for detection. The colour is either red or grey.

Contraction of the Chest.—If the lung has been so compressed that it will not expand, and the fluid has been absorbed or let out, and no more has formed, the ribs on that side fall, and lie more closely together than they should do. The shoulder, on that side, falls below the other; and the muscles (especially the pectoral) waste,—both as to breadth, and as to length. The muscles waste in proportion as the side becomes contracted; and they are found, on actual measurement after death, to be diminished; and still more do they appear to the *eye* to be diminished. Even the spinal column at length inclines, in some cases, to the opposite side. Most practitioners must have seen instances of persons, with their ribs lying closely together on one side; with the shoulder depressed, and the spinal column bent to the other side. The nature of such cases, however, was not understood, nor were the general phenomena of the case itself well described, before the appearance of the first edition of Laennec's celebrated work.[a] I recollect, very well, having had an individual pointed out to me, as a decided proof of the power of hydrochlorate of lime in scrofula and phthisis. After suffering very long from pectoral complaints, and being put under the long exhibition of muriate of lime, the man recovered his health; but one side of the chest was manifestly smaller than the other; and he was shewn to every body as a man who had long had phthisis; but in whom all the ulcers had healed up, in consequence of his having taken the remedy just mentioned. It was considered that the lung had wasted away from ulceration; and the contraction of the side of the chest, was thought a sufficient proof of it; because he had continually expectorated from irritation of the bronchia. I supposed, not knowing better,—for nobody knew better in those days,—that this was actually the case; and therefore did not attempt to deny it. There is no doubt, however, that this was not a case of phthisis at all; but that it was a case of chronic pleuritis, in which great effusion had taken place; which effusion had afterwards been completely absorbed, by the power of nature; and the lung had never been able to recover itself from its compressed condition. There is, in Laennec's work, a drawing of an individual, with one side of the trunk lower than the

[a] See Note to Page 798.

other [a];—through the falling in of the chest, in the manner I have now described.

Cause of Contracted Chest.—Laennec considers, that when a case of this description is well marked, it arises from that form of pleuritis, which is attended by hæmorrhage into the pleural cavity.[b] I mentioned, when speaking of hæmorrhage, that mucous and serous membranes will sometimes produce an effusion of blood [c]; though we cannot tell the reason; but sometimes it is the case. This sometimes happens in the case of the pleura. There is, however, no proof that it *always* results from hæmorrhagic pleuritis. Sometimes it arises from that source; but sometimes the fluid, when let out, has proved to be mere pus, without any admixture of blood; and yet contraction of the chest has occurred;—just as where blood has been let out in conjunction with the pus. If it occur more frequently (as Laennec says [b]) after hæmorrhagic pleuritis, and if the dense fibro-cartilaginous bands (formed by a cohesion of the fibrin in the blood effused upon the costal pleura) were always discovered in contraction of the chest [b], still I should not regard the thickness of these bands of fibrin as the *cause* of the contraction; but as *effects*, no less than the contraction itself, of the inability of the compressed lung to expand again.

Bloody fluid, just like pus, is not so rapidly absorbed as mere serum. When blood is effused, the lung is irrecoverably compressed, by the duration of the pressure; and, from the slow manner in which the elasticity of the chest, and the pressure of the atmosphere,—resisted as they are by the natural structure of the chest,—can bring down the side to the flattened lung, a space probably exists, greater or smaller, for some time. Laennec, indeed, seems to contradict himself; for he says he is of opinion, that contraction of the chest may be found, in an equal degree, after the disease has produced merely cellular adhesions; so that, in some parts of his work [d], he seems to give up the opinion, that the inability of the lungs to recover always arises from these firm fibrous cartilaginous bands. He also allows, in another part of his work [e], that the contraction is owing, not to the adhesions themselves, but to their slow formation. The more slowly these are formed, the less chance will the lung have of expanding. He says [e] that if the effusion be copious, and consequently the resolution of the pleuritis slow, the contraction is evident long before the complete absorption of the fluid; but he says [e], that the more rapid the absorption, the less chance is there of contraction; since the longer the lung is compressed, the greater is the loss of its natural elasticity. In short, Laennec himself does allow [e], that the continuance of the compression, through the effusion, is the cause of the inability of the lung to recover itself. I myself have frequently opened persons, in whom the lung has never recovered itself; and yet there have been no fibro-cartilaginous bands, or bloody fluid; so that the long continuance of the compression, appeared sufficient to explain the immobility of the lung.

Period at which Contraction Commences.—When the chest contracts, in chronic pleuritis, the diminution may begin at an early period of the effusion; but may not be perceptible for months. Of course it can only be a certain degree of contraction of the chest that is observable; and those

[a] See Plates 6 and 7 in Dr. Forbes's Translation.

[b] Laennec on the Chest; translated by Dr. Forbes; Part 1; Book 3; Chapter 1; Section 6. (Third Edition; Page 459.)

[c] See Pages 146 and 147.

[d] See Dr. Forbes's Translation; Part 1; Book 3; Chapter 1; Section 6. (Third Edition; Page 462.)

[e] See Dr. Forbes's Translation; Part 1; Book 3; Chapter 1; Section 6. (Third Edition; Page 463.)

persons who are not in the habit of examining patients with the eye and with the hand,—who consider those as mechanical means, fit only for the surgeon;—those who are not in the habit of making patients undress, and are not accustomed to handle them, except to feel the pulse;—such persons will, of course, be ignorant, for a great length of time, of contraction of the chest. It may go on till the patient makes the discovery, and announces it to his medical attendant.

Auscultatory Signs of Contracted Chest.—When the chest is contracted,—when fluid no longer exists, but the lung is compressed, and the thorax goes down upon it,—then there is a dull sound upon percussion;—just as when pleuritis existed; and sometimes we have not only a *dull* sound, but a true *fleshy* sound;—the same sound as if we struck the shoulder or the thigh. But notwithstanding this dull sound, the respiratory murmur is heard a little. Probably, there will be no respiratory murmur at the lower part of the chest, where the effusion had taken place first, and must have ceased the last;—for, of course, it is to the lower part of the chest that the fluid will gravitate at first, as well as at last; but respiration may be heard faintly at the upper part.

Usual Termination of Chronic Pleuritis.—When the inflammation has ceased, and the effusion to which the inflammatory state gave rise has ceased, the walls of the chest are flattened down proportionately to the contracted dimensions of the lung; and nature has effected a cure, exactly in the same way that a surgeon effects a cure of hydrocele;—by adhesion. In the case of a hydrocele, there is a serous membrane; and when it is inflamed by an injection, fibrin is poured forth, and also serum. The serum is at last absorbed, but the fibrin blocks up the cavity altogether; and that is exactly the state of the parts in the cavity of the chest. When nature has effected a cure, in the way that I have now described, the person is more or less deformed for life; but suffers little inconvenience. The general health may be excellent. Laennec mentions the case of a distinguished surgeon at Paris, whose chest was contracted after pleuritis, which took place in youth; and in whom percussion, when Laennec wrote, gave a dull sound at the lower and lateral parts of the affected side of the chest; and the respiratory murmur was weaker there, than on the opposite side; but this surgeon had a strong voice; and contrived to lecture once, or even twice a-day, for an hour at a time, without any inconvenience.[a]

Treatment of the Empyema.—In this particular form of the disease, the making of a correct diagnosis is very important; because we may render a patient essential relief. We may save life; and in those cases in which we cannot *save* it, we may *protract* it. It was only a few years ago, that I had a case of this description, in a young child almost at the breast. The heart was pushed so much to the right side, that it was pulsating there; and, the nature of the case being perfectly clear, a lancet was plunged into the left side of the chest two or three times; and the child fortunately recovered, and is alive now. An operation is always safe in these cases. If the collection should point at a particular part, that is the spot at which we should make the opening; but if it do not point, then we should puncture between the eleventh and twelfth ribs. If there be any doubt about the case, I should advise the use of a needle invented by Dr. Thomas Davis. He had a large needle made with a groove; which we may introduce without any danger. When it is plunged in, if fluid exist,

[a] See Dr. Forbes's Translation; Part 1; Book 3; Chapter 1; Section 6. (Third Edition; Page 459.)

a drop will form near the end of the needle. Whether there be water present, or pus, it will escape to a certain extent; and if a drop of fluid come, we may be sure of the nature of the case. A small trocar may then be passed in; and we may thus draw off the fluid. It will be right not to draw off much at a time;—to draw off only what we consider to be a third or a half of what is there,—according to the size and age of the patient; and we may continue to draw it off at different times, till the chest is completely emptied. It was the custom of the late Dr. Thomas Davis[a], I know, to pass in a piece of hollow bougie; and to let it remain there. The end of the bougie must be bent down, and fastened by straps of adhesive plaster; so that it may not find its way into the chest. Something must be put into the end of the bougie, to prevent the fluid from escaping too suddenly. The plug may be taken out every day, and a little fluid allowed to escape. When the lungs were sound, this treatment has been successful. I have not seen many cases of this description; but Dr. Davis had several; and he could count up a considerable number, where life has been saved entirely by this method.

Besides the surgical treatment of such a case,—letting out the fluid,—it is necessary to support the strength, and to lessen the irritation by means of opiates;—to use the same constitutional means that we should employ in the case of a large abscess.

SECTION III.—HYDROTHORAX.

Pathology.—It sometimes happens that an effusion of fluid takes place into the pleura, without much inflammation. A quantity of serum is effused there; sometimes quite clear; sometimes more or less turbid, and of various characters; but it is not pus, nor is it the result of inflammation. This is commonly called "hydrothorax."[b] When speaking of dropsical effusion, I mentioned[c] that effusions in a serous membrane were sometimes puriform, sometimes purulent, sometimes bloody, and so on; and I mentioned, that sometimes they arise from *violent* inflammation, sometimes from *moderate* inflammation, and sometimes, apparently, without any inflammation at all.[d] Now the pleura is in the same predicament as all other serous membranes. It is frequently in the state I have now mentioned from inflammation; but sometimes it contains a quantity of thin fluid, where there was scarcely any inflammation at all,—where there was no necessity to employ antiphlogistic means; and sometimes it contains a large quantity of serum, without our being aware (not only during life, but likewise after death) that inflammation has occurred;—in fact, without the least sign of inflammation. Effusion may take place in the pleura, as in other parts, without any signs;—just as a person may sweat, and pour forth fluid, without any inflammation whatever.

Idiopathic Hydrothorax very Rare.—A genuine idiopathic case of hydrothorax (water in the pleura) is a very rare thing. Some people who never examine the chest during life, but who open bodies after death, speak of hydrothorax as the most common thing in the world; but when it does not arise from inflammation, hydrothorax is a rare disease. When there is any other disease in the chest, it is common for effusion to take place; but for it to take place, except as a consequence of inflammation, or some organic

[a] Physician to the London Hospital.
[b] From ὑδωρ, *water*; and θωραξ, *the chest*.
[c] See Page 168.
[d] See Pages 163, 166, 189, and 190.

disease in the chest, is very rare. I do not recollect half a dozen such instances.

Auscultatory Signs.—When hydrothorax occurs, whether it is the result of a very slight kind of inflammation, or is produced by bronchitis, or peripneumonia, or disease of the heart, or any other disease, the symptoms discoverable by the ear are just the same as those that occur when the fluid is puriform or purulent, and the result of decided inflammation. There is, of course, a dull sound on percussion, from the presence of fluid; and there is no respiratory murmur at the lower part, although we may still have it at the *upper* part (unless the chest be completely filled), below the clavicles; and also on each side of the spine, where the fluid does not compress the roots of the lungs.

General Symptoms.—The general symptoms are difficulty of breathing, deficiency of urine, swelling of the legs, cough, and a sudden starting from sleep; but all these things, when they do occur with a certain degree of effusion into the chest, are more frequently the result of other diseases in the chest than of hydrothorax. In almost every case of hydrothorax, we find, on examination, other disease sufficient to explain the symptoms. In most cases there is disease of the heart, or chronic disease of the lungs; and in those affections we have exactly the same symptoms; although there may not be the same quantity of fluid effused into the pleura. I have frequently opened patients, who have been supposed to have died of hydrothorax; whereas death arose from disease of the heart. Cases are frequently set down as hydrothorax;—where the legs are swelled; where the breathing is so difficult that the patient is unable to lie down; where he has orthopnœa and deficiency of urine; and where there is a collection of symptoms which are pronounced to be hydrothorax; whereas, on listening to the chest, we hear respiration all over it; and we hear the usual sound on percussion; but on listening to the heart, we hear disease of that organ; or on listening over the chest, we find sonorous and sibilous rattles; —shewing that there are other diseases present. The fluid that occurs in the chest, when it is not puriform, is usually the result of some other disease in the chest. In cases of effusion into the chest, we have, in all circumstances, the same auscultatory phenomena;—not only the want of a respiratory murmur;—not only the want of a hollow sound on percussion; but, if the fluid be not considerable, there is also ægophonism. No matter what the disease is, the phenomena are the same.

Treatment.—If we can ascertain that there is really hydrothorax, to an amount sufficient to explain the symptoms;—that there is a dull sound all over the chest on percussion; that the respiratory murmur is not heard anywhere except just below the clavicle, and at the root of the lungs; and if we see the general signs of dropsy, and the absence of disease of the heart; —we then may presume that the extreme difficulty of breathing, the swelling of the legs, and the scantiness of the urine, arise from a collection of fluid in the chest;—especially if ægophonism be present; and if we observe that the dulness of sound, and the want of respiratory murmur increase,— reaching higher and higher. In such a case we ought to let out the fluid. Exactly as in other cases, where the presence of a collection is doubtful, we may use the needle which I spoke of[a], to ascertain whether fluid exists or not. It would be well to do it in every case; because it gives no pain to the patient, and is perfectly safe.

Diuretics.—But before these measures are taken, it would be right to

[a] See Page 928.

give the common remedies for dropsy, where there is no inflammation;—to give diuretics. Digitalis answers an excellent purpose, and also squills; more especially if united with a small quantity of mercury, which appears to increase the diuretic effect. A great deal of good may be effected by these remedies, in all cases of chronic difficulty of breathing,—whether there is effusion of serum or not; because there is continually a great collection in the air-cells, and perhaps also in the cellular membrane of the lung, which impedes respiration. When there is not hydrothorax, properly speaking, we continually find that diuretics are very useful, by causing an absorption of the fluid which is oppressing the cellular membrane of the lungs, or filling the air-cells themselves. I mentioned, when speaking of dropsy, that diuretics answer more purposes than one.[a]

SECTION IV.—PNEUMATO-THORAX.

Etymology.—The pleura is sometimes distended by air. This disease is called, by Laennec, "*pneumo*-thorax"[b]; but very improperly so. It should be "*pneumato*-thorax." Such compound words are always made from the dative singular;—the final letter being changed into *o*, if it be any other vowel. We thus have "*utero*-gestation", "*cerebro*-spinal", "*hæmato*-cele." The genitive and dative of αἷμα, are αἵματος, αἵματι. The genitive and dative of πνεῦμα, are πνευμάτος, πνευμάτι; and the compound word should be "*pneumato*-thorax." In truth, we already have "pneumatomphalos", to signify a flatulent umbilical hernia; and, what is still closer, we have "pneumato-*cele*." Laennec, therefore, is wrong in the name which he has given to the disease; which consists of air being present in the pleura. This, however, is unimportant; and one is not disposed to dwell upon words; only when a new term is invented, it is right to make it legitimate, according to other words. With words that have been long established, we must be contented, and not be over nice.

Signs.—When air exists in the pleura, it of course gives rise to the same effects of distension, that the existence of pus or serum does. The intercostal muscles swell out a little; and the diaphragm and liver, in the case of the right side, are pushed down. We may predict what will be the signs to the ear. The air that is inclosed is not the air of respiration; but exists externally to the lungs; and therefore it does not give any respiratory murmur; but there is this great difference;—that if we strike the chest, notwithstanding there is no more respiratory murmur than in the abdomen, yet we have a fine clear hollow sound. Here is an instance of the importance of not trusting either to percussion or to the stethoscope separately;—being a case in which the combined use of percussion and auscultation is necessary. If we merely *strike* the chest, in these instances, we find nothing wrong; for it gives a fine hollow sound;—perhaps a clearer sound than in health. Again, if we only *listen* to the chest, without striking, we shall say—"Here is a lung solidified"; or—"Here is a pleura filled with liquid,—with pus, or with serum." But, by using both, the nature of the case is clearly seen. We ascertain, by the fine hollow sound, that air is there; but, by the want of respiratory murmur, we perceive that the air has nothing to do with the lungs.

[a] See Pages 190 and 191.

[b] See Dr. Forbes's Translation of his Treatise; Part 1; Book 3; Chapter 4. (Third Edition; Page 499.)

When speaking of liquid in the pleura, I mentioned that, however large the collection might be, we should still hear respiration about three fingers' breadth from each side of the spine [a];—that the roots of the lungs were never so compressed, but that we might hear respiration there; although, in extreme inflammation of the lung, the lung becomes so solid, that no respiration can be heard. Now it is exactly the same when the pleura becomes distended with air. When the lung is compressed by air in the pleura, still the compression is never so great, that respiration cannot be heard at the roots of the lungs;—at least, it must be an extremely rare occurrence. The lung still resists sufficiently to maintain its function at the roots; and, consequently, at the sides of the spine we may hear the respiratory murmur.

Varieties.—[Pneumothorax, or air in the pleura, may be produced in three different ways:—1. It may be the consequence of a partial pleurisy. After a pleuritic effusion has long compressed the lung, and the compression has been perpetuated by a rigid false membrane which has been formed over it, the absorption of the liquid leaves a void, which the collapse or contraction of the walls of the chest is in some few cases insufficient to obliterate; and this void is sometimes filled with air secreted by the membranes. I [b] have seen two instances of partial pneumothorax apparently produced in this way. They each occupied about half of the pleural sac—one the upper, the other the lower half; and the lung in both cases was strongly bound down by fibro-cartilaginous membrane, and condensed in the part contiguous to the empty space. There was also some contraction of the chest in both cases. This kind of pneumothorax is very rare; and I [b] do not think that it is described by any author.

2. Another kind is that which may be called "idiopathic"; and arises from an effusion or secretion of air into the sac of the pleura, without perforation. This is also of very rare occurrence. It is said to be sometimes met with towards the termination of fatal diseases;—in the same manner as tympanitis occasionally occupies the peritonæal sac, in similar circumstances. I [b] have never met with a case in which any signs of such a form of pneumothorax were discovered during life; although I have several times seen air in the pleural sac on opening bodies after death, where no perforation could be discovered in the pleura. It is possible that the air may have been exhaled from the animal fluids after death, and then increased by exosmosis through the lung. The facility with which air pervades dead membranes, countenances such a notion. Pneumothorax is also said, by Dr. Graves and others, to have occurred in a few instances at the commencement of pneumonia, and to have soon afterwards disappeared; but as the chief sign in these cases was a remarkable resonance on percussion, I suspect that these were examples of the production of tracheal or amphoric sound on percussion, from consolidation of the upper lobe of the lungs; and not cases of pneumothorax.

3. By far the most common kind of pneumothorax, is that caused by some unnatural communication between the pleural sac and the external air; and this may be by a perforation either of the external parietes or of the pulmonary pleura. The latter case is the now usually recognised cause of pneumothorax, and constitutes the great bulk of the examples that are met with. The perforation depends on the progress of ulceration, generally of a tuberculous character, rarely of gangrenous abscess, through

[a] See Page 924.

[b] Dr. C. J. B. Williams.

the pleura. The circumstance of ulceration reaching and perforating the pleura, indicates a low state of the reparative powers, and a want of plasticity in the products of inflammation; for, in ordinary circumstances, ulceration could not approach the pleura without causing it to inflame and throw out coagulable lymph; which, becoming organized, forms either a protecting thickness of membrane, or close adhesions to the costal pleura. We see this in most cases of chronic phthisis; where the upper lobes are generally adherent to the ribs. I have seen an ulceration extend from a tuberculous cavern across the two layers of the pleura, thickened and adherent, and completely through the walls of the chest; so that when the patient coughed, air bubbled out of two or three fistulous openings in the front of the chest; but here was no pneumothorax. On the other hand, I have met with more than one case in which the adhesive process seemed quite incapable of protecting the pleura, which was consequently perforated in several points;—wherever, in fact, the ulceration of the lung extended to it, and the air freely entered the sac of the pleura by all these holes. More commonly, however, there is only one perforation; and this is generally near the apex of the lung, in connexion with some of the cavities that first form there.[a]]

Diagnosis from Emphysema.—There is one case in which the auscultatory phenomena resemble those which are noticed in pneumato-thorax; and that is one that I have already mentioned, under the head of "chronic bronchitis."[b] It is when the air-cells are greatly distended, and perhaps broken one into another. When the disease improperly called "emphysema of the lungs"[c] takes place, there is a great cavity in the lungs, filled with air. I say "improperly" so called; because "emphysema" is the existence of air in the cellular membrane; and in this case it is contained in the air-cells of the lungs. I mentioned[b], that there is a very clear sound on percussion; but that, on listening to the respiratory murmur, we scarcely hear any thing. The cases are very similar in their nature; that is, cases where air exists in the pleura; and cases where some of the air-cells are very much enlarged, and partly broken down; so that a body of air exists in the substance of the lungs, and does not pass and repass as it ought to do in respiration. There is, however, a mode of distinguishing between the two cases; and it is this. When air exists in the pleura, we hear no respiratory murmur at all at the front of the chest;—it is stagnant: but in the case of dilatation of the air-cells, the air, although *nearly* stagnant, is never *quite* so;—it is partially expired and inspired; and therefore we do hear a faint respiratory murmur. Another mode of making the diagnosis is this. When the case is one of dilatation of the air-cells, it is consequent upon a long-continued catarrh, or bronchitic affection. It only takes place when the disease has existed a long time; and we hear the mucous, sonorous, and sibilous rattles of bronchitis; so that, altogether, we may very clearly make out the nature of the case; whereas when air exists in the pleura, it is, for the most part, a very sudden affection. There are no signs of bronchitis; and it is not only sudden, but generally very violent; and usually confines the patient to his bed.

Prognosis.—[The *prognosis* of pneumato-thorax from perforation, must be generally unfavourable; because, besides its own formidable character, in the vast majority of cases it arises from tuberculous disease of the lungs. Provided, however, the tuberculous disease be very limited, it does not

[a] Dr. C. J. B. Williams on the Chest; Fourth Edition; Pages 125 and 126.

[b] See Page 852.

[c] See Page 849.

seem unreasonable to think (with Laennec[a]) that the case may not be entirely hopeless. Laennec mentions an instance, in which pneumothorax lasted for six years.[b] Dr. Houghton describes another, in which the individual survived the perforation eighteen months; and probably would have lived longer, if he had not imprudently exposed himself in his work as a bricklayer: for the signs of the cavity had disappeared, the side had contracted, and the general health had been much improved. In a case related by Dr. Stokes[c], the patient lived for many months; during which he rode much on horseback, and could hear a splashing in his chest, when he trotted or cantered. We[d] have known two patients with pneumothorax leave the hospital with the impression that they were nearly well;—having gained flesh, and lost the worst phthisical symptoms, after the first severe consequences of the perforation had subsided. In such cases, which are to be considered exceptions to the general rule, the production of the new disease in the pleura, seems to act favourably in retarding the tuberculous affection of the lung; and if this be of limited extent, it is possible that it may be removed, the wound on the lung cicatrized, and the cavity of the pleura obliterated by contraction and adhesion.

Treatment.—The measures calculated to relieve the symptoms of pneumothorax with perforation, vary considerably;—according to the period of the lesion, and the condition of the system. In the first instance, the perforation and access of air and matter to the pleural sac, are often attended by considerable prostration of the system, with rapid feeble pulse and faintness; together with the pain and cough, which are then the result of irritation, rather than inflammation. Considerable doses of opium or morphia are necessary to allay this irritation: they may be advantageously combined with calomel and antimonials; and sinapisms or warm fomentations may be applied to the affected side. More active antiphlogistic measures cannot be used, until the reaction takes place; which generally begins in a few hours;—bringing with it heat of the skin, strength and hardness of the pulse, the great soreness as well as pain of the whole affected side: then blood-letting, chiefly local, must be used, with aperients and salines;—according to the strength of the patients, and the degree of fever present. These may be followed by blistering, or tartar-emetic counter-irritation, in proportion to the continuance of the inflammatory symptoms. But it is not to be forgotten, that perforation of the pleura and its consequences are almost always added to a previously existing disease,—tuberculous phthisis; and the degree of advancement that this may have reached, must much limit the propriety and efficacy of the measures for this accidental inflammation that has been excited. The same considerations are to be kept in view when, in consequence of the smallness of the perforation, or its valvular condition, air accumulates in the chest, and becomes the cause of oppressive dyspnœa. The immediate indication in this case is, doubtless, to give exit to the air by puncturing the chest; and this has been done in several instances, with great temporary relief. But before this operation is prescribed, it should be considered whether, as the relief from it will be but temporary, the condition of the patient be such as to make this likely to outweigh the pain and risks of the operation. These certainly are not

[a] See Dr. Forbes's Translation; Part 1; Book 3; Chapter 4; Section 4. (Third Edition; Page 533.)

[b] See Dr. Forbes's Translation; Part 1; Book 3; Chapter 4; Section 4. (Third Edition; Page 534.)

[c] In his "Treatise on the Diagnosis and Treatment of Diseases of the Chest"; Part 1; Section 9; Page 531.

[d] Dr. C. J. B. Williams.

great; but, when added to the dubious view in which the friends of the patient may regard an operation which proves but imperfectly successful, they are sufficient to deter us in many cases from recommending it. The case is different when the accident occurs before the consumptive disease has advanced far;—when there is much flesh and strength, and when the physical signs have shewn that there is a large proportion of sound lung. The operation may be repeated if the air accumulate again. As it is impossible to avoid the continued introduction of air into the chest, the mode of performing the operation is a matter of much less consequence than in empyema. It is more desirable to puncture below the level of the liquid;—to allow this, as well as the air, to escape.[a]]

SECTION V.—HYDRO-PNEUMATO-THORAX.

Its Nature.—A compound case sometimes happens;—one made up of the two affections of which I have last spoken;—of "*hydro*-thorax"[b], or empyema, from the fluid existing in the pleura; and of "*pneumato*-thorax"[c], in which air exists in the pleura. We sometimes see patients with both air and fluid in the cavity of the pleura. This affection is termed "hydro-pneumato-thorax." It is a long word, but very expressive. It shews, at once, the nature of the case;—"*hydro*-thorax", the name for *liquid* in the chest; and "*pneumato*-thorax", the name for *air* in the chest. There is nothing puzzling in the name.

Symptoms.—On reflection, we may (as in many other cases of affection of the chest) say beforehand what will be the symptoms of this disease perceptible by the ear. The *air*, of course, must be at the *upper* part of the chest,—unless there be adhesions there; and the *liquid* will be at the *lower*; and therefore, on percussion at the *superior* part, we have a *clearer* sound than natural; but on striking at the *inferior* part, there is a *dead* sound. The contrast is very great indeed. On listening with the stethoscope, during respiration, to all parts of the side of the chest, we hear no respiratory murmur. The air above, and the liquid below, impede respiration; and therefore there is no respiratory murmur, either in the one situation or the other. But there is this difference between simple *hydro*-thorax, and *pneumato*-thorax;—in the former case there is a *dead* sound, from the presence of the *liquid*; while in the latter there is a *clearer* sound than natural, from the presence of the *air*; and in a compound case there is a *dead* sound *below*, and a *clear* sound *above*. Again: if we alter the position of the patient, we alter the situation of these phenomena. If the patient under examination be sitting or standing upright, the symptoms will be what I have stated. But suppose we make him lie down. The *hollow* sound, instead of being at the *superior* part of the chest, will then be altogether at the *anterior*; and the *dead* sound, on percussion, will be quite by the *side*;—simply by altering the relative position of the air and the fluid.

Fluctuation.—There is, however, another circumstance which takes place only in this disease. If we suddenly shake the patient,—take him by the shoulder and jolt him, we frequently hear fluctuation. We cannot hear fluctuation in empyema alone; neither can we hear it in hydrothorax; nor is it audible where only air exists in the chest. It is only perceptible in hydro-pneumato-thorax. We may hear the fluctuation with the naked

[a] "Library of Medicine"; Volume 3; Pages 133 and 134.

[b] See Page 929.

[c] See Page 931.

ear applied to the chest; or by means of the stethoscope. It is well, in all cases of this sort, to put the ear on the patient's chest, and let some one move him rather suddenly; and then we hear fluctuation within, and the patient will be aware of it himself. Sometimes the patient has discovered this, before the medical attendant has thought of the nature of the case. In a volume of the "Dublin Transactions", there is reported a very remarkable case, which occurred before Laennec's time. The patient did not say, like the woman in Scripture, that he had spent all his substance on physicians; but he had been to all the doctors within his reach; and, moreover, he had been sent to the Continent; but it was all in vain. Nobody knew the nature of his malady; and he discovered it at last himself. He found that when he was sitting up, or jolted himself in any way, he heard fluctuation within his chest. He pointed the attention of his medical attendant to it; and then the latter, for the first time, listened to his chest. This phenomenon is mentioned by Hippocrates, or in some of the works ascribed to him; but, unfortunately, it is there said that it takes place only when pus exists in the chest. This is incorrect. It takes place only when there is both liquid and air in the chest; the reason of which is very evident. Those who attended to what Hippocrates, or the writer of this passage said, endeavoured to verify it by dissections; but they found that the observation was inaccurate, and therefore it dropped to the ground; and medical men neglected to apply the ear to the chest, (although Hippocrates had done so,) and stigmatized the plan as mere nonsense. Unfortunately the observation was not sufficiently minute. The sound was ascribed solely to the existence of pus; and so the mistake was made.

Metallic Tinkling.—Another symptom which exists when there are these compound contents (air and liquid) in the pleura, is "metallic tinkling."[a] This sound may be heard, most frequently, by putting our ear to the patient's chest, and then suddenly raising him, or causing him to be raised upright. It is supposed that a portion of the pus then drops from the upper part of the chest, down into the lower part; and thus produces the sound. At any rate, the way I have stated is one of the best modes of hearing it. We may hear it by this means, when we cannot hear it in any other mode; but in one particular case of air existing in the pleura, it may be heard when the patient is speaking, coughing, or even breathing; and that case is where the air has got into the pleura through the lungs. It appears that air may sometimes be secreted in the pleura; sometimes it is the result of a decomposition of puriform fluid; and sometimes it enters the pleura through a rupture of the surface of the lung. If a communication be established between the lung and the pleura,—whether by the ulceration of a tubercle, by rupture, by gangrene of the surface of the lung, or by a wound,—then this clear silvery sound is heard when the patient is speaking;—perhaps when he is coughing, or when he is breathing. An aperture of this description, most frequently takes place from an abscess of the lung,—from a tubercle bursting; so that both air and pus are effused into the cavity together; and in this case there is always a clear "metallic tinkling."

Case.—I may here mention a patient, in whom there was a most beautiful metallic sound. On striking the chest when I first saw him, I found a perfectly dead sound all over the lower part of the chest; and, being told that it was a case of consumption, of course I did not

[a] See Page 807.

know the reason of it. But, on listening above, I found no respiratory murmur; and the nature of the case, in my estimation, was then clear. When he spoke, there was a fine, clear, ringing sound all over the chest; and when he coughed, it was exactly the same. After a time, it entirely disappeared; and then, I presume, a small cavity which had existed in the lung,—forming a communication between the lung and the pleura,—had healed. In about a fortnight, there was no ringing sound to be heard; and the patient, after going into the country, was apparently a great deal better. After a time, when I saw him again, there was still no respiration to be heard over nearly the whole of the chest; and there was a dead sound on percussion;—not merely at the *inferior*, but also at the *superior* part of the thorax. There was no more metallic tinkling; and it was clear that what had been filled with *air*, was now filled with a *liquid*. An operation was performed; and a quantity of liquid was let out, day after day, till it amounted to many quarts,—*gallons*, I believe. I forget how much was evacuated; but it was an immense quantity. Unfortunately, however, there was too much disease of another kind for the operation to cure him.

Amphoric Buzzing.—When air exists in the pleura, in consequence of such an opening as I have now described, before the silvery sound is heard, we may occasionally hear a particular sound, from air going in and out of the opening; and it is so much like the sound which we make when blowing air into a bottle, that it has been called "amphoric buzzing." I do not recollect ever having heard it.

Diagnosis from Abscess of the Lungs.—I mentioned[a], that when the air-cells are dilated, and a cavity filled with air exists in the lungs, the symptoms in some measure resemble those arising from air existing in the pleura; because the one is a great cavity, and so is the other. Now if it so happen that a great cavity exists in the *lung*, filled half by pus, and half by air, the circumstance is very much the same, as when the occurrence takes place in the *pleura*. Just as a cavity in a large dilated air-cell, resembles a cavity in the pleura, and gives rise to nearly the same symptoms, so a large *abscess* in the lung, filled half with air and half with fluid, resembles the pleura when in the same condition; and therefore we have the same phenomena;—that is to say, "metallic tinkling." If the symptoms take place from a large abscess (containing both air and fluid) existing in the lungs, on raising the patient suddenly, a drop will descend from the upper to the lower part, and cause a silvery sound. But if the case be not very clear, it can be made out from this circumstance;—that, when a cavity exists in the *lungs*, we shall have pectoriloquy, or the air going through the tube, as if the person's mouth were at the other end of the stethoscope; whereas, in cases where the *pleura* is affected, as there is no great communication between that and the bronchial tubes, we do not have this phenomenon. Where an abscess in the lung, containing partly air and partly fluid, is large, it will give a sense of fluctuation, upon suddenly shaking the patient.

Causes of Pneumato-Thorax.—With respect to the *cause* of pneumato-thorax, far more frequently than otherwise, it takes place suddenly; and I believe that, most frequently, it happens to phthisical patients; in whom, unfortunately, a tubercle has existed close to the surface of the lung; and nature has not formed an adhesion of the surface of the lung to the costal pleura; so that ulceration has gone on to the pulmonary pleura, which has

[a] See Page 933.

become thin, and at last has ulcerated through. It has frequently happened, that when a patient labouring under phthisis has made a violent effort, rupture has taken place. The general symptoms are extreme dyspnœa; and a person who does not use his ear, might perhaps be led to suppose that it was merely an attack of inflammation;—especially if the patient had been running out of doors in the evening. One might then suppose, that the patient had caught a violent cold; and he might be bled and blistered all to no purpose;—the nature of the case simply being, that air had escaped into the pleura. The importance of listening to the chest, in such a case, is evident; for we may make out the nature of the case, clearly enough, by striking the chest. There is a perfectly clear sound; and yet, on listening to the respiration, we hear no respiratory murmur.

Treatment by Operation.—In such circumstances, an operation should be performed. The parts should be punctured, and the air let out. An interesting case of this description, occurred to Dr. James Johnson.[a] It happened to a medical practitioner, who ran to a case of midwifery; and was seized with difficulty of breathing, and the symptoms I have just mentioned. Several practitioners were called in; one of whom said that he had had a similar case the preceding winter, and that the patient was cured with hyoscyamus; but nobody had the least idea of the true nature of the affection, except Dr. James Johnson; and he was so satisfied respecting it, that Mr. Guthrie (I think), at his request, made an opening into the chest; and out came a rush of air, and the patient felt immediate relief. This was a great object effected;—ease after pain. The patient died afterwards, because he was phthisical; but had there been no other disease than this accidental escape of air, no doubt he would have done well. If the collection of air occur on the left side of the chest, it will push the heart to the right side;—just in the same way as a collection of *liquid*. Of course the operation would not be required, merely because we hear air in the chest. It need only be performed where there is such difficulty of breathing, as to make it necessary to do something for the relief of the patient. So in a compound case,—one of hydro-pneumato-thorax, where there is both air and water in the chest,—no operation would be required, unless there were extreme dyspnœa. It is best to make the opening large enough to let out the liquid; so that, after the air has escaped, the liquid may also be evacuated.

General Treatment.—The general treatment would be that of phthisis, or a large abscess;—supporting the strength, &c. These are rare cases comparatively; but it is very necessary to know them. Every now and then, in practice, we meet with such a case; and by knowing the nature of it, we may lessen the patient's sufferings, and sometimes even cure him. When air exists in the pleura from gangrene of the lung at that spot, and the separation of the eschar,—a circumstance which will occur when the gangrene is quite partial,—the operation, in such a case, might be followed by complete success. If the air were disengaged merely from a quantity of fetid pus underneath, it is possible that the operation might be the means of saving the patient's life,—by putting an end to the dyspnœa, which would perhaps have killed him; and then the other disease may be made to subside. Phthisis is rarely cured; but these other affections sometimes are. It may happen, therefore,—unless the patient have phthisis,—that the disease may be permanently cured.

[a] See the "Medico-Chirurgical Review"; Volume 10.

SECTION VI.—ORGANIC AFFECTIONS OF THE PLEURA.

Tubercular Disease of the Pleura.—There are certain other diseases of the pleura, of an *organic* nature; upon which I will not dwell long. Occasionally the pleura is attacked by the same disease which, when it exists in the lungs, forms phthisis. The pleura is sometimes, though not very frequently, in a state of tubercular deposit. Sometimes, in phthisis, we find one pleura, or both, studded with tubercles of various sizes;—generally small, but sometimes of a large size.

Symptoms.—The deposition of tubercles in the pleura, may be attended with scarcely any symptoms whatever; because phthisis may exist at the same time; and the symptoms of the *greater* disease, may swallow up those of the *small* one. But sometimes, if the disease exist alone, and is of any considerable amount, there will be all the signs of a pleuritic effusion into the chest;—all those symptoms which I just now mentioned; and it may not be easy to make a diagnosis, in a case of this description. On making a post-mortem examination, we are often surprised at finding tubercles in the pleura. But if the disease be considerable in any one spot, we shall have marks of pleuritis. Inflammation will take place around the tubercle; and suppuration will occur. But it is not easy to distinguish inflammation from such a source as that, from inflammation of a simple nature. When the tubercles suppurate, pus may be discharged into the pleura; or, without suppuration, there may be an effusion into that cavity, from excessive secretion; and the secretion may be either serous or purulent. In fact, we may have pleuritis, and all the *consequences* of pleuritis; so that air may pass in, and all those other changes will take place which I mentioned as occurring without tubercles [a]; and the patient will become hectic.

Treatment.—The treatment of the case will depend entirely upon the presence of air, the presence of liquid, the presence of inflammation, and so on. It is only necessary to know, that all the changes which I have mentioned [a], are sometimes connected with tubercles in the pleura itself; and that sometimes very minute tubercles will exist there, and give rise to scarcely any symptoms at all. Tubercles are frequently observed there, when they are seen in various other parts of the body. More frequently than not, perhaps, when pleuritis is chronic,—when the patient has a fixed pain of an inflammatory nature in the pleura, and wastes away, it is a scrofulous affection; and is attended by this tubercular deposition. The tubercles, most probably, are situated in the cellular texture, immediately under the serous membrane.

Ossification of the Pleura.—I have seen the pleura ossified to a great extent. Here, again, it is not the *pleura* (properly speaking) that is ossified,—at least *originally*; but it is the cellular membrane under it. The cellular membrane is frequently converted into bone, in various parts of the body; or bony deposit takes place in the cellular membrane. Perhaps the latter is a more accurate mode of speaking. But the pleura above the bone will sometimes disappear,—waste away; so that, on looking into the cavity of the pleura, we perceive the bare bone. I recollect once meeting with this occurrence, to a great extent, in an old man who died of ascites and liver-disease; and who was not aware that he had disease in the pleura;—at least, he never attracted our attention to it. I recol-

[a] See Pages 929, 931, and 935.

lect remarking how well he could lie down, notwithstanding the fluid in his abdomen. I found the pleura covering several ribs, in a state of ossification.

Scirrhus, &c.—Other affections may occur in this situation. We may have scirrhus, and melanoid disease; but these are comparatively rare affections.[a]

[a] We cannot take leave of Diseases of the Lungs, without directing the attention of our readers to "A Treatise on the Diagnosis and Treatment of Diseases of the Chest. By William Stokes, M.D." In this, the most able work we possess on the subject, one of the first stethoscopists of the day, has given us the result of great talents and ample opportunities, brought to bear, for a long series of years, on this, his favourite department of medical investigation.

BOOK IV.

DISEASES OF THE HEART.

CHAPTER I.

PERICARDITIS.

Pericarditis, the first disease which I purpose to consider, would never be selected to shew the advantages of auricular examination; which, in the acute form at least, is (for the most part) of only negative utility. But the consideration of it will prove the injustice of those who assert, that auscultators both regard auscultation as a universal light, and neglect the general investigation of symptoms.

Frequent in Occurrence.—The acute inflammation which occurs in the region of the heart, is usually situated in the pericardium; and pericarditis is a very common disease.

Anatomical Characters.—The anatomical characters are little different from those of inflammation of other serous membranes.[a] There is either a partial redness,—patches, sometimes as if the membrane were injected, at others as if dyed red,—or groups of red points. The redness is seldom deep; and, in the most violent cases, is often very faint. The membrane was never, in a single instance, observed by Laennec to be thickened[b]; though Dr. Baillie declares this to be frequently the case[c]; but upon it lies a quantity of fibrin, thicker and more consistent than in pleurisy; and differing from the fibrin of pleurisy, also, in being generally irregular on its surface;—sometimes with minute pores, sometimes with depressions so large as to give it the appearance of the second stomach of the calf, sometimes knobbed like butter spread upon two slabs (to use Laennec's comparison[b]), first approximated and then suddenly separated from each other. Dr. Baillie says that the fibrin never adheres firmly[c]; Laennec that it adheres more firmly than in pleurisy.[d] Although the redness is partial, this exudation is most frequently general, and often very abundant when the redness is slight. It is of the ordinary pale colour.

The serum effused is in far less proportion to the fibrin than in pleurisy;—seldom amounting to a pint, though it has amounted to four; and some-

[a] See Page 113.

[b] See his Treatise on Diseases of the Chest, translated by Dr. Forbes; Part 2; Book 2; Chapter 22. (Third Edition; Page 671.)

[c] "Morbid Anatomy"; Chapter 1; Section 1.

[d] See his Treatise on Diseases of the Chest, translated by Dr. Forbes; Part 2; Book 2; Chapter 22. (Third Edition; Page 672.)

times scarcely any is found. It is of the common whitish lemon-colour; rarely limpid; sometimes very turbid, containing larger or smaller flocculi of lymph, or absolutely curdled;—as if only one kind of effusion had taken place. Sometimes it is bloody, sometimes puriform: Dr. Baillie once saw a quart of pus in a pericardium violently inflamed, but free from ulceration.[a]

In the chronic disease, the redness is more intense and more diffuse, and the inflammation is almost always general. If any fibrin exist,—and it seldom does,—it is thinner and softer. There is always the turbid serous effusion.

As time elapses after the acute attack, the liquid effused is absorbed, the fibrin grows to the cardiac and parietal portions of the pericardium, and adhesions (more or less partial or general) of cellular or serous membrane are produced;—usually thinner and stronger, like those of other serous sacs, the older their date. The adhesions are sometimes very thick and fibrous,—as it were fleshy; and sometimes cartilaginous or bony. I have frequently seen the whole cardiac and parietal pericardium coherent, and even the proper auricles concreted to the ventricles; so that no pericardial cavity existed;—the serum being entirely absorbed, and the fibrin nearly so. Such cases have occasionally been mistaken for instances of the absence of the pericardium.

Both when the pericardium is very coherent, and when it is only thickened, the morbid action may be more intense in particular spots; for we often find, at different parts, knobs of cartilage, some of which dip deeply into the substance of the heart. Sometimes the fibrin effused becomes cellular; and, contracting no adhesions, lies pale (like lace) upon the surface of the heart: sometimes merely an opaque white patch, which can be peeled off, remains; and sometimes, instead of smooth patches, we have opaque white granulations. If the inflammation has been severe, lymph is often found (in more or less quantity) on even the external surface of the pericardium;—uniting it by bands to the pleura. The reason is not obvious, why the fibrin within the pericardium sometimes adheres, and sometimes contracts no adhesions. The degree of serous effusion and consequent proportionate separation of parts, affords no explanation; because, first, we often see one portion of lymph adherent, while another by its side is not; and, secondly, there is often a total absence of adhesion, without sufficient serous effusion to account for it.

The substance of the heart after pericarditis may be unchanged, or redder or paler than usual, yellowish or brown, hardened or softened. After the chronic disease, it has been found hypertrophied. It is usually when the organ is softened, that we observe the effused serum to be bloody. In "softening of the heart", I have almost always found bloody serum in the pericardium. Not only the substance of the heart, but its lining membrane,—especially at the valves,—is also frequently affected; sometimes in the acute form[b], but generally in the chronic, if very long continued.

We shall find, presently, that the majority of cases of diseased heart, both as to its substance and its valves, arise from, or (at least) are coetaneous with, or spring up during, inflammation of the pericardium.

[a] "Morbid Anatomy"; Chapter 1; Section 1.

[b] In the "Medico-Chirurgical Transactions" (Volume 7, Page 323), Mr. Stanley describes a case of pericarditis, that occurred with pain of an extremity, evidently rheumatic. The pericardium contained several ounces of turbid fluid, with flakes of lymph; and was covered, in various situations, with a reticulated layer of lymph. The substance of the heart was almost black with congested blood, was very soft, and was studded with little collections of dark pus.

Causes.—Pericarditis is occasioned by all the causes of the inflammation of serous membranes in general. But the most frequent is either exposure to cold,—especially after a warm temperature, and if rheumatism is also induced; or sympathy with the fibrous membranes of joints attacked by rheumatism. It will occur simultaneously with the rheumatism; or not till the rheumatism has existed for a longer or shorter period, has even gradually declined, or altogether ceased for some time; and, though the metastasis is comparatively rare, when the rheumatism suddenly disappears.

Its Connexion with Rheumatism.—Pericarditis is usually not very violent, but is disposed to assume the chronic form;—frequently stealing on, as a chronic disease, from the abuse of fermented liquors. In this case, the valves and (finally) the substance of the heart, as I have mentioned [a], become diseased. From these circumstances, the connexion between rheumatism and affection of the heart was first noticed in the stage of organic disease; and rheumatism was said to produce, not inflammation, but disease of the heart. Occasionally the pericardium may not be affected, and occasionally but in a secondary manner: but I am certain, that nearly all the cases of affections of the heart, after rheumatism, are originally pericarditis; and that, when the inner membrane is thus affected from the first, so also is the pericardium. Among the cases of organic disease of the heart connected with rheumatism, published by Dr. Wells, in the year 1812 [b], those which proved fatal displayed a complete abolition of the pericardial cavity, or strong or abundant partial adhesions; and those which did not prove fatal, were marked by decided symptoms of pericarditis. In nearly all [c] those mentioned by Sir David Dundas, in the First Volume of the "Medico-Chirurgical Transactions" [d], the pericardium was adherent. Every dissection that I have made in cases that proved fatal during the early period of the disease, has proved the case to be violent pericarditis; the history of every chronic case that I have witnessed, could be clearly traced back to pericarditis; and every affection of the heart (however slight) that I have seen take place during rheumatism, has been marked pericarditis. The pleura, particularly of the left side, is occasionally inflamed at the same time; and the subsequent chronic organic disease of the heart, is of every possible variety.

First observed by Dr. Pitcairn.—Dr. Pitcairn, of St. Bartholomew's Hospital, was the first who noticed, about the year 1788, the connexion of rheumatism with disease of the heart; and Dr. Baillie, in 1797, was the first who published on the subject.[e] They considered the disease to be a morbid growth of the heart. Sir David Dundas, published upon the subject, many years afterwards [f], without reference to the observations of these physicians; and even asserted his belief, that no account of the matter was to be found in any medical writer [g]; though, as Dr. Wells remarks [b], "there is great difficulty in supposing him ignorant of what had been mentioned twelve years before, in so popular a work as Dr. Baillie's Morbid Anatomy." Sir David mentions the disease as dilatation of the heart, and chiefly of the left ventricle; with paleness and softness of its substance, and adherence of

[a] See Page 942.

[b] In the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge"; Volume 3; Page 373.

[c] That is, in five cases out of the six which were examined. A seventh fatal case was not examined. "See the "Medico-Chirurgical Transactions"; Volume 1; Page 40.

[d] Page 37.

[e] In his "Morbid Anatomy of some of the Most Important Parts of the Human Body."

[f] In 1808.

[g] "Medico-Chirurgical Transactions"; Volume 1; Page 37.

the pericardium.[a] But, from the imperfection of morbid anatomy in this country at the time he wrote[b], his description is very loose. However, in one of Dr. Wells's cases,—which proved fatal early, and was opened by Sir Benjamin Brodie,—nothing but pericarditis was discoverable[c]; and Dr. Wells, no less distinguished for his sagacity than his independence, evidently regarded the rheumatic affection of the heart as inflammatory, by advising copious bleeding in the outset.[d]

The French do not appear aware of the connexion of pericarditis with rheumatism, except as an ordinary instance of internal inflammation, upon the sudden retrocession of an external disease.

However, I think it is pretty certain that disease of the *heart* is not connected with rheumatism, except so far as the effect of *pericarditis* is connected with rheumatism. We every day see the latter occurrence; and whenever a case of disease of the heart connected with rheumatism occurs in a young person, and the patient dies, we find marks of preceding inflammation within the pericardium; and, on inquiring into the history of the case, we learn that there were originally symptoms of pericarditis. It is quite clear that the rheumatism is connected with the inflammation of the pericardium. I will not say it *produces* it; because all the symptoms result, perhaps, from the same state of the system: but the first thing *connected* with the rheumatism, is pericarditis; and then when that has existed any considerable time, the organic changes of the heart take place. We may easily, I think, satisfy ourselves of this, by reading all the cases that have been published of diseases of the heart, as consequent upon rheumatism. We find strong proofs of inflammation of the pericardium; and if the original history of the case be detailed, we shall see strong symptoms of pericarditis. In affections of the heart connected with rheumatism, we continually find that inflammation has taken place first, and that organic disease is consequent upon that. This is a very happy circumstance; because inflammation of the pericardium may be controlled, as easily as inflammation of any other part; whereas organic disease of the heart, for the most part, is an affection which we can only palliate. But it is not disease of the *heart* which is connected primarily with rheumatism, but *pericarditis*.[e] This is nothing more than might be supposed; because young persons, who are chiefly the subjects of this disease of the heart, are not subject to organic diseases, except scrofula. They are subject enough to *inflammation*; and we know that inflammation of any part whatever, will leave organic disease. The great source of organic disease, is inflammation; and it is quite capable of producing every organic affection whatever;—that is to say, of producing all *common*, and all *structural* diseases, and a predisposition to any *peculiar* disease. The debility produced by inflammation of another part, easily makes the patient the prey of a specific affection. But it is in *young* subjects that this affection occurs;—young subjects being particularly liable to *inflammation* of every description; and not to *organic* diseases of any kind, except scrofula.

Duration.—This disease would appear sometimes to remain very long mere pericarditis, or at least merely an inflammatory affection; for it is sometimes cured after a lapse of time, and sometimes continues for many years with no signs of organic disease;—proving troublesome only when cold is

[a] "Medico-Chirurgical Transactions"; Volume 1; Page 40.

[b] In 1808.

[c] "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge"; Volume 3; Page 400.

[d] "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge"; Volume 3; Page 409.

[e] See Page 943.

accidentally caught, and a fresh attack of rheumatism in the joints induced.

Age at which it Occurs.—Most instances of rheumatic pericarditis commence in persons from about the age of puberty to near thirty. We occasionally see it in the younger; rarely for the first time in the older. I once saw it in an infant. With neither of Dr. Baillie's remarks,—that pericarditis is not very common, and that it chiefly attacks persons who have been some time adults [a], does my experience at all agree.

Symptoms.—Acute pericarditis is, of course, attended by more or less pyrexia. There is a pain in the region of the heart,—sometimes severe and lancinating: generally darting through to the left scapula, upwards to the left clavicle and shoulder, down the arm a certain way, and (what is remarkable) rarely extending quite so far as the elbow. I lately had a case, in which the pain extended down the fore-arm; but it did not quite reach the wrist. The pain is increased by pressing forcibly upon or between the ribs and cartilages over the heart; and by pressing, with the points of the fingers, upwards against the diaphragm, under the cartilages of the left false ribs; frequently even by pressing the epigastrium and left hypochondrium in the usual manner. The pain is often increased on inspiration, and by lying on the left side. I think patients in general lie most easily upon the back. The respiration is rapid; but less so than in affections of the lungs. There is sometimes a cough, which is dry. Nearly always palpitation, frequently violent, at least upon exertion. Sometimes, though more rarely, a disposition to syncope. The pulse varies exceedingly. It is necessarily quick; and often, but not always, small, in proportion to the heart's action; and only sometimes intermittent and irregular; neither is it always hard or even very full. The countenance is described as anxious, and the features contracted: but this, I imagine, happens only when the pain is acute; and it is equally the case in pleuritis.

Auscultatory Signs.—On examination by the ear, the *whole* heart is found acting more forcibly, and with a clearer sound, than in health. But this is all. Auscultation, however, appears to be of negative use. We do not discover the loud murmur or the sonorous or sibilous rattle of bronchitis, the crepitous rattle or obscure respiratory murmur of pneumonia, or the ægophony of pleuritic effusion, unless these diseases are combined with the pericarditis. Neither have we the partially excessive or defective impulse or sound, or preternatural sounds, of organic diseases of the heart. In all uncombined cases, therefore, light is thrown on the disease. I remember having once found auscultation of great use, in the diagnosis of a disease which might have been considered clearly pericarditis. The patient was a poor Irishman; and the Irish are by no means happy in their attempts at a lucid history and description of their diseases. He complained of pain (increased on pressure) in the region of the heart, palpitation, and dyspnœa; and declared he had been ill but a few days. The case appeared to be pericarditis. The pulse was full, and the constitution good. There appeared every reason to bleed him freely, and to put in force the whole antiphlogistic plan. But, on listening to the heart's action, the left ventricle gave a violent dead noiseless blow against the chest; and the case was evidently one of hypertrophy of the left ventricle. I insisted to the man, that he had long been ill; and it was ascertained, from his own mouth and from his wife, that he had suffered palpitation and dyspnœa for a great length of time; and that the error of his history arose from his having been com-

[a] "Morbid Anatomy"; Chapter 1; Section 1; Paragraph 1.

pelled to leave off work for only a few days before. He died in a fortnight; and great hypertrophy of the left ventricle was discovered.

M. Collier says, that the action of the heart is accompanied by a sound resembling that of new leather. Laennec does not mention it; but remarks the occasional occurrence of a sort of click, which some persons mistake for a "bruit de soufflet."[a]

Diagnosis.—The diagnosis of pericarditis is thought by many to be extremely difficult. Laennec declares that he has frequently suspected it where it was not found, and found it where he had not suspected it.[b] By close inquiry into the existence of all the marks just mentioned[c], I have never found the diagnosis difficult. I would particularly lay stress upon the extension of the pain from the region of the heart to the scapula, shoulder, and a certain way down the arm;—symptoms which patients will not always mention, unless questioned respecting them: and its increase on strong pressure upon or between the ribs and cartilages over the heart, and upwards under the cartilages of the left false ribs. These two points I do not remember to have seen mentioned anywhere; and the others are not dwelt upon in some of the best books. In Andral's "Clinique Medicale", pain of the epigastrium on pressure is said to have occurred in some cases; but the point is not spoken of as if inquired into: in one case only is the extension of pain to the arm mentioned; and its extension even to the shoulder does not seem to have formed an object of inquiry.

I am certain that, by a scrutinizing examination, the existence of pericarditis will very rarely be mistaken: and from this conviction, and the frequency of its occurrence during acute rheumatism, I make it as invariable a rule to examine the cardiac region by the touch and hearing in every case of acute rheumatism, as the usual seats of hernia are examined by us all in cases of colic and intestinal inflammation. Were this rule universally observed, practitioners would not be occasionally surprised by the death of patients, in what had been considered merely acute rheumatism.

Treatment.—When the disease is acute, there is nothing peculiar in its treatment;—being the same as that for active inflammation in other parts of the body. Only it is to be remembered, that this inflammation is seldom violently active; and is generally disposed to become chronic. When acute inflammation is not very intense, the best way of attempting to remedy it, is by local bleeding; so in this case, I have observed free local bleeding to be more serviceable than general depletion. Mercury is of equal efficacy in acute pericarditis, as in other acute inflammations; over which, wherever they may be situated, a very extensive experience of many years has fully satisfied me,—conformably with the observations of so many able physicians,—that it possesses far more power than any other medicine. Bleeding and other ordinary measures cure cases of severe inflammation every day; and, in cases of little danger, may be relied upon. But they frequently fail in cases of intensity; and I know that if, in addition to suitable bleeding, mercurial ptyalism is quickly induced, active inflammation will very rarely destroy; and not only is fatality almost always prevented, but far less bleeding is required. This has been my practice, from the

[a] "The contraction of the ventricles yields a greater shock, and sometimes a more marked sound, than usual; and, at intervals, feebler and shorter pulsations are perceived; which correspond with the intermissions of the pulse.—"*Forbes's Translation of Laennec's Treatise on the Chest*"; Part 2; Book 2; Chapter 22. (Third Edition; Page 676.)

[b] See his Treatise on Diseases of the Chest, translated by Dr. Forbes; Part 2; Book 2; Chapter 22. (Third Edition; Page 675.)

[c] See Page 945.

commencement of my professional life; and I have never met with a necessity for those frightful bleedings of quart after quart, recorded from time to time in our publications. I have given tartarized antimony (in quantities of a scruple and half a drachm every twenty-four hours), hydrocyanic acid, and other medicines recommended by the Italians; but found them all greatly inferior to mercury. Among the best, unquestionably, is colchicum; and its power over active gout and rheumatism of the extremities, is universally acknowledged to be very great. After the violence of acute pericarditis is subdued, it appears of use in restraining the morbid irritability which sometimes still continues in the heart; and several chronic cases, of which I had despaired, have gradually recovered under perseverance in its use for many months.

Dropsy of the Pericardium.—The quantity of fluid at a certain period of acute pericarditis, and in chronic pericarditis, is occasionally (but not often) so considerable, that "hydrops pericardii" exists. Inconvenience could scarcely arise from a less quantity than half a pint. Unless it is considerable, it is indicated with no more certainty by percussion and auscultation, than by the ordinary symptoms. But if the quantity be large, there is a dull sound to a great extent, on striking the cardiac region; the heart's action may be perceived very faintly, and perhaps in a diffused manner; so that the epigastrium pulsates or vibrates, and may appear fuller than in health: patients have experienced a sense of weight in the cardiac region, and even fluctuation has been detected. In cases of copious effusion of blood, pus, or serum, into the pericardium, these symptoms have suddenly appeared; and good examples of the occurrence of some of them may be found in Andral.

A fluid occasionally collects in the pericardium,—as in the pleura and peritoneum, arachnoid, and "tunica vaginalis",—by a slow process, not amounting to inflammation. The membrane is not red, but perhaps opaque; and even thickened, and of a satin-whiteness. This condition, is, I believe,—where no redness of inflammation is visible,—the common cause of ascites, chronic hydrocephalus, hydrocele, and idiopathic hydrothorax; and though, like the state which gives birth (as I shall presently mention[a]) to one kind of adhesions in serous membranes, it may be the result of a change allied to inflammation, it hardly merits the title of "inflammation";—from the absence of inflammatory symptoms, the absence of redness in the membrane, the pellucidity of the fluid, and the inutility of anti-inflammatory measures.

Adhesions.—The adhesions within the pericardium left after pericarditis, are almost the only instances that occur in this membrane. I have never seen adhesions except with redness of the membrane, or the presence of turbid fluid, or after the existence of decided symptoms of pericarditis. In the pleura they are continually found, without the least previous symptoms of inflammation, and without redness or turbid effusion; and though, like chronic dropsy of the membranes, they may result from what cannot be proved to be a non-inflammatory state, they certainly (like it) are no proofs of any thing deserving the decided name of "inflammation."

In the case neither of the pleura nor pericardium, do they in general produce the slightest inconvenience. I have seen the whole pericardium so coherent, that its cavity was entirely abolished; and yet the symptoms which had been present were exactly commensurate with the organic disease of the heart which existed at the same time, and had certainly no relation to

[a] See the previous Paragraph.

the adhesion. I cannot say I ever observed a symptom produced, except in one case; and there a single thick adhesion extended along the front of the heart. In the supine posture this must have been dragged down by the subjacent heart; and must have tended to drag the pericardium of the front of the chest with it, and to suspend the heart;—so that the parietal and cardiac pericardium, at their points of union with it, must have been put upon the stretch. The patient, accordingly, had been unable to lie on her back;—on account of a smarting pain produced, in this posture, at the front of the cardiac region. Bertin, in his excellent work upon diseases of the heart[a], states that adhesions often produce no symptoms; but gives one case in illustration of the fact, that inconvenience sometimes is felt: yet in this case, adduced singularly enough, the substance of the heart, in addition to the adhesions, was found very soft;—a change quite sufficient to explain every symptom that occurred.

Organic Affections of the Pericardium.—The cellular side of the pericardium, like that of other serous membranes, is sometimes (though very rarely) the seat of hydatids and cysts, scrofulous and other tubercles, and of ossification. The diagnosis must be impossible; and, indeed, no symptoms have in some cases been observable.

Hæmorrhage into the Pericardium.—The pericardium is the seat of sudden and fatal hæmorrhage without previous indisposition. Sometimes, like the arachnoid, it is perfectly dry. Sometimes it contains air, either alone or with a preternatural quantity of fluid; in the latter of which cases, fluctuation or undulation has occurred. Sometimes the pericardium is absent: at least five unquestionable cases of this singularity are on record.

[a] "Traité des Maladies du Cœur et des Gros Vaisseaux, par R. J. Bertin. Paris, 1824." Page 254.

CHAPTER II.

DISEASE OF THE LINING MEMBRANE OF THE HEART.

SECTION I.—GENERAL INFLAMMATION OF THE MEMBRANE.

I SHALL now proceed to describe affections of what may be called the membrane corresponding to the pericardium. The heart has a membrane within, as well as a membrane without;—a membrane which is continuous with the lining membrane of the aorta, and of the valves. This is subject to inflammation,—in the same way as the pericardium; but there are no signs by which we can ascertain its existence with certainty. We may occasionally *suspect* it; but, after all, I imagine it will be a mere guess.

Anatomical Characters.—After death, this lining membrane is occasionally found in a state of inflammation; but we are not to presume, in every instance in which we find redness of this part, that there is inflammation. If it so happen that the parts are all soft, they will become dyed by the blood; imbibing it after death, and becoming stained by it. Almost always, when the heart is softened in structure, this membrane is of a deep red colour;—simply as the effect of that imbibition, which I mentioned, when speaking of inflammation in general; and when I pointed out the necessity of being careful, in many instances, not to decide that there was *inflammation*, simply because there was *redness*.[a] But there is no doubt that this redness does sometimes result from inflammation. This is proved by fibrin being effused upon the coloured portion, and adhering to it closely. Another proof is, that we find the part which is so intensely red without a drop of blood in contact with it. Sometimes the membrane is red in particular valves, for example; and yet the whole cavity will be emptied of blood; so that it cannot be ascribed to the imbibition of blood from the part with which it was lying in contact. Occasionally this redness will arise from great dyspnœa. When, before death, there is long-continued difficulty of breathing, the mucous membrane of the stomach, intestines, and bronchia, becomes very red; and the right side of the heart becomes gorged with blood. In these cases we shall, in many instances, have redness of the inner membrane. But where a patient has died suddenly, and there has not been time for the gradual accumulation of the blood from the smaller vessels,—where after death no blood is lying in contact with the red part, the lining membrane is sometimes intensely red.

Symptoms.—In cases of this description there has sometimes been, before death, great rapidity of the pulse, rapid action of the heart, and more or less uneasiness and smarting in the region of the latter. If this occur within the aorta, for example, there is in general great rapidity of pulse, and a smarting sensation down the spine in the course of the aorta. In the case of the heart, the only reason for supposing its existence is that, in addition to the signs of pericarditis, (for pericarditis is generally united with it,) there

[a] See Page 76.

is a very violent action of the heart; but I confess that, more frequently than not, I have found this appearance after death, without having had any reason to suspect it during life.

Usually Chronic in its Nature.—When the lining membrane is affected with inflammation, it is generally a mere *chronic* disease;—just like inflammation of the pericardium.[a] It undergoes the common changes produced by inflammation; it becomes thicker than it should be; and, at the same time, it becomes harder.

The Valves most frequently Affected.—The parts most frequently affected are the valves; which are nothing more than an elongation and doubling of this lining membrane. In the case of the tricuspid and mitral valves, a portion of tendinous structure likewise enters into their composition. The "chordæ tendineæ", invested as they are by the lining membrane of the heart, run along into the valves, and are lost there in the lining membrane; so that the mitral and tricuspid valves, are made up of *fibrous* membrane and the *lining* membrane;—tendinous and serous membrane; whereas the semilunar valves of the aorta and pulmonary artery, are nothing more than the lining membrane itself, protruded and extended.

It is a general rule observed in pathology, that the lining membrane at the openings of the heart, is more subject to disease than other parts;—whether it be simple inflammation, or the effects of chronic inflammation in any other part. We know very well, that it is not the stomach at large which is generally diseased; but one of the openings;—the cardiac or the pyloric. We also know that, more frequently than otherwise, disease affects the intestines where the small intestines terminate in the large; or, again, where the large terminate in the rectum. The rectum is the great seat of scirrhus, stricture, and various other diseases of structure. In fever, ulcerations are more frequently found at the termination of the ileum than elsewhere; and there it is we continually see scirrhus and cancer of the intestines. Instances of disease of the cardia and pylorus, are infinitely more frequent than disease of the rest of the stomach. Exactly the same is observed in the case of the heart; so that we have infinitely more cases of disease of the *openings* of the heart, than any other part of the lining membrane. This is nothing more than an exemplification of a general rule.

Left Side of the Heart most frequently Affected.—There is another rule, however, which is peculiar to the heart; namely, that the left side is more subject to diseases of all kinds, and infinitely more to redness, than the right. That is a general rule, with respect both to the lining membrane within the heart, and with respect to the substance of the heart itself. Various hypotheses have been formed to explain this; but the most probable explanation is, that one side of the heart receives blood of an *arterial* character, whereas the other has blood of a *venous* character. It has been thought that one side of the heart does more work than the other; but in proportion it certainly does not. Every time the left ventricle contracts, the right does the same; and so with respect to the auricles; and if the left ventricle have to send its blood farther than the right, yet the structure is much thicker than that of the right; and thus it is fully qualified for the exercise of the duty which it has to perform. No difference that I can discover exists between them; except that one receives *arterial*, and the other *venous* blood. Whether that will explain the circumstance, I do not

[a] See Page 946.

know; but we know, as a general rule, that arteries are more subject to active diseases of all kinds, than veins; and it is very probable that the greater stimulus of the arterial blood occasions other causes of disease, when applied, to act energetically; and also causes disease to take place with more readiness.

SECTION II.—DISEASES OF THE VALVES OF THE HEART.

Inflammation of the pericardium, when chronic, is very frequently united with chronic inflammation of the membrane within the heart; and most frequently with chronic inflammation of those parts that form the valves. This is one way in which organic disease of the heart is produced; namely, by pericarditis. Pericarditis seldom exists long, without being followed by a similar state of the lining membrane within.

Anatomical Characters.—In the natural state, these valves are quite flexible; and, though not trans*parent*, trans*lucent*. But when they have become chronically inflamed, instead of being light, they become yellow; and, instead of being translucent, they become opaque. They lose their flexibility, perhaps; and become more or less rigid. They play less easily; and at last become quite rigid. They lose their fineness, and become thick; and not only thick, but dense. If these changes be not very severe, they give rise to no symptoms at all. If they do not prevent the passage of blood, by narrowing the opening,—if they do not prevent the valve from doing its duty, no symptoms (that I am aware of) can arise; so that the best auscultator in the world may find, after death, disease of the valves, of which he had no idea before the patient ceased to live. It is only when function is impeded, that any symptom can arise.

Converted into Cartilage or Bone.—The change which the valves undergo will, at last, amount to cartilaginous hardness. They will become perfectly cartilaginous; and, in a still further degree, they will become complete bone. When they undergo this change of consistency, the aperture of the part is diminished. In the case of the tricuspid valve, the opening may be reduced to one-third or one-fourth. Still, however, it generally retains its circular form. In the case of the corresponding valve on the opposite side (the mitral), the circular form is still in many instances retained; but in other cases the opening grows up in such a way, that it is only a chink. Instead of being circular, it is of a crescentic, or semilunar form; and, from the valve growing so considerably, a pouch is formed, leading from the auricle to the ventricle; so that on opening the left ventricle, a pouch is seen extending into it; and, at the end of the pouch, there may be a circular opening. Sometimes, instead of a pouch, the valve is all contracted together; and we have nothing more than a chink.

Sometimes the valves will become bony. When there is bone, it is deposited under the membrane;—it is deposited, as in all cases of serous membranes, immediately under it; and then the membrane, from the presence of the bone, becomes exceedingly thin; till at last it will disappear, perhaps, over the bony portion; and the bare bone is then in contact with the blood. It is very rare for the valve to be universally converted to bone, nor is it common for it to be universally converted into cartilage; but the changes exist in different degrees at different spots; so that here and there there will be bone, and sometimes the valves will become completely cartilaginous.

Changes in the Auriculo-Ventricular Valves.—The valves between the

auricles and ventricles on either side,—the *tricuspid* on the *right* side, and the *bicuspid* or *mitral* on the *left*,—when they are much diseased, instead of falling back, form a very considerable curtain, with an opening (generally of an oval or circular form) in the centre of it. The different parts of the valve may become filled, or grown up; so that we have a complete membrane between the auricle and the ventricle; and in the case of the *mitral* valve, especially, we every day see it extended in the form of a pouch. The opening in the mitral, as well as in the tricuspid valve, is generally in the centre, and is circular or oval. I before mentioned [a], that the mitral valve is sometimes so grown up, that a mere slit remains; and it is worthy of notice, that this slit is not straight, but is generally of a crescent form,—in the shape of a bent finger;—the concavity of the opening usually being towards the root of the aorta, and the convexity backwards. I believe the latter circumstance may be said to be universally the case. On looking from the auricle, the light is seen through the chink, in a very remarkable manner. I believe this observation was first made by Mr. Adams, a surgeon at Dublin; who wrote a very excellent paper on Diseases of the Heart, in the "Dublin Hospital Reports." [b]

The Pulmonary and Aortic Valves.—With regard to disease of the other two openings of the ventricles,—the opening on the *right* leading into the *pulmonary artery*, and in the *left* leading into the *aorta*,—disease is more frequently found in the valves of the aorta, than in those of the pulmonary artery. This is according to the general rule, that all diseases far more frequently affect the *left* side of the heart, than the *right*. It is a rare thing, indeed, for the *pulmonary* valves to be much diseased; but if they are, the appearances are the same as when the *aortic* valves are affected. When the latter are diseased, they will stand quite firm; and do not give way at all to the common pressure of the blood; so that the opening becomes diminished. The aperture which is left in the middle of the three valves, is sometimes circular; though occasionally it is triangular. It sometimes happens that these valves are completely converted into bone. They then form three shells of bone; but still they retain the appearance they present when there is only cartilage. It is very common to find bone about the aortic valves,—more common than anywhere else; but next in frequency we find it on the *mitral* valve. It is sometimes found at the *edge* of the valve; sometimes at the bottom of the *sac* of the valves; and sometimes there is bone on the aorta, *opposite* the valves. The quantity of bone is sometimes very great; and occasionally it occurs in minute granules, and not very firmly adherent; so that by rubbing it with the finger, portions come off in the form of grit.

Warty Excrescences on the Valves.—These changes are not the only ones, however, that we observe in the valves. Occasionally we find excrescences; and these are so much like venereal warts on the genitals, that Corvisart, who has written a very good work on Diseases of the Heart [c], actually believed they were syphilitic. The appearance of warts on the genitals, does not depend upon their being syphilitic, but upon their being morbid growths of a particular structure; and we know that, in the greater number of cases, the warts depend upon mere irritation, without any other cause. These excrescences are very various in their appearance. Sometimes they are variously pointed, so as to exactly resemble venereal warts; and sometimes they are of very great length. I once opened a body, in

[a] See Page 351.
[b] Volume 4.
[c] "Essai sur les Maladies, et les Lesions Organiques du Cœur, et des Gros Vaisseaux."

which the excrescences were so long, that they nearly reached to the apex of the heart. It was the extremest case I have ever seen. There were a number of projections from the outside of the mitral valve; but it was at the roots of the *aortic* valves that they were so very long.

Shrinking of the Valves.—When the valves become so changed in various ways, they frequently shrink, and become shallow; and they also shrink in breadth. They also frequently become shorter, so that the aperture is altogether diminished; and when bone is deposited upon them, they frequently become brittle; and, from their brittleness, they split and crack. The two valves frequently separate at the point at which they are usually united. They are no longer bound down, and the two are thrown into one; and at that point the valves frequently split to a greater or less extent. This is a very common occurrence. The valve is so corrugated, that the division between the two is lost. This is just the same occurrence that takes place in the interior of an artery, when bone is deposited there. An aneurism arises from the deposition of bone, and not from the mere coat of the artery. Bone is deposited in the middle of an artery, and the coat splits. In the case of the heart, it is not an artery that is affected, and therefore an aneurism is not produced; but the part splits in the same way. Dr. Baillie has given an excellent representation of some of these affections.

Corrugation of the Valves.—When the aortic valves become opaque, thickened, indurated, and rugged, they sometimes corrugate,—so as to curl in towards the side of the aorta; and sometimes so as to turn out. Sometimes they are neither curled *in* nor *out*; but remain rugged. A paper was read at a society by a gentleman, announcing this as a very great discovery; but really it was no discovery at all. Corvisart's work contains a mass of information on Diseases of the Heart and Aorta; and is the best next to Laennec's on Diseases of the Chest. I recollect he states (without announcing it as any thing important) that sometimes the valves are folded *in*, and that sometimes they are folded *out*. Occasionally the induration is merely at the *roots* of the valve. On rubbing each, we find the root semicircular and hard. These are the chief varieties of disease of the valves.

Comparative Frequency of Disease in the Valves.—With regard to ossification, although it is seen so commonly in the *aortic* valves and the *mitral* valve, it is a very rare thing indeed to find the disease advancing so far upon the *right* side of the heart; but far more rare indeed to see it proceed so far upon the valves of the *pulmonary artery*. The tricuspid valve of the right side, is far more frequently diseased, than the semilunar valves of the pulmonary artery. Thus the aortic and mitral valves are not only far more diseased than those on the right side, but (to go to the latter situation) the tricuspid valve is more frequently diseased, than the valves of the pulmonary artery.

Causes of these Changes.—The changes to bone and cartilage, when they occur in young persons, are undoubtedly the result, in by far the largest majority of cases, of mere accidental inflammation; so that without having rheumatism, catching cold, or being exposed to the causes of inflammation, the individual would never have suffered from the disease. But when they occur in old persons, these affections can rarely, I believe, be traced to any particular attack of inflammation. They appear to be a degeneration of structure dependent upon age. Some parts of the body, under the influence of age, suffer transformations sooner than others; and this portion of the heart will become diseased, in old persons, really from a disposition to organic disease, and not from the result of accidental inflammation. This

change of structure is common, in various parts of the body, as individuals grow older.

Other Parts of the Membrane Affected.—Although the foregoing are the parts of the lining membrane of the heart, which are most frequently diseased, yet we occasionally see other parts of the lining membrane of the ventricles and auricles, but particularly the former, thickened very much, and hardened. Sometimes the lining membrane is particularly thickened where it lines the ventricles; while at the valves it is in a healthy condition. But this is an exception to the general rule. Now and then we see a little ulceration of this membrane; but that is a very rare occurrence.

Deposition of Lymph on the Valves.—There is one circumstance, which I do not find to be much dwelt upon in books; and it is, perhaps, the result of inflammation. Occasionally, after chronic pericarditis, there will be a deposition of lymph under the mitral or tricuspid valve; which will bind it completely down, so as to prevent it from fulfilling its functions. I have seen several instances of this occurrence. My attention was drawn to it by Dr. James Johnson; or probably I should not have known any thing about it. After I had published a case of this description, I found it had been incidentally mentioned, some years ago, in an account of the dissection of a body; but in the regular books on diseases of the heart, I do not recollect having been able to meet with any mention of the circumstance. It is well known that the tricuspid and mitral valves have a free floating curtain; and that if lymph be deposited between them and the heart, they may be bound down. A striking instance of the first of these affections, occurred to me; and I have never met but with three or four cases. I have given a representation of the case, in my work on Diseases of the Heart.[a] This was a case of common rheumatic inflammation. The woman had had rheumatism, several times. She had had disease of the valves; and also inflammation of the left ventricle.

SECTION III.—EFFECT OF DISEASED VALVES ON THE FUNCTIONS OF THE HEART.

Twofold Effect.—We will now proceed to consider what effect these changes must have upon the functions of the heart. The effect may be twofold;—it may be to diminish the aperture through which the blood escapes from the auricles or from the ventricles; or it may prevent the valves from doing their duty, in offering an obstruction to the blood when it attempts to come back. Hence these changes may cause an obstruction to the blood going from the auricles to the ventricles, or from the ventricles to the pulmonary aorta; or they may prevent the valves from offering an obstruction to the blood; so that it rushes back, in some degree, from the ventricles to the auricles, or from the pulmonary artery or aorta into the ventricles. When the aperture is diminished, and the valves grow up, then there will be an obstruction to the transit of the blood; but very frequently the valves become so rugged, that they will not distend when the blood

[a] Plate III. The morbid appearances are thus summed up:—"The tricuspid valve thickened throughout; one half grown up, and completely adherent to the inner surface of the ventricle, with a hard rounded edge: the other half loose, and put upon the stretch, to shew its extent, and the dimensions of the opening left during the play of the valve. The figure of the heart is altered,—being lengthened by hypertrophy and dilatation of the left ventricle; while the *right* ventricle—remaining healthy, and therefore reaching but a short way down—looks like an appendage to the *left*."

attempts to return; and therefore they can no longer perform the office of a valve. When the blood drives back against them, a portion of it goes through; though, of course, not the whole; because, whenever the valves are indurated and rugged, the aperture is diminished; and, at the same time that the diminution of the aperture prevents all the blood from going out that should do so, it prevents some from coming back that wishes to do so; and therefore there is not a *complete*, but a *partial* retrocession. Now the same thing will occur, if the valves happen to be bound down, but I have never seen the valve bound down, except in the case of the tricuspid; and I cannot conceive it possible that it can happen in the case of the semilunar valves of the aorta, or of the pulmonary artery; but if the aortic valves are corrugated, and are only half their size, then they can furnish no proper obstruction; and a quantity of blood will return. Thus disease of the valves may prevent the blood from going in a natural course; or they may allow it, in some measure, to come backwards.

Natural Sounds of the Heart.—These occurrences could not be known, formerly, in the living subject; but now that the ears are employed, they may frequently be detected during life. On placing our ear over the heart, or employing the stethoscope with one extremity placed over that organ, two sounds are heard. The first sound which takes place is rather long; and is immediately followed by a short sound: so that we have a double sound when the heart acts. The first sound which occurs at the moment of the impetus of the heart against the side; and the second immediately after it. The stroke of the heart and the first sound take place both together; and occur a little before the pulse at the wrist;—at least, in most cases. Sometimes we cannot distinguish any interval at all, between the stroke of the heart and the pulse at the wrist; but very frequently we can: this interval arises from the distance of the radial artery from the heart. If we feel the artery nearer the heart, we find a less interval; if we feel the temporal artery, or the aorta itself, there is no interval at all. We may feel the aorta at the arch; and if you place one finger on that, and one on the heart, the stroke at each is found to be simultaneous. It is quite clear, that the pulse at the wrist is immediately consequent on the impulse of the heart. The second sound, which takes place after the impulse of the heart, always occurs, in health, after the pulse at the wrist; and the pulse of the wrist and the stroke of the heart are so close together, that in common language we may say they are simultaneous. Laennec supposed that the first sound of the heart took place from the contraction of the *ventricle*, and that the second occurred from the contraction of the *auricle*[a]; and so he was able to predict where an obstruction would be found after death.

Recent Investigations on the Sounds of the Heart.—There is a difference of opinion, at this moment, as to whether Laennec was right in ascribing the second sound to the contraction of the auricle; and I am inclined to believe that he was wrong. My reason is this. On passing the stethoscope over the heart of a jack-ass, when the heart was laid bare,—according to the experiment of Dr. Hope,—I heard the second sound when the stethoscope was placed upon the ventricle. The sound clearly came from the ventricle; and I was told by others who could see what happened, that the auricle did not contract at that time. But although I dare say the sound did not arise from the mere contraction of the auricle, yet I have no doubt

[a] See Dr. Forbes's Translation of his Treatise on Diseases of the Chest; Part 2; Book 1; Chapter 4; Paragraph 1. (Third Edition; Page 558.)

that it took place at the very moment when the blood passed from the auricle into the ventricle; because, as soon as the two ventricles have contracted, they dilate; and the instant they dilate, the blood must rush into them. A vacuum is formed by the dilatation; and the blood must rush out of the auricles into them; and I believe this is a passive circumstance. The contraction of the auricle appears to have little to do with it. When the ventricle dilates, the auricle empties itself; but, as far as I could observe in the experiment made, it does this in an irregular manner.

[These experiments were afterwards repeated and varied by the Dublin Committee of the British Association for the Advancement of Science; and, more recently, an extended series of experimental researches, on the same subject, has been conducted by Drs. Clendinning, Todd, and myself[a], in another committee for the same association. It was decided unequivocally, by all the series of experiments alluded to, that the first sound accompanies the whole duration of the systole of the ventricles, which also causes the impulse felt on the walls of the chest; it was equally clear that the second, or flapping sound, occurs at the first moment of the diastole, and that the motion of the auricles was not accompanied by any perceptible sound.

Production of the First Sound.—How does the contraction of the ventricles produce the first sound? Sound may be defined to be "*motion* of a certain force, resisted with a certain force": where is the resisted motion in the contraction of the ventricles? One of the first ideas that suggest themselves, is that of Magendie: does not the heart produce the impulse by striking against the walls of the chest? and why should this not cause sound? In forcible pulsations, and when the lung does not too much intervene, I[a] have no doubt that the impulse does produce sound; and if we listen to the sound of the heart when it is beating strongly, or when, by leaning forward or by breathing out, the heart is brought in contact with the walls of the chest, we hear the first sound has in it something like a knock, which we can scarcely help referring to the impulse. But this is an *accessory*, and not an *essential* sound; for we may hear the first sound when there is no impulse;—as in a person leaning backwards, or taking a full breath; and, in our experiments, we heard the first sound at the origin of the arteries, when the body of the heart was surrounded with the soft lung or with tow; or was allowed to hang out of the chest, and strike against nothing in its motions. It is well known, too, that liquid in the pericardium, or liquid or air in the pleura, although it entirely prevent the heart from striking the walls of the chest, does not annul the first sound. In moderate pulsations, the heart makes a partial rotatory movement: the long fibres of its anterior convex surface, drawing the apex upwards and forwards, and causing it to slide obliquely on the smooth pericardium, bring it to the walls of the chest too gently to produce sound, except in the circumstances before mentioned.

The first sound, then, is produced by something in the heart itself;—either by its contents, or by its own structure. Can it be by its contents;—by the motion of the blood resisted by the inequalities of the interior of the ventricles? This was supposed by the Dublin Committee to be the chief cause of the sound. But the motion of the blood over these inequalities is not rapid, nor is their resistance considerable at the time of the production of the sound. These inequalities are, as Dr. Cowan has pointed out, chiefly confined to the lower or auricular portions of the ventricle, into which the blood has already passed before the systole begins; and the effect

[a] Dr. C. J. B. Williams.

of the systole is to drive the blood, not over or across the inequalities, but from them, to those smooth and funnel-shaped parts of the ventricle which lead to the arteries, and which offer the least possible resistance to its course. The contraction of the ventricles propels the passive mass of blood gradually—that is, during the whole period of the first sound—into the arteries; and the motion is therefore too slow and easy to be likely to cause sound. Some of our experiments further settled this point; by proving that the first sound continued when the ventricles contracted without any blood in them.

By excluding the blood we are thus brought to the conclusion, that the cause of the sound must be in the solid structure of the ventricles: it is our next question, whether it be in any part of them in particular. Several writers have ascribed it to the auriculo-ventricular valves; which, when they close, are supposed to produce a flapping sound. But the act of closing these valves is momentary, and takes place only at the commencement of the systole; whereas the first sound of the heart is prolonged through its whole duration. Further: in some of our experiments the first sound continued, although impaired, when the auriculo-ventricular valves were prevented from acting, by fingers introduced into their orifices, or by some of their cords being *hooked* back or cut. Still these valves no doubt produce a part of the sound; for at each contraction they are suddenly tightened, in a manner calculated to generate sound.

But are the valves the only parts which are tightened at each systole of the ventricles? Is not every muscular fibre in the ventricles suddenly tightened by this action? Here are the elements of sound, motion vigorous and rapid, suddenly resisted by the mass of blood to be urged forwards by the contraction; and the contracting motion and the resistance, although greatest at first, continue to act as vibrating forces during the whole systole: hence the prolongation of the sound. In other instances, abrupt and forcible muscular contraction produces a sound like the first sound of the heart; as when we apply the stethoscope to the adductor muscle of the thumb of the closed hand, and contract the muscle strongly and quickly. Or, to avoid the possibility of the joints being the seat of the sound, if we apply the end of a flexible tube to the abdominal muscles, and start them into sudden vigorous action, we may thus get sounds quite as loud as those of the ventricles, and very like them in character.

By varying the mode of this muscular action, different kinds of sound may be produced. When the contraction is slow or sustained, however strong, we have only the dull rumbling noise which Dr. Wollaston first described; and which he attributed to a vibration, depending on a regular intermittence in the force of the contraction. When the contraction is gentle and slow, it may cause no sound at all; as the auricles generally produce no sound, neither do the ventricles, when their contraction is very feeble. But whenever there is strong abrupt muscular action in any part of the body, like that of the heart, there will be heard a sound which will resemble that of the ventricular systole, in proportion as the muscles in which it is produced resemble in thickness and density the tissue of the heart. The loudness of the sound is by no means in proportion to the thickness or strength of the muscle; but rather to its simplicity, and the abruptness as well as the vigour of its contractions: the transition of a thick muscle from slack to tight, can never be so complete and sudden as that of a thin one; where there are many fibres, they choke or muffle each other's vibrations; hence the sound is dull and prolonged, rather than loud and clear. Many writers who have objected to my explanation of the first

sound of the heart, have done so in ignorance of the principles on which muscular action causes sound. When these are known, the identity of the phenomena becomes apparent; and, in my experiments[a], there was the best proof we could have, that the muscular contraction of the heart produced systolic sound; for we had the heart out of the body, without its blood, without valvular action, lying on the table, or on my hand; and its contractions were still accompanied with a sound, weak indeed, but in character resembling its natural first sound.

The walls of the ventricles appear to be peculiarly calculated to generate sound. Their flaccid state when relaxed, the fineness of their fibres, and the harmony with which they suddenly contract on their contents, and become almost as hard as a stone (as we can feel in the living heart of a stunned animal), fulfil the conditions best calculated for the production of sound. The commencement of the systole—producing the tightening of the auricular valves, and thereby completing the resistance of the body of blood on which the contracting fibres have to act—is naturally its loudest part, and often has a flapping character; that which continues after is more dull, and is prolonged according to the quantity of blood to be expelled, and the continued strength of the contraction. This prolonged termination of the sound is, therefore, best heard when the heart acts slowly and vigorously.

Production of the Second Sound.—What causes the second sound? That it is intrinsic, and not caused (as Magendie supposed) by the heart striking any of the surrounding parts, we proved by the same experiments in which the intrinsic character of the *first* sound was shown: the sound continued when the heart was so completely isolated that it could strike against nothing.[b] What is there, then, within the heart, that can produce this short clapping sound at the moment of the diastole? Is there any thing that tightens at that moment? Not the walls of the ventricles certainly, nor the auricular valves; for they are then all loose and flaccid. What can it be but the semilunar valves at the mouths of the arteries; which are then suddenly tightened by the reaction of the arterial column of blood? And so it was proved to be, in my experiments first, and in many repeated since; for by hooking back these valves, or by pressure preventing the reaction of the column of blood upon them, the sound was stopped; and by releasing the valves, or discontinuing the pressure, the sound was as surely restored.[c]

We may consider it, then, as established, that the *first* sound of the heart is produced essentially by the tightening of the valves and walls of the ventricles, by muscular contraction; and that the *second* sound is caused by the sudden tension of the arterial valves, by the recoil of the arterial column of blood upon them.[d]]

Abnormal Sounds of the Heart.—The nature of those sounds which occur in health, need not be described; because we have only to place a stethoscope, or our ear, over a friend's chest, in the region of the heart, and we shall immediately perceive them. But if there be an obstruction,—so

[a] Those of Dr. C. J. B. Williams.

[b] See Page 956.

[c] Dr. Carswell seems to have been the first who conceived, that the second sound is caused by the flapping of the semilunar valves. He was led to this opinion by observing the signs of a case of aortic aneurism in 1829; a drawing of which is now in the Museum of University-College, London. The first proposal of this explanation that I know of in print, is in a thesis ("De Corde") by Dr. Elliott, Edinburgh, 1831. Dr. Billing, M. Rouanet, and Mr. Carlile, were later advocates of this view.—*Dr. C. J. B. Williams.*

[d] Dr. C. J. B. Williams, on the Chest; Fourth Edition; Pages 204 to 208.

hat the blood cannot pass freely out of the left ventricle into the aorta, or rom the right ventricle into the pulmonary artery,—then, in most instances, here is an alteration of the sound. If the mouth of the pulmonary artery, r of the aorta be obstructed, a similar effect is produced to that resulting rom the arch of a bridge being narrowed; so as only to permit the stream o pass through it at a certain pace. The stream passing through a narowed arch, makes a whizzing sound, which was not heard before; and so the blood, while passing from the ventricles into the pulmonary artery or he aorta, meets with an obstruction, it produces a sound not heard in ealth. This sound occasionally resembles that produced by a pair of bellows; and is therefore called "a *bellows*-sound"; or, in French "bruit de *oufflet*." Occasionally it is shrill, like the action of a file; and then it is alled "a *rasping* sound", or "bruit de *râpe*." Sometimes it is like the ction of a *fine saw*; and then it is called "bruit de *scie*." Perhaps the erm "*preternatural* sound" would be a good generic term for embracing ll these sounds. I have so used it, in my work on "Diseases of the Heart."

Causes of these Murmurs.—[An example or two will set before us somehing of the character and causes of these murmurs. At the moment when he blood is issuing from the ventricle, if—instead of a smooth, equally ense channel—it meets with a rigid constriction, or an abrupt orifice, its assage through it will be attended with a whizzing or blowing noise, which ay be heard in the region of the heart. Or to take a simple case: if we pply the stethoscope in the course of an artery far from the heart, we ear nothing as long as the current of blood flows smoothly and unmodified hrough it; but if by pressure we diminish the calibre of the tube at any oint, we then complete the elements of sound: we give resistance to the oving blood; and, at each pulse, we hear a blowing or a whizzing sound; which will vary in tone and loudness, according to the force of the current, nd the degree of resistance which it meets with. This is purely a physical phenomenon; it may be produced in any tube through which a current of water runs. Thus, if we take an india-rubber tube, and adapt it o a reservoir of water,—so that the water shall flow freely through the ube, we may by pressure on the tube produce murmurs, varying according to he force of the current, and the resistance which the pressure opposes to it. hey are sometimes like blowing; sometimes like rasping or sawing a piece f wood; and now and then they may be heard in quite a musical tone, which implies that the vibrations are then regular and sustained. The lowing and musical murmurs are generally caused by greater regularity, ut less force of current, than that which produces the sawing or whizzing ounds.[a]]

Obstruction of the Auriculo-Ventricular Opening.—If the obstruction be etween one of the auricles and the corresponding ventricle, then it is the *econd* sound which is altered; and it is after the beat of the heart,—after he pulse at the wrist, that we hear this preternatural sound;—whether it e a *bellows*, a *sawing*, or a *filing* sound.

A vacuum cannot be formed in the *ventricle*, without the blood escaping rom the *auricle*; and therefore when there is an obstruction between the uricle and ventricle, a bellows-sound is heard at the moment we should ear the second natural sound of the heart. We may form an accurate iagnosis in this way. I have done it over and over again; and have

[a] Dr. C. J. B. Williams, on the Chest; Fourth Edition; Pages 215 and 216.

always predicted the exact part where the obstruction existed. I have always taken it for my guide, that where a bellows-sound was heard at the moment of the stroke of the heart against the side, there was an obstruction, either at the mouth of the *pulmonary artery*, or at the mouth of the *aorta*; and, on the other hand, where a bellows-sound has been heard *after* the first natural sound, that then there has always been some obstruction to the course of the blood from the auricle into the ventricle; or else that the valves at the mouth of the aorta, or of the pulmonary artery, have not done their duty; so that the blood has partly rushed back into the ventricle. Whatever may be the cause of the second sound heard in the heart in health,—whether the dilatation of the ventricle or not, it is at that moment that we hear the bellows-sound, when there is an obstruction to the course of the blood from the auricle to the ventricle.

Period at which the Blood leaves the Auricles.—Laennec states, that at the moment of the pulse at the wrist,—at the moment of the stroke of the heart against the side, the blood leaves the ventricles, and rushes into the pulmonary artery and the aorta[a]; and that it is immediately after this, that the blood leaves the auricle, and rushes into the ventricle;—so that the first sound of the heart occurs at the moment of the stroke of the heart, and the pulse at the wrist, or just before it,—the difference being exceedingly minute; and depends upon the rush of the blood from the ventricle; and the *second* sound depends upon the rush of the blood into the ventricle from the auricle. It perhaps may be doubted whether, in the latter case, it arises from a contraction of the auricle; but I think there can be no doubt it takes place at the *period* he mentions; though, in all probability, it arises from the flow of the blood out of the one cavity into the other. It has been said, that if we inspect the heart of a living animal, we see that the auricle contracts before the ventricle;—the reverse of what Laennec has stated. This, certainly, I have seen. But it is to be considered, that the muscular part of the auricle is very inconsiderable; that the greater part is a mere venous sinus; and, I imagine, it must be when the ventricle is dilated, that the blood rushes into it. Now the ventricles dilate the moment after they have contracted; and therefore I should conceive, that this rush of the blood from the auricle, is an effect independent of the *contraction* of the auricle;—that it is merely the effect of a vacuum produced in the ventricle by its dilatation; so that the blood rushes on, as it does from the "venæ cavæ." In the experiments I saw, the auricle contracted with great irregularity;—sometimes *before* the ventricle, sometimes *after* it; and I have seen five or six contractions of the auricle, to one of the ventricle; so that I do not think the ventricle is filled by the action of the auricle. Another great argument is, that I have been able to make an accurate diagnosis, by observing the periods of the morbid sounds, as Laennec has stated them. Whenever there has been a contraction of the mouth of the aorta, or of the pulmonary artery, the preternatural sound—whether it has been a *bellows*, a *sawing*, a *rasping*, or a *cooing* sound—has been at the moment of the stroke of the heart. Whenever the tricuspid, or the mitral valve, has been diseased,—whenever I have seen the opening between the auricle and the ventricle (or either side) contracted or narrowed, then the morbid sound which I have heard has always been *after* the pulse,—*after* the stroke of the heart;—shewing that it is at that time the blood leaves the auricle; that is to say, it is as soon as the ventricles have emptied themselves and dilated again.

[a] See Note to Page 955.

Case of Dr. Hopkins.—Details have been published of a post-mortem examination, which took place abroad. It was the case of Dr. Hopkins, who was formerly a lecturer at Mr. Grainger's Medical School, Webb Street, Southwark. It is stated, that the left ventriculo-auricular opening of the heart was ossified, in its whole circumference, for three lines in breadth; and that there was a singular contraction of the opening. It so happened that this gentleman came to me, about six months before his death, with œdema of the lower extremities, and difficulty of breathing. I examined his chest; and, in a moment, found signs of dreadful disease of the heart. I made pretty extensive notes of the case, at the time; and, founding the diagnosis on what Laennec has said, I stated there was disease of the mitral valve. In that case, I heard a very extraordinary sound, immediately after the stroke of the heart. It was not a bellows-sound, but a variety of preternatural sounds; and sometimes there were two or three of them in rapid succession. It occurred immediately after the pulse; and was heard on the left side of the heart's region. When I listened with the naked ear, instead of this extraordinary sound, it appeared like the sound of a saw. I did not doubt that he had disease of the mitral valve; or, if they were not an obstruction to the course of the blood from the auricle into the ventricle, that the aortic valves were so diseased, as to let a little blood come back. I therefore wrote down in my note-book—"Disease of the mitral valve, or else imperfect action of the aortic valves." If Laennec be wrong, the sound I have described ought to have been heard at the moment of the heart's action. But here is a dissection taking place in a foreign country, by a person who knew nothing of me or of my diagnosis; and here are the post-mortem examination, and my written account of the state of the heart, corroborating each other. This shews us, as more than twenty or thirty cases have done before, that Laennec is right. He may be wrong in saying that the auricle contracts then; but I cannot consider him incorrect in saying that the blood rushes, at that moment, from the auricle into the ventricle. Some ascribe the sound to the circumstance of the ventricle dilating; but I am not aware that it gives a sound. I should think it more likely that it is owing to the rush of blood into the ventricle. I regretted, when Dr. Hopkins went abroad, that I should not have an opportunity of comparing the dissection with the diagnosis; and therefore I was gratified when I saw the case published.

Cause of the Preternatural Sounds.—Why it is that we have sometimes a bellows-sound, and sometimes a sound resembling the action of a saw or a file, is not well known. Some have supposed, that ossification gives rise to the shrill sound; but that is not proved. It depends, I should imagine, on two or three things in conjunction. If the opening be very small, and the action of the heart be driving on a large quantity of blood, I should think it would be shrill; but if the opening be small, and the action of the heart not very strong, then the feeble influence of the blood will, I should think, not cause the shrill sound. If the parts were soft, then we might have a shrill sound.

Does the Auricle Contract First?—It has been supposed that the auricle contracts before the ventricle,—for this reason;—that, in the case of an obstruction, the jugular veins swell at the time of the stroke of the heart. Before the pulse is felt, indeed, the jugular vein will sometimes swell, in disease of the heart; and will pulsate strongly. It is supposed, that when the auricle contracts, an obstruction must take place in the veins, and the blood accumulate there. For myself, however, I do not think that, at the time the auricles contract, there is any obstruction in the veins; for when

they lose their blood, the ventricles must be open for the blood to rush into them; and, consequently, there is a free passage for the blood. When the ventricle is *contracting*, there must certainly be a great obstruction to the blood; but the moment the ventricles *dilate*, that moment the auricles act; and the action of the *auricle* cannot cause an obstruction, because there is a free course for the blood to rush into the *ventricle*.

Laennec's accuracy has been again called in question by others; and the stroke of the heart's apex, and the *first* sound of the heart, have been declared to happen before the pulse; and to be produced by the *dilatation* and *repletion* of the ventricle; and the *second* sound has been said to occur at the moment of the *contraction* of the ventricles, and to arise from the flapping together of the parietes of the emptied ventricles.

I would reply, in the first place, as before[a], that when an obstruction exists at the mouth of the *aorta* or *pulmonary artery*, a morbid sound occurs at the moment when Laennec supposes the *ventricles* to contract; and when an obstruction occurs at either *auriculo-ventricular* opening, a morbid sound occurs at the moment he supposes the *auricles* to contract. This could not happen had he mistaken the periods of the ventricular and auricular contractions.

Secondly: when the pulse at the wrist follows the stroke of the heart, it does so after only a very minute interval;—such as may be explained by the distance of the radial artery from the heart; and actually occurs decidedly *before* the auricular sound;—that sound which is now declared to be the *ventricular*. Moreover, when the pulse of the wrist is observed to follow the stroke of the heart, the pulse at the innominata (so much nearer the heart) may be found to precede that at the wrist, and to occur all but simultaneously with the stroke of the heart; so that the relative distance of the parts explains the whole difference; and the pulsation of the arteries, in all cases, clearly arises from the stroke of the heart. If an artery still nearer the heart than the innominata be observed, *no* interval between its pulse and the stroke of the heart is perceptible. In four cases of aneurism of the ascending aorta, producing a strongly pulsating tumour to the right of the sternum, this and the heart, when the fore-fingers were placed upon both, were felt, and by all seen, to pulsate quite synchronously. When the obstruction is at the mouth of the *aorta* or *pulmonary artery*, I have always noticed the preternatural sound to be *synchronous* with the pulse;—when at an *auriculo-ventricular* opening, in the *intervals* of the pulse, *after* or *before* the pulse. Sometimes in the latter case, it is so prolonged, as to last till the pulse is again felt; so that there is no interval; but merely an equal alternation of the ventricular, and the preternatural auricular sound: or even an interval occurs after the ventricular stroke;—probably from the auricle not being disposed for contraction at the usual time; on account of its contraction having been so lengthened by the difficult escape of its blood, that a longer repose is required, than just during the ventricular contraction. Here the *auricular* sound occurs first; then the *ventricular*; and then the *interval*.

Thirdly: the sounds considered by Laennec to be auricular and ventricular, are heard loudest (both in health and when morbid) at the seat of the auricles and ventricles respectively.

Cause of Preternatural Sounds after the Pulse.—When these peculiar sounds are heard a moment after the pulse, and after the action of the heart, we cannot say with certainty, that they arise from a difficulty to the

[a] See Page 958.

transmission of the blood from the auricle; and for this reason. If the valves at the mouth of the pulmonary artery and aorta do not do their duty, but allow a portion of the blood to regurgitate, (as is very common in the case of the aorta,) I believe the rushing back of a small quantity of it, will occasion the bellows-sound. We know, that the moment the ventricle has acted and dilates again, the blood attempts to rush back into the vacuum; but is prevented by the three aortic valves, which are filled out in a moment. But if it so happen that one is torn, or becomes corrugated and small, then a certain portion of the blood will regurgitate; and as it is not the *whole* of the blood in the aorta that can go back, but a *minute portion* that passes through the small opening which is left, (the valves doing their duty to some extent,) that is sufficient to cause the bellows-sound. If the *whole* of it regurgitated, doubtless there would be *no* bellows-sound; but if only *one* valve be torn, or corrugated, or if the whole of the valves be *partially* corrugated, then the small portion which returns causes the bellows-sound. This must take place synchronously with the emptying of the auricles. The same cause which makes the blood rush from the auricles,—namely, the dilatation of the ventricle,—also attempts to make the blood rush back from the aorta and pulmonary artery into the ventricle. The blood attempts to go from the *auricles*, and does so with success; and at the same instant it attempts to do so from the *aorta* and *pulmonary artery*, but cannot; and it is at this moment that we have the morbid sound. Suppose it is one of the auriculo-ventricular openings that does not do its duty;—suppose the tricuspid valve on the *right* side, or the mitral valve on the *left*, is bound down on one side; or suppose it is diseased, so that there is a constant aperture there, through which a certain portion of blood must rush back from the ventricles into the auricles;—then we have a bellows-sound, from this cause, at the time the ventricles contract. I have frequently heard a bellows-sound, at the moment of the pulse;—arising, not from an obstruction to the course of the blood out of the ventricles, but from a valve between the auricles and ventricles not doing its duty; so that a small portion refluxed.

Before I was aware of this circumstance, in one or two cases, I gave a false diagnosis; and said that there was an obstruction to the course of the blood from the ventricle; whereas it turned out that the valve between the auricle and ventricle, was not performing its functions properly. Hence, when there is a bellows-sound at the moment of the heart's action, it may arise from disease of the *aortic* valves, or from disease of the *mitral* valve; and when the bellows-sound takes place *after* the pulse, it may be the result of an obstruction to the course of the blood from the *auricle*, or from a certain portion rushing back into the *ventricle*. In every case, it is caused by one of these two circumstances. The first case in which I found I had made a false diagnosis, was one which I have already described.[a] The preparation is at St. Thomas's Hospital. There was a loud bellows-sound at the moment of the pulse; and I therefore concluded, that there was an obstruction at the mouth of the aorta, or of the pulmonary artery. But I found that the mitral valve was bound down; so that there was a constant opening; and, when the ventricle contracted, the blood refluxed freely into the auricle.

Causes of Diminished Apertures.—These diminished openings may occur from various causes. Sometimes the valves are diseased in the way I have

[a] See Page 954.

mentioned. The valve may be indurated,—become cartilaginous,—become bony; and the opening may be organically diminished. The aperture is sometimes decreased by excrescences. Twice I have seen the valves perfectly sound, and the pulmonary artery contracted immediately beyond the valves; so that only a very minute aperture existed, for the blood to escape through. In one of these cases the disease arose (as it does in so many instances in young persons) from violent pericarditis. The pericarditis had gone on to produce cartilage under the pericardium; and the cartilage had dipped down so much into the substance of the heart, that it pressed upon the origin of the pulmonary artery, and there produced a great obstruction. In that case there was a bellows-sound, heard at the moment of the pulse. I heard it on the right side of the heart's region, in the situation of the right ventricle; and it was written down in the hospital-books—"Difficulty to the transmission of the blood from the right ventricle to the pulmonary artery." What the cause was, I did not know.[a] I have met with but two cases of obstruction of the pulmonary artery. Disease of its valves is exceedingly rare. In fact, all diseases are far less common on the *right* side of the heart than on the *left*. In the second case the diagnosis was equally correct. There was a loud bellows-sound on the right side of the heart, at the moment of the pulse; and after death just such a disease was found as I have now described;—that is to say, the pulmonary artery was so diminished, that the blood could not escape from the ventricle.

There is an engraving, in my work [b], of a case which I did not see; and therefore I do not know what the particular symptoms were; but there was a loud bellows-sound. Part of the interior of the right auricle and ventricle was grown together round the mouth of the pulmonary artery; leaving a very small opening, beyond which was the real mouth of the artery, of its natural size, with its valves. The case occurred at St. Bartholomew's Hospital; and the heart was shewn me when lecturing at the College of Physicians. The patient was a young woman, and died from this affection. I should think it was a case of malformation; because I did not perceive any sign of disease of the heart. She was dropsical all her life; and, at last, there were signs of great obstruction. The older she grew, the more the heart increased in size; but the opening never enlarged. There were more and more ill effects the longer she lived. These are very rare cases indeed. If any thing press upon the aorta, or upon the pulmonary artery, we have this bellows-sound;—although there may be no disease of the vessel itself,—no disease of the valves,—no disease of the opening. I recollect seeing a case, where there was a piece of bone between the aorta and the pulmonary artery; and it pressed on both. There was a bellows-sound at the time of the pulse, on both sides of the chest. A case is mentioned by Bertin, where a sort of hymen existed at the mouth of the pulmonary artery; but it was probably congenital; and this is the only instance of obstruction, that he ever saw at that spot. I have never seen

[a] Through an oversight, the specimen was allowed to putrefy; and the whole was destroyed, except (fortunately) the portion of the right ventricle at which the artery rises, the semilunar valves, the commencement of the artery, and the cartilaginous mass. Besides various symptoms from pulmonary and other cardiac disease, there had been a bellows-sound at the lower part of the sternum and to the right of it, at the moment of the pulse. The production of cartilage originated in pericarditis. The pericardium was throughout coherent and thickened, and was cartilaginous in several other points than where the great mass existed.

[b] "Lectures on Diseases of the Heart"; Plate 2; Figure 2.

obstruction from disease of the pulmonary semilunar valves. Bertin refers to two;—one in Morgagni, and one seen by M. Louis at La Charité.

Preternatural Sounds from Dilatation.—We may have a preternatural sound, however, while the opening remains quite natural. The cavity *behind* the opening is very much dilated; and in that way the opening is *relatively* small, although not *absolutely*. Nature, of course, has established an exact proportion between the size of the *openings* and that of the *cavities*; and the natural dimensions are those which allow the blood to pass through in the most easy manner, and with the least noise. Thus, the natural proportions may be destroyed in two ways. The cavities may remain the same, and the openings become too small; or the openings may remain the same, and the cavities become too large. In the latter case, the openings are no longer large enough for the cavities; and in either case we have the bellows-sound. We must not be surprised, therefore, after a bellows-sound, to find the openings in a natural state; because the cavity may be too large. Nay, when this is the case, the least alteration in the position of the heart, will sometimes cause a bellows-sound; and, by position, the free course of the blood from the left ventricle may be destroyed. I once had a very curious case of this kind.

Case.—A woman laboured under ascites; the cause of which I was anxious to discover; and also to ascertain, whether there was organic disease. I examined the heart, and found a bellows-sound at the moment of the pulse. She was tapped; and no sooner was the operation performed, than the bellows-sound went away. The water accumulated again, and with it the bellows-sound returned. In this case, after death, the opening was found healthy; but the left ventricle was dilated. It appeared to me, in that case, that the diaphragm, being pushed up by the water, tilted the heart a little,—prevented it from being quite in its natural situation; and caused the apex to rise in such a way, that the passage of the blood into the aorta would be a little impeded. If the position of the heart be altered,—if the apex be lifted up, no doubt the blood will experience a difficulty in going into the aorta. In this case, when the heart was pushed up (with the diaphragm) by the water, there was a bellows-sound; and when the diaphragm was let down,—the heart going with it,—the bellows-sound ceased.

In any case where a bellows-sound is heard at the moment of the pulse, we *may* find pressure from the abdominal viscera. When a person is upright, and the bellows-sound takes place at the moment of the stroke of the heart, if we make him lie flat, the bellows-sound is increased;—owing to the abdominal viscera pressing up, and the apex becoming a little tilted. I have frequently not heard the bellows-sound at all, when a person labouring under disease of the heart has been standing up; but on making him lie down, I have heard it distinctly. It is better, therefore, in these cases, to listen to the sound in both ways. When a bellows-sound is heard in the case of the aorta, I presume the circumstance arises from the same cause. When a person lies down, the abdominal viscera press against the diaphragm, and alter the position of the heart; so that the blood cannot so easily escape from the aorta. We know that when there is difficulty of breathing, patients wish to sit up; and then the heart falls more into a vertical position. In hypertrophy of the heart, a bellows-sound is frequently heard where there is no great dilatation. If it so happen that the substance of the heart is much thickened,—that the "columnæ carneæ" are much thickened near the mouth of the aorta (towards the semilunar valves),—the increase of the flesh of the heart will cause a little obstruction; so

that we have a bellows-sound. Frequently, therefore, in opening bodies where there has been a bellows-sound, we find some other cause than disease of the opening. We may find something pressing on the outside of the aorta;—we may find the substance of the heart increased;—we may find the heart out of its due position;—we may find the cavity behind the opening so much dilated, that the latter, although of its natural dimensions, is not capacious enough for the enlarged cavity which forces its blood through it.

Bellows-Sounds sometimes Temporary.—It would appear that sometimes the bellows-sound is only a temporary phenomenon, dependent upon spasm or irritation. Sometimes there would appear to be a spasm in the neighbourhood of the opening; for a person will have a bellows-sound one day, and not another. It is said that hysterical women sometimes have this bellows-sound; and they have spasmodic affections of various parts.

Bellows-Sound affected by Blood-letting.—Frequently, by taking blood away, we diminish the bellows-sound, and even remove it altogether. If we lessen the quantity of blood that has to go through the opening, there will be less obstruction felt; and therefore, by bleeding to a certain amount, we diminish (or, it may be, entirely remove) the bellows-sound. Sometimes, in inflammation of the heart, this bellows-sound is heard; and, on subduing the inflammation, it may never return. In this case, the parts may be thrown into a spasmodic state;—just as, when the urethra is inflamed, a spasmodic stricture may take place,—so that no water can pass; and, on bleeding the patient, the affection is removed. So, I conceive, it may happen with the opening of the heart. Again: the bellows-sound will be heard if we bleed a patient *too much*. We may bleed a patient till we get a sharp pulse; and then we may be led to suppose that inflammation exists, although the person may be blanched like wax. Now when a patient has been thus reduced, I have been told by many, that a bellows-sound has been heard. I presume that, in this case, the bellows-sound arises from the violent action of the heart. It attempts to drive the blood away faster than it can go with ease. We may, however, have a bellows-sound simply from great *plethora*. There is such fulness of the heart, that the blood cannot escape through the opening; and, on the other hand, we may have such a rapid action of the heart, that more is attempted to be forced through it than the opening will allow.

Mode of Using the Stethoscope.—In observing these morbid sounds, we should use the stethoscope without the plug. Laennec does not mention the circumstance; but if we examine the sounds of the heart with the plug in the stethoscope, and then take it out, we shall generally hear the sounds far louder without the plug. I am quite sure of this. I have proved it myself, and mentioned the circumstance to others; and they have always said they found it to be the case. It is right to examine a patient labouring under disease of the heart, with the plug *in* as well as *out*; because, when the plug is in the stethoscope, we have a larger surface for the heart to strike against. Laennec employed the stethoscope in its entire state, to examine the heart; and the presence of the plug is certainly advantageous in ascertaining the *impulse*. But for observing the *sounds* of the heart, the instrument is much better without the plug. The excavation renders the sounds far more audible. It is often very useful to make the patient suspend his breath for a few moments, while we are listening to the sounds of the heart. The murmur of respiration is often mistaken for a cardiac bellows-sound; and in dyspnœa, the sounds of the lungs sometimes completely overpower those of the heart.

SECTION IV.—GENERAL SYMPTOMS OF OBSTRUCTED CIRCULATION.

Dilatation of the Auricles.—There are, of course, other symptoms induced, besides those which are to be learned by the ear. If there be any difficulty in the transmission of blood through the heart, the cavity behind is very much disposed to dilate. The blood not going out with ease, accumulates; and gradually causes a dilatation. This is a very common circumstance; but it is a curious fact, that we do not always have the dilatation in the cavity immediately behind the obstruction. The auricles, being much thinner than the ventricles, more easily become dilated. The effect of an accumulation of blood, is frequently felt at a great distance from the seat of the obstruction. When the mouth of the aorta is obstructed, sometimes the left *ventricle* is dilated; but more frequently it is the *auricle*; and even the *mouth* of the auricle. In disease of the mitral valve, of course we cannot expect dilatation of the left *ventricle*, because it is beyond the obstruction; but we may expect dilatation of the left *auricle*,—and dilatation of the *right* auricle, or even of the right *ventricle*; because all these parts are *behind* the obstruction, wherever that obstruction may be.

Pulmonary Congestion.—When there is an obstruction at the left side of the heart, either at the mouth of the aorta or at the auriculo-ventricular opening, the obstruction is shewn particularly in the lungs. Dr. Wilson, of St. George's Hospital, has mentioned that he has frequently seen what is called "apoplexy of the lungs"[a], after an obstruction of the mitral valve. We continually meet with an obstruction of the mitral valve, without any such circumstance; though certainly it will very frequently happen; but in almost every case, there is great congestion of blood in the lungs; and this soon shews itself in the whole of the venous system. The obstruction is soon felt beyond the lungs, on the right side of the heart.

Congestion of the Venous System.—Of course any obstruction on the *left* side, can only act on the system at large. If the blood do not escape easily from the pulmonary veins, it accumulates in the lungs, and therefore will not pass freely out of the pulmonary artery; then the right ventricle suffers, and all the venous system. The consequence of all this, is great fulness of the veins of the neck, frequently of the head, and sometimes of all the veins of the body;—and then general dropsy;—not only a swelling of the ankles, and œdema of that part; but *general* œdema, which is called "anasarca",—universal dropsy.[b] And then, from the great accumulation of blood in the head, there is headach and drowsiness, and perhaps apoplexy;—effusion into the brain and upon the brain. The patient's countenance is blue; his lips are pale; and perhaps the nose and eyes look exceedingly livid. In many cases of this description, effusion is first of all seen about the eyes, particularly the lower eye-lid. Indeed so striking is it, that many persons have considered it an invariable sign of disease of the heart. At any rate, when there is an obstruction to the course of the blood in the chest, we find a puffiness of the lower eye-lid.

Palpitation, &c.—Besides these, there are symptoms in the heart itself. There is palpitation, a great sense of fainting, and great difficulty of breathing,—particularly on motion. In this and all other diseases of the heart, the lungs are very much disposed to fall into a state of chronic bronchitis;

[a] See Page 865.

[b] See Page 160.

so that the patient not only coughs but expectorates; and perhaps expectorates *blood*; and the difficulty of breathing becomes extreme. The quantity of urine is diminished; and then, frequently, a great accumulation of blood takes place in the liver, as well as in other parts; and at length there is effusion, not only into the pleura on each side, but into the peritonæum; so that perhaps, at last, we have not only œdema, but general dropsy.

Preternatural Sounds Synchronous with the Pulse.—There are two or three other points which it is desirable to notice, before leaving diseases of the lining membrane of the heart; and the peculiar and preternatural sounds, to which a narrowing of the different orifices gives rise. These preternatural sounds are heard far more frequently on the *left* side, than on the *right*; because (as I have repeatedly observed) *all* diseases of the heart are so much more common in that situation. In an infinitely greater number of instances, a preternatural sound is heard at the moment of the stroke of the heart, than either before or after it. At St. Thomas's Hospital, for months together, there has not been a single instance of a preternatural sound of the heart, except at the moment of the stroke of that organ;—so much less frequent is it to hear a preternatural sound at the time the auricles allow their blood to go into the ventricles. All cases of a bellows-sound, in which there was no real narrowing of the openings to be found after death, occurred at the time of the stroke of the heart; and where it has arisen from a temporary cause, and has gone off again, it has been at the same period; so that the impediment appears to have been at the mouth of the aorta. In the particular case which I mentioned [a], where a woman had a bellows-sound as long as the abdomen was distended with liquid, and no longer,—for it ceased when she was tapped, and returned again when the water re-accumulated,—it was heard at the moment of the pulse. By far the most frequent seat of it, is the aperture leading from the left ventricle to the aorta.

Usual Seat of the Sound.—I need hardly say that, in general, the bellows-sound, when it arises from an obstruction of the mouth of the *ventricle*, is heard in the *lower* part of the cardiac region, in the situation of the ventricle; whereas, when it proceeds from a diminution of the opening of one of the *auricles*, it is heard at the *upper* part;—the auricle being situated above, and the ventricle below. We may sometimes hear the bellows-sound, not only in the situation where the obstruction exists, but to a great extent around. I have frequently heard it in the right axilla, when the heart was not at all enlarged; but frequently it is only perceptible at the place where the obstruction exists; and when heard in various parts, it is always loudest in the immediate seat of its cause. Generally, therefore, it is loudest in the case of the *ventricles*, at the *lower* part of the cardiac region; and in the case of the *auricles*, or auriculo-ventricular openings, at the *upper* part. When it is on the *left* side, we hear it loudest in the *left* half; and when on the *right* side (where it is rare), we hear it loudest at the *right* part of the cardiac region.

Double Bellows-Sound.—Sometimes we hear a *double* bellows-sound;—one sound at the stroke of the heart, and then another immediately after it;—like something falling against some other object, and then falling back again directly. I believe that, in these cases, there is a degree of obstruction to the passage of the blood, which produces the *first* bellows-sound; and then, as the valves do not perform their duty perfectly, but permit a portion to reflux, we have the *second* bellows-sound. It is by no means a

[a] See Page 965.

rare thing to hear this double sound; though it is not nearly so common as a single sound. When the mitral valve is grown up, so that we have merely a circular opening in the middle, of course there is great obstruction; and as the valve does not do its duty well, some of the blood always comes back, and a double bellows-sound is produced. So, in the case of the aortic valves, the opening is sometimes much diminished; and we have a bellows-sound when the blood rushes out; and, the semilunar valves being corrugated, a portion returns; and thus you have a see-sawing sound,—backwards and forwards.

Sounds Influenced by the Heart's Action.—I mentioned[a] that, in the case of the bellows-sound which occurs at the stroke of the heart, it is heard loudest when the patient lies down; and sometimes we can hear it only when the patient is in a horizontal position; but when he is standing up, it is always diminished. Variations take place in this respect, however, according to the force of the heart. Sometimes the pulse is very irregular; so that first we have a strong thump, then a slight one, and then several strong ones. Now in these cases, if there be a diminution at the mouth of the aorta, when the heart acts moderately, it gives short strokes; so that the blood is not sent violently through the opening, and therefore it finds its way pretty well; but when it acts violently, such a torrent of blood is driven against the opening, that a great obstruction is felt; and then we have a loud bellows-sound. Thus, when there is a bellows-sound, and the heart acts irregularly, we sometimes hear it loud, and sometimes very inconsiderable; according to the quantity of blood driven against the opening, and the degree of obstruction experienced. If the parts be not very rigid, when the stroke of the heart impels the blood, it may force its way, and the obstruction will not be much felt; but if the parts will not give way, the greater the impulse, the more is the obstruction felt.

Purring Thrill.—Sometimes we perceive another circumstance when these bellows-sounds are present; and that is a vibration, like the purring of a cat. It is just the same gentle vibration, as that which is felt on placing our hand on a cat's back, when she is purring. This has been called "the purring thrill." I do not recollect noticing it in the case of the heart, except where there was a bellows-sound; and it appears to arise from an obstruction. It is nothing more than a jar given to the heart, by the blood attempting to pass through the obstructed opening. It is by no means generally observed; but, every now and then, we may feel a vibration in the region of the heart, at the moment the bellows-sound is heard.

Variations in the Pulse.—With regard to the heart's action, it varies both as to force and frequency. It has been thought that this indicated the want of a free opening; but intermissions and irregularity of pulse (both as to force and frequency), will take place when there is no obstruction; and I do not know the particular state of the heart that gives rise to these variations. We may continually observe this occurrence, in old people, who never had disease of the heart. It is more frequently observed when there is an obstruction of the mitral valve; but it is by no means a necessary consequence of it.

When the auriculo-ventricular opening is narrowed, the pulse is generally irregular, both in force and frequency;—a peculiar combination well known to practitioners, in which several beats succeed each other in rapid succession and with tolerable force; while others again occur slowly, and with little force;—perhaps so weakly, that they can scarcely or not at all be

[a] See Page 965.

perceived, although at the heart the pulsation is evident enough.[a] This most irregular pulse is thought by Mr. Adams[b] to be pathognomonic of narrowing of the left auriculo-ventricular opening. Corvisart thought extreme irregularity of pulse in both force and frequency to characterize narrowing of the aortic opening. I do not happen to recollect a pulse irregular in force and frequency, in a single case of narrowing of the aortic opening solely, while I know that it is very common in the narrowing of the left auriculo-ventricular opening; though possibly not peculiar to it, nor indeed to narrowing of any opening.[c] Mr. Hodgson also mentions, that in narrowing of the left auriculo-ventricular opening, there is often a double pulsation of the heart; that is, *two* beats of the heart to *one* of the wrist; —a pulsation of the heart from the action of the ventricle, and another from the action of the auricle. This able surgeon attempts to explain the fact; but expresses himself in rather an obscure manner. "The auricle", he says, "first acts, and propels its contents into the ventricle; but (from the contraction of the communication) the blood is not, as in the natural state, poured at once into that cavity. The ventricle, though imperfectly filled, contracts, and forces the blood into the aorta. Thus there is a pulse caused by the action of the auricle, and another by that of the ventricle; so that, for every pulsation at the wrist, two are perceptible at the heart." But the truth is that, even *in health*, there is perceptible to the ear a double action of the heart;—one of the auricles, and another of the ventricles; though this was not generally noticed at the time Mr. Hodgson wrote. When the left auriculo-ventricular opening is narrowed,—so that the blood can be only squirted into the ventricle,—this auricular action is sometimes very distinct to the hand, in the condition of a thrill or purring; which is what Mr. Hodgson had remarked, and called "an irregular thrill, or *bruissement*, as Corvisart terms it, rather than a distinct pulsation." Sometimes it is a distinct shock; and, in another sentence, Mr. Hodgson speaks of it as such:—"Thus there is a pulse caused by the action of the auricles, and another by that of the ventricles"; "nor is the auricular pulse trifling."[d] This happens only, I believe, when the walls of an auricle are increased in substance,—hypertrophied; so that they act with a force approaching to that of the ventricles, and a double stroke of the heart may be felt by the hand. That this, and not the imperfect repletion of the left ventricle (by which it acts twice), is the reason of the double stroke, appears to me shown by the fact that, when it has been observed, the auricle or auricles have always been hypertrophied, and in some cases the auriculo-ventricular opening not at all narrowed; and, secondly, that it is not observed, however narrow the auriculo-ventricular opening, if the auricle is not hypertrophied. This hypertrophy is rare; as the obstruction usually produces dilatation and thinning.[e]

[a] In cases of any disease, if the pulse is too rapid to be counted at the wrist, it may almost always be counted at the heart. I have easily counted two hundred pulsations at the heart, when it was impossible to count the pulse at the wrist. Ossification of the radial arteries causes the pulse to be feeble, while perhaps the action of the heart is natural, or even very strong; and in cases of this condition of the vessels, and in many others, the action of the heart should always be examined at the chest.

[b] "Dublin Hospital Reports"; Volume 4; Page 424.

[c] Laennec considers irregularity in frequency to arise generally from dilatation: and this is a common consequence of narrowing of an opening.—*See Dr. Forbes's Translation. Part* 2; *Book* 1; *Chapter* 7; *Paragraph* 1. (*Third Edition; Page* 579.)

[d] "A Treatise on the Diseases of Arteries and Veins." Dr. Parry, in his work upon the pulse, adopts, without reference, Mr. Hodgson's explanation.

[e] See the "Dublin Hospital Reports"; Volume 4; Page 416.

Corvisart remarks that obstruction at either aperture on the left side, causes more irregularity than obstruction on the right. Even the thrill is frequently absent when the narrowing is considerable, and I am ignorant upon what exact conditions it depends;—whether upon the degree of the narrowing, or the shape of the diseased opening, or some other cause.

A third peculiarity has been remarked in the narrowing of the left auriculo-ventricular opening; namely, smallness of the pulse; and a good example of this is given by Mr. Abernethy [a], and another by Mr. Adams.[b] The small quantity of blood poured into the left ventricle, at each auricular contraction, is insufficient to enable this cavity to project a due portion into the arteries;—whence the smallness of the pulse. But the same smallness of pulse results from a narrowing of the aortic opening; and nothing but the observation whether the preternatural sound which may exist occurs at the auricular or ventricular action, can determine whether the narrowing is at the auriculo-ventricular, or at the ventriculo-aortic opening. It may also result from a general diminution of the cavity of the left ventricle, accompanied by no narrowness of opening: for this, equally with a diminution of aperture, must obviously occasion a small projection of blood into the arteries. The importance of this symptom alone, therefore, is absolutely nothing. It does not necessarily indicate narrowing of the openings in the left side of the heart. If, indeed, the preternatural sound is heard at the ventricular contraction, this smallness of pulse may assist in leading to the idea, that the narrowing is on the left side of the heart; but the greater loudness of the sound on the left side, will sufficiently declare it. The inferiority of this symptom in the pulse to the observation of the preternatural sound, is shewn by the preternatural sound occurring long before the pulse grows small. I have often noticed no smallness of pulse up to the time of death, in cases where an auricular or ventricular preternatural sound, loudest on the left half of the cardiac region, shewed the left auriculo-ventricular or ventriculo-aortic opening to be diminished; and, after death, this state of parts was discovered.

When the narrowness is at the mouth of the aorta, the action of the left ventricle,—notwithstanding that the pulse is small,—is sometimes very strong; owing to its walls being hypertrophied.

Necessity of Observing all the Symptoms.—There are no symptoms, except those learned by the ear, to indicate particularly what is the seat of the obstruction; or, indeed, whether there is any obstruction at all; but we shall be much deceived, unless every thing be taken into consideration. If we hear a bellows-sound, it is not right to infer that there is structural disease of the heart. In order to justify our coming to that conclusion, the sound ought to be heard *constantly*,—not to-day only, but to-morrow and every day; and even then we ought not to be satisfied, unless we find other symptoms;—such as enlargement of the heart, dulness of sound to a great extent, anasarca, great distension of the veins, and so on. The whole

[a] "Medico-Chirurgical Transactions"; Volume 1; Page 27.

[b] Mr. Adams ("Dublin Hospital Reports", Volume 4, Page 435) refers the double pulse to hypertrophy and dilatation of the right ventricle, which acts strongly; while the left has too little blood to discharge into the arteries, to give a pulse regularly. But, as the left ventricle acts and empties itself every time the right ventricle does so, there is no reason why it should not accumulate blood enough to occasion a perceptible pulse. Disproportionate pulsation of the heart and of the arteries is, of course, owing to a strong pulsation of the right ventricle, and often also of the left,—both or either of which are often hypertrophied,—and the small quantity of blood discharged from the left. A regularly double pulsation at the heart appears very explicable, in the mode mentioned in the text. When the pulse varies in force at different moments, I have always observed the strokes of the heart to vary proportionally.

circumstances of the case must be taken into consideration. Useful and important as it is to attend to the sounds addressed to the ear, it is absurd to depend upon any one of these, to the neglect of all the general symptoms, which medical men notice in the ordinary way.

Effects upon the Lungs.—It has been thought that when there is an obstruction on the *right* side of the heart, the jugular veins are more distended, and the obstruction in the venous system more evidently shewn, than when it occurs on the *left*. This is no doubt a fact, up to a certain point; but it is to be remembered, that an obstruction on the *left* side of the heart must produce the same effects, after a time. There will at last be great congestion in the lungs; and, in consequence of that, there must be an obstruction to the blood passing on the right side of the heart; then there must be a distension of all the veins, and dropsy. We cannot depend upon these symptoms alone. When the veins of the neck are distended, that circumstance, considered in itself, will not justify us in saying that the obstruction is seated on the *right* side of the heart. It *may* arise from an obstruction there; but there may be a real organic obstruction on the *left* side. There is, however, this difference:—when the obstruction occurs on the *right* side, there is far less difficulty of breathing than when it takes place on the *left*. The blood is not at all impeded in its progress through the lungs; the obstruction exists before it goes there; but when the obstruction is on the *left* side, it causes great dyspnœa, on account of its producing congestion of the lungs. But greater reliance cannot be placed on this point; for this reason:—in structural disease of the heart, the lungs are much disposed to become diseased too. From their contiguity to the morbidly affected heart, they are much disposed to fall into chronic bronchitis; and when that occurs, we have all the signs of difficulty of breathing, and of congestion of the blood. Still it stands to reason, that if there happen to be no chronic bronchitis,—no affection of the lungs, there will not be dyspnœa when there is an obstruction only on the *right* side of the heart; whereas, if the obstruction be on the *left* side, we must expect it.

CHAPTER III.

DISEASE OF THE SUBSTANCE OF THE HEART.

I WILL now proceed to the consideration of diseases of the *substance* of the heart; and I think this arrangement will make the matter plain. First we considered the membrane *investing* the heart; then the membrane *lining* the heart; and now we will consider diseases of the *muscular substance* of the heart.

SECTION I.—CARDITIS.

The substance of the heart is now and then, but very rarely, the subject of acute inflammation. I do not myself recollect having seen an instance of it; but a most decided case is recorded by Mr. Stanley, in the seventh volume of the "Medico-Chirurgical Transactions."[a] The symptoms of this disease, would be very similar to those of pericarditis. In the case mentioned by Mr. Stanley, there was pericarditis likewise present.[b] I hardly think it can exist without that affection being conjoined with it. Extreme faintness has been observed. There is sometimes extreme faintness in *pericarditis*; but it is not common. In the case of inflammation of the substance of the heart, however, extreme faintness has been noticed; —fits of syncope indeed. After death, in these cases, the substance of the heart has been found soft, and black with congestion. The accumulation is so great, that the substance of the heart is black. In Mr. Stanley's case, the disease had proceeded even to suppuration; so that there were little collections of pus, with which the heart was studded.[b]

SECTION II.—HYPERTROPHY AND DILATATION.

With the anatomical marks of previous pericarditis, or inflammatory change of the lining membrane of the heart, or after pain in the cardiac region and palpitation, perhaps occurring during or subsequently to rheumatism, we frequently observe the heart thickened or dilated, or both.[c]

The Result of Inflammation.—I am convinced,—with Bouillaud, Bertin, Andral, and others,—that the increase of the heart's substance, no less than

[a] Page 323.

[b] "Medico-Chirurgical Transactions"; Volume 7; Page 326.

[c] It is in general said that the heart is naturally about the size of the fist of the individual: that the walls of the left ventricle are twice as thick as those of the right, and in infancy and old age four times as thick; but that the "columnæ carnæ" of the left are less voluminous than those of the right, though the surface of the left presents a more delicate and intricate reticulation: that when the two ventricles are cut into, the left should remain open, but the right fall together: and that the capacity of the two ventricles is equal.

the diseases of the valves, is generally inflammatory. I have witnessed, after acute rheumatism, a constant and severe pain in the region of the heart, palpitation, and at length death; and found the left ventricle thickened, without any other morbid appearance in the organ; and here, no less than when the ordinary anatomical results of inflammation were visible, it was impossible not to consider the change inflammatory. On comparing an hypertrophied left ventricle with a healthy specimen, M. Chevalier (a pupil of Vauquelin's) found, under the microscope, that its fibres were redder; and, a portion of each being steeped in a separate quantity of distilled water, the hypertrophied portion reddened the water more than the other, and when taken out was still the redder of the two. On being put into boiling alcohol, it proved to contain less fatty matter.[a] Indeed an hypertrophied heart, if undilated, is always in the affected portions redder and firmer than usual; and its coronary arteries are enlarged, sometimes enormously. Besides, as hypertrophy is a common accompaniment of chronic inflammation of the outer or inner membrane of the heart, no doubt can exist upon the subject. Indeed its essence, being excessive nutritive action, cannot but be in some measure inflammatory. It is unquestionably produced, in some cases, by obstruction in the opening leading from the cavity whose walls are thickened;—the difficulty giving rise to evident great muscular effects, and consequently to augmented circulation, of the organ. But even here it may be to some degree inflammatory; because the lining membrane of the cavity has generally been in an inflamed state; which, in truth, was the cause of the valvular obstruction.

Varieties of Hypertrophy.—Hypertrophy of the left ventricle is often found with disease of the lining membrane of the aorta; sometimes coexistent with true or false aneurism of the aorta; but not unfrequently the sole diseased appearance. Hypertrophy is frequently attended with dilatation; and more so, perhaps, when there exists an obstruction to the egress of the blood from the diseased compartment. Dilatation often occurs alone, especially in the auricles, from this cause. But, like hypertrophy, it is sometimes the only morbid circumstance discernible; and therefore not so easily to be explained. The dilated portion, we shall find, is occasionally thin and soft; and the reason of the dilatation is then evident.

Hypertrophy is considered by Bertin, according as the compartment of the heart is simply thickened, without any change in the dimensions of the cavity: as it retains its natural thickness, but is dilated; in which case there must be an hypertrophy or preternatural quantity of substance, or it would have become thinner: and, thirdly, as it is not merely thickened, but its cavity diminished. He designates these three forms "*simple* hypertrophy", "*eccentric* hypertrophy", and "*concentric* hypertrophy."

The second variety, "*eccentric* hypertrophy",—or increase of substance and dilatation united,—was described by Senac, Morgagni, and Lancisi; and was denominated, by Corvisart, "active aneurism of the heart." It is the most common of the three; and the excessive deposition must have taken place in the direction of the surface. The first variety, "*simple* hypertrophy", in which the dimensions of the cavity are unchanged, and the deposition takes place also in the direction of the surface; and the third, the "concentric", in which the cavity is diminished, and the deposition must have occurred in a vertical direction,—at a right angle with the surface, were first described in 1811, by Bertin.[b] In the "concentric", the

[a] Bertin.

[b] See "Traité des Maladies du Cœur, et des Gros Vaisseaux; par R. Bertin. Redigé par J. Bouillaud." ("Treatise on the Diseases of the Heart, and Great Vessels; by R. J. Bertin. Edited by J.

cavity is sometimes so small, that it will scarcely contain the shell of an almond.

Every heart with thick parietes and a small cavity, however, is not perhaps an example of "concentric hypertrophy." A violent contraction at death might probably produce these effects. But, in such a case, the bulk of the organ would be proportionately lessened. To be justified, therefore, in declaring the existence of "concentric hypertrophy", not only the parietes should be thick and the cavity small, but the bulk natural.

In the "simple" and "concentric" hypertrophy of the left ventricle, the thickness is sometimes double, or even triple, what is natural: the walls of the left ventricle, in the healthy state, are about half an inch thick. In the first and second varieties ("simple" and "eccentric"), the thickening of the left ventricle is generally greatest at the base, and lessens towards the apex. In the "concentric", there is usually as much thickening at the apex as at the base. The septum of the ventricles, and even the "columnæ carneæ", participate in the increase of substance. The thickening is sometimes unequal in different parts;—both in the case of the left ventricle, and of any other part that may be hypertrophied. The right ventricle, when not participating in the disease, is comparatively so small, and reaches so short a way down, that it looks like a mere appendage, or as if included in the walls of the heart.

Most Common in the Left Ventricle.—The left ventricle is the most usual seat of hypertrophy. When the disease occurs in the right, the thickening is seldom (if ever) so great, and is generally more uniform; but the "columnæ carneæ", it is said, are generally more enlarged in proportion. Sometimes both ventricles are hypertrophied; sometimes one is hypertrophied, in one or other of the three varieties of the affection ("simple", "eccentric", and "concentric"), while its fellow is only dilated.

Rare in the Auricles.—Hypertrophy rarely affects the auricles; and still more rarely unless other disease exists in the heart. It is generally united with dilatation of the auricle. Laennec[a], and many others, never witnessed an instance of pure hypertrophy of an auricle.[b]

If the walls of all the cavities of the heart, or even both ventricles only, are affected with hypertrophy and dilatation, the heart may acquire an enormous size. In these circumstances, its form usually becomes rounded,—its apex being effaced; and it lies almost transversely in the chest. The thickening is in the walls of a cavity; sometimes partial only; and even thickening and dilatation may exist separately, in different parts of the walls of the same cavity. The "columnæ carneæ" are in some instances more thickened, in others less, as compared with the walls.

Varieties of Dilatation.—In *dilatation* of the heart, as we have seen[c], the natural thickness of the dilated parietes may be retained, or their thickness may be augmented: but there is a third variety of dilatation—the thickness may be diminished; and this was denominated "passive aneu-

Bouillaud.") Book 2; Section 2; Chapter 1; Article 2; Subdivision 1. (Page 342 of the Paris Edition of 1824.)

[a] See his Treatise on Diseases of the Chest, translated by Dr. Forbes. Part 2; Book 2; Chapter 6; Paragraph 2. (Third Edition; Page 614.)

[b] We have observed hypertrophy of the auricles under the triple form described as affecting the ventricles ["simple", "eccentric", and "concentric"]; but hypertrophy with dilatation ["eccentric" hypertrophy] is incomparably more frequent than the other two.—*Bertin's "Treatise on Diseases of the Heart." Book* 2; *Section* 2; *Chapter* 1; *Article* 1; *Subdivision* 3. (*Pages* 335 *and* 336 *of the Paris Edition of* 1824.)

[c] See Page 974.

rism." The first of these varieties—that in which the dilated parietes retain their natural thickness—appears to me, I confess, as true an hypertrophy as the second,—in which the thickness is increased; because dilatation would inevitably occasion attenuation, were not an addition of substance made. Two or even three of these varieties may exist in the parietes of the same cavity.

Causes of Dilatation.—Laennec regards original disproportion of the cavities, as the most powerful cause of dilatation.[a] But, certainly, a very common cause is obstruction to the progress of the blood from the cavity; and the source of this obstruction may be situated in another cavity;—in one farther forwards, relatively to the blood's course. It is frequently the auricle, and not the ventricle, that is dilated, when there is an impediment at the opening of the aortic or pulmonary artery; and when the difficulty is at the aortic opening, it is sometimes not the left auricle, but the right, which becomes dilated. The obstacle may arise from a diminution of an opening, or from diminution of another cavity; as of the left ventricle. A permanent patency of the auriculo-ventricular opening, by which too much blood attempts to rush into the auricle, will create marked dilatation of it.

The auricles, from their thinness, are more subject to dilatation than the ventricles; and the right than the left,—from the frequency of obstruction in the lungs: but both ventricles are often dilated simultaneously. Dilatation would appear sometimes to be of only temporary duration; and the right auricle often becomes dilated in the dying state, especially when this state is lingering, from the impediment to the blood's passage through the lungs.

While, in pure hypertrophy, the substance of the affected portion is usually very firm and red, it is usually soft and pale in dilatation with thinness: and when hypertrophy and dilatation exist together, the substance is generally firm or soft, accordingly as the hypertrophy or the dilatation is the greater. In dilatation of the ventricles, the septum suffers least; and, contrarily to what happens in hypertrophy, the expansion takes place chiefly in the direction of the breadth;—so that when both ventricles are dilated, the heart becomes usually almost round.

Dilatation occurs oftener in women than in men;—probably, as is supposed, from the female heart being naturally thinner. Hypertrophy and dilatation frequently coexist in the walls of different cavities of the same heart.

Signs of Hypertrophy and Dilatation.—Let us now inquire into the signs of hypertrophy and dilatation. When the heart is hypertrophied, an unusually strong impulse is given in the situation of the part affected, and the sound usually heard there is diminished,—becomes a sort of murmur; and in severe cases it is not heard at all. The contraction takes place more slowly than in the healthy state; and, in the hypertrophy of the ventricles, little or no interval of repose occurs after the auricular action. When the heart is dilated, the reverse happens;—there is far less than the usual impulse in the situation of the part affected; and the sound usually heard there is augmented, and is not merely louder but clearer than natural. In dilatation of the ventricles, their action takes place more rapidly than in the healthy state; and, as in hypertrophy, little or no interval of repose occurs.

In hypertrophy of the left ventricle,—its most common seat, a strong

[a] See Dr. Forbes's Translation of Laennec's Treatise. Part 2; Book 2; Chapter 3; Section 1; Paragraph 2. (Third Edition; Page 604.)

mpulse is felt between the cartilages of the fifth and sixth left ribs; and he action of the auricles is very short. In hypertrophy of the right ventricle, this strong impulse is felt at the lower part of the sternum.

If the difference is considerable, it is easily discovered by the greater orce with which the stethoscope is repelled in the affected side, when applied to the cartilages and the sternum in succession. Where the difference is less, it may perhaps be more easily ascertained, by examining both ides at once;—placing the hand longitudinally over the cardiac region; when the stronger impulse against the fingers lying over the left or the ight half of the region, will presently be noticed. In health, the impulse n both halves is equal. Should hypertrophy affect both ventricles at once, he excess of impulse in both halves will determine its existence in both; nd the equality or difference of the morbid impulse, will demonstrate its equality or difference in the two ventricles.

Hypertrophy of the auricles must be very considerable to afford an impulse; which, when present, will be felt in the *right* or *left* superior half of he cardiac region,—according to the situation of the hypertrophy. The situation of the loud and clear sound of dilatation, equally agrees with the seat of the dilatation.

The accuracy with which the seat and nature of these diseases can be determined, is wonderful. If due attention be given, and the symptoms carefully investigated, a physician may pronounce with certainty, frequently even at the first visit, that a particular ventricle or both are hypertrophied or dilated, or the two in opposite states; that a particular auricle or both are hypertrophied or dilated, or the two in opposite states;—no less than that an opening in a particular cavity is deranged: and an examination after death will verify his assertions. Laennec considers these results of auscultation, when well marked, infallible; and so I believe them to be. A good auscultator, after making a full investigation, will never object to write down his opinion, and deliver it to another, for the purpose of being read at the autopsy.

When hypertrophy and dilatation coexist in the walls of a cavity, the two sets of auscultatory signs are blended; and those of hypertrophy or of dilatation predominate, accordingly as either state predominates. In general, the hypertrophy exceeds the dilatation; for, not only do we continually see an increase of thickness with dilatation, but, however extensive the dilatation, if the natural thickness be undiminished,—nay, even if it be diminished, but not in proportion to the dilatation,—hypertrophy must still exist. In these compound cases, therefore, the sign of hypertrophy,—the preternatural impulse,—is generally the more prominent phenomenon; and I own myself to have repeatedly pronounced a case to be one of hypertrophy, when the cavity was likewise to a certain degree dilated;—the dilatation, however, being much inferior to the hypertrophy; and the injury to the system arising, not from the dilatation, but from the hypertrophy. This combination is every day seen in the left ventricle, the great disease of which is hypertrophy; but, with its hypertrophy, there is generally more or less dilatation.

When the left ventricle is severely affected in this twofold manner, its violent pulsations are felt, not merely in the left lower half of the cardiac region, but also under the sternum, and even to the right of this bone: for the growth of the diseased ventricle pushes the right outwards and backwards, and occupies its place as well as the left side. But there is violent impulse, equally, in the left half of the cardiac region;—proving the hyper-

trophy of the left ventricle; and there is a dull sound on striking the sternum;—from the presence there of the enlarged left ventricle.

The cardiac region of the front of the chest corresponds with the lower third or the sternum; and thus the cartilages of the fourth, fifth, sixth, and seventh ribs, have a *right* and a *left* half. The *right* or *sternal* half, sounds clear on percussion in the healthy state, and often even under dilatation of the right cavities: but enlargement of the heart from hypertrophy and dilatation, or the deposition of solid or fluid upon or around the organ, makes it sound dull or dead. The *left* or *costal* half of the cardiac region naturally sounds rather dull in most persons; and even dead in fat, anasarcous, and muscular persons; except at the highest (the auricular) part, where some hollowness of sound is almost always heard, unless in enormous dilatation of the auricles;—such as exists only with constriction, Laennec says, of the left auriculo-ventricular opening.

Dead Sound on Percussion.—A considerable dilatation of the heart necessarily causes a dead sound to be heard more extensively than usual, on striking the cardiac region with the ends of the fingers; and M. Piorry assures us, that if a hard elastic substance is interposed at the time between the chest and the fingers, such a distinctness of sound is produced, that the size of the portions of the heart immediately under the sternum and ribs may be ascertained, with the greatest nicety.[a] The auscultatory signs are the only means of accurately ascertaining the existence and seat of these affections.

Palpitation.—It is in some of these instances of combination of the two affections in the left ventricle, that we frequently see those dreadful cases of violent palpitation, and of throbbings of the arteries: and for no other reason, I presume, than that hypertrophy is here carried to the highest pitch; for when, notwithstanding extensive dilatation, the walls are thickened, the quantity of additional substance must be enormous. Towards the close of even this variety of hypertrophy, the impulse is often much reduced, and the heart sometimes grows soft;—so that the pulse is weak, and the morbid action of the heart is recognised only in the cardiac region. The occurrence of pneumonia may also obscure the stethoscopic signs while it lasts.

The pulse, the respiration, the state of the veins, the secretion of the cellular and serous membranes, the countenance, the state of mind, may all suffer; but the changes induced are too varied for any reliance; and may owe their origin to many other circumstances.

State of the Pulse.—In hypertrophy, especially with dilatation, the pulse is frequently full;—causing headach, and even apoplexy, if the vessels of the brain are weak or diseased: but when the opening of the mitral or aortic valves is narrowed, the pulse may be very small; while the left ventricle is hypertrophied, and beats violently. In mere hypertrophy, the pulse is small, if the variety is the "concentric";—where the addition of thickness is attended by diminution of cavity. Irregularity of pulse is natural to some persons; so that regularity occurs only in disease. In others irregularity depends upon disease of the head, stomach, intestines, or lungs. Frequent faintness may be a purely nervous or sympathetic affection. Violence of arterial pulse may be purely functional; and, although the action of the heart be also violent, particularly on lying down.

[a] "C'est à une ligne près que cette mensuration est précise." ("The size may be determined, almost to a line.")—"Journal Hebdomadaire", No 30, Page 137. See also his work on the same subject, published in 1828.

we generally determine with ease that the violence is independent of hypertrophy: but only by noticing that the violence is general,—is of both ventricles and both auricles; whereas in hypertrophy, it is nearly always confined to, or is much greater in, one cavity of the heart than another; the rhythm is altered; and often some sound preternatural in quality or morbidly intense, is constantly heard in some one cavity;—indicating organic disease.

Anasarca, &c.—It might be suggested that, in many cases, the presence of anasarca, lividity, and tumefaction of the countenance, would assist us in discriminating organic disease. But palpitation may be violent, and these symptoms present, without organic affection of the heart:—a chronic bronchitis, or an original dropsy of the pleura may exist, and produce these symptoms; and here nothing but auscultation can determine whether the heart is sound, and the anasarca referrible merely to the lungs or pleura. In all three cases, the anasarca usually commences in the feet.

Remission of the Symptoms.—Again: the symptoms produced by a diseased heart will sometimes so remit,—either from a decline of the ordinary irritation of the heart, or the cessation of some temporary irritation of another organ,—as to create a doubt in the mind of any but an auscultator, that organic disease of the heart had really existed. Even the dropsy, frequently attendant upon organic disease of the heart, subsides and returns, without evident reason; or accordingly as the patient is quiet in body and mind, and careful with respect to diet and vicissitudes of temperature, or the reverse.

Duration.—Frequently, too, auscultation will disclose cardiac disease, and the symptoms may not increase for many years;—so that the auscultator may be ridiculed, and no organic affection be admitted; when, from unfavourable circumstances or the progress of life, the disease may suddenly begin to augment, and dissection disclose some organic affection. Many persons die of organic cardiac disease after forty; though, for many years of their lives, they had merely a little dyspnœa, with occasional palpitation, and swelling of the feet; and were told that they were free from all disease of the heart. Indeed, Laennec was convinced, that congenital disproportion of the cavities of the organ, was one of the great predisposing causes of its dilatation.[a] In slight cases of the "blue disease", where a small direct communication existed between the right and left sides of the heart, I have seen the symptoms—after being stationary during the whole of infancy, adolescence, and the earlier part of manhood—at once augment;—from the sudden enlargement, I presume, of the preternatural opening; either through the enlargement of one of the cavities between which it formed a communication, or the occurrence of narrowness of one of the natural openings of the heart farther on.

The general symptoms, however, may each be highly useful, when viewed by the side of the symptoms discovered by auscultation: they may confirm the diagnosis; or, rather, they may unite with the last mentioned symptoms, in forming a satisfactory theory of the nature of the case. They should never be neglected; for all the phenomena of every disease deserve the attention of a good practitioner.

Treatment of Hypertrophy.—I have no doubt that hypertrophy of the heart may sometimes be cured. The heart (as I mentioned before[b]) is

[a] See Laennec's "Treatise on Diseases of the Chest"; translated by Dr. Forbes. Part 2; Book 2; Chapter 3; Section 1; Paragraph 2. (Third Edition; Page 604.)

[b] See Pages 973 and 974.

evidently in an inflammatory state. The organ, for the most part, toward the close of the disease, is not only firmer and harder than it should be, but likewise redder; and frequently there is pain in the region of the heart, and even pericarditis also. Now if we make a person live on low diet, cup repeatedly over the heart, keep him perfectly still, and relieve the bowels when it appears requisite,—so that there shall be no congestion anywhere; and if we exhibit colchicum, perhaps digitalis, and sometimes mercury, if he can bear it;—the symptoms of hypertrophy will gradually decline. I have certainly known several cases,—where I had every reason to believe that the hypertrophy was very great,—in which abstinence from meat, spirits, and things of that description,—abstinence from mental excitement,—abstinence from every occupation of mind which could cause anxiety,—abstinence from exercise, and every circumstance that could quicken the pulse,—was followed by a decline of the symptoms; and the patient became comparatively well. This however, requires a long time; and after the patient appears quite well, he must persevere in the general plan, though it need not be very assiduously carried on.

Advantage of Local Bleeding.—Local bleeding, for the most part, answers better than general bleeding. It is not very safe, in chronic diseases of the heart, to bleed at the arm; for, now and then, patients will fall into a state of syncope; and it is a dangerous thing, in diseases of the heart, to bleed to syncope. We have all heard of cases, where a patient with diseased heart has lost more blood than was intended; so that faintness was produced by the abstraction even of a couple of ounces, and the individual has died. A remarkable instance of this kind happened within the last few years. A distinguished personage [a], labouring under disease of the heart, was bled at the arm. The bandage slipped; and although (it is said) only a few ounces escaped, yet he fainted and died. It is more safe, therefore, to take blood from the region of the heart itself, by means of cupping or repeated leeches, than to bleed at the arm; for it is dangerous to induce syncope. If we do bleed generally,—as we often may, with perfect safety, when the patient is strong and hearty,—it should not be to the extent of syncope; because patients with diseased heart will sometimes die suddenly. Indeed, it is not an uncommon occurrence; and they die, more frequently than not, through syncope.

Treatment of Dilatation.—Active measures are not required in such a case as this. We have merely to bleed locally (in order to take off the congestion), to keep an open state of the bowels, and to enjoin rest. Very frequently, however, tonics are required. If the pulse is soft and feeble, it would be dangerous to take away blood;—the only object of venesection being to remove congestion. Leeches, applied to the anus, frequently answer a good purpose in such cases; but, for the most part, a strong evacuation is not at all required. When, however, there is dilatation, there is (much more frequently than not) hypertrophy, and a disposition to dropsy. From the dilatation, the blood is not sent out so freely as it ought to be; and, consequently, there is an accumulation, and a tendency to morbid secretion in the cellular membrane, and in the serous cavities. Great congestion takes place in the liver, and likewise in the head; and there is also a tendency to general effusion. Such being the case, it is very desirable to give diuretics; and a combination of three or four, as I formerly mentioned [b], is best. Squills, digitalis, and acetate of potash, answer very well. In fact, I do not know any thing so good. They answer far

[a] Sir Thomas Lawrence.

[b] See Pages 190 and 846.

better than hydragogue purgatives. Patients are very much relieved by measures of that description; but if they be weak, we shall find it serviceable to give iron; and I believe the best preparation is the Ferri Potassio-Tartras; because, in conjunction with other means, it has a tendency to increase the flow of urine, and the discharge from the bowels. I have seen patients with every symptom of dilatation of the heart, lose the greater part of these symptoms, and be able to go about, after taking the potassio-tartrate of iron. As I formerly mentioned, it may be given in large doses. In fact, instead of a few grains, we may give a drachm, or even two drachms, twice or thrice a-day; but still we cannot give it in such large quantities as the sesquioxide[a]; because it is apt to purge and to pinch. Many persons cannot take more than a drachm. When it is mixed with treacle, it opens the bowels, causes an increased flow of urine, and strengthens the patient. If it should purge too much, it is a good plan to mix with it an equal part of the sesquioxide.

Superiority of Iron.—In such cases, I should give this tonic in preference to all others; because I know, from experience, that it answers so much better than they do. Many cases of hypertrophy with dilatation occur, where the patients are in a state of anæmia,—in a leucophlegmatic condition; and if we take blood away, it is watery, and we make the patient worse. When patients are in a state of anæmia induced by blood-letting, or in that peculiar state in which the blood is not properly manufactured, the pulse will become sharp; and so, in disease of the heart, we sometimes have a sharp pulse, with great debility of the patient. Whenever I have seen this condition united with disease of the heart, I have abstained from evacuations, and given preparations of iron; and have found the patients improve. But if there is a tendency to effusion,—as shown in the ankles, or if we hear mucous or other rattles in the bronchia, diuretics are of essential service. If there be general paleness and debility, then iron is one of the best things that can be given; and if the debility be very great, while we give diuretics, we should exhibit the potassio-tartrate of iron; which is both a diuretic and a tonic. With such treatment as this, it is wonderful how much good may be done. We may certainly cure some cases; and even where the affection is very severe,—so that a cure is out of the question,—we may still do a certain portion of good;—we may make the patient feel better than before, and may prolong life. It is our business to protract life, whether it be desirable for the patient or not. It is our business to act upon a general rule, and endeavour to prolong life; without considering, for a moment, whether the individual would be better *out* of the world than *in* it. If we treat all these cases antiphlogistically, we may do harm. When there is a state of anæmia, the adoption of such measures would be madness. The administration of iron, and even good nourishment, is then the proper treatment.

SECTION III.—ANEURISM OF THE HEART.

Partial Dilatation.—Dilatation of the heart is sometimes partial. Dr. Bertin says, that he has frequently found a cavity dilated in one point; while in every other it preserved its natural state, or was even narrowed or hypertrophied.[b] "The right ventricle, for example," he adds, "is often considerably dilated near the pulmonary artery; while the rest of the chamber

[a] See Page 733.

[b] See his Treatise on Diseases of the Heart; Book 2; Section 2; Chapter 2; Article 2; Note to Subdivision 5. (Page 387 of the Paris Edition of 1824.)

preserves its ordinary dimensions." I have not yet met with this; but now have before me an example of partial aneurism of the heart;—of aneurism such as occurs in arteries, and therefore necessarily partial.

Cases on Record.—Upon the superior and lateral part of the heart of a young negro who had died in a state of asphyxia, Corvisart found a tumour nearly as large as the heart itself. Its interior contained several dense layers of coagula, perfectly similar to those which fill the cavities of arterial aneurism; and communicated with the cavity of the ventricle by a narrow opening, the margin of which was smooth and polished. The German anatomist, Walter the elder, had previously described a case of this kind. Drs. Baillie[a], Zannini, James Johnson, Cruveilhier, Rostan, Breschet, each mention one; Dr. Berard mentioned two; and Talma's heart proved to be in this state.[b] Two aneurisms are mentioned by Dr. Reynaud, as occurring in the same heart.[c] There are two specimens in the museum of St. Thomas's Hospital: in one the aneurism is nearly as large as the heart; and in the other the aneurism is pyramidal, and projects into the left auricle. One lately occurred at St. George's Hospital; and, like one of those at St. Thomas's, projected into the left auricle.[d] Two are mentioned by Mr. Adams; one of which was, like the other at St. Thomas's, nearly as large as the heart.[e]

Situation at which it Occurs.—In all these cases, the aneurism existed in the left ventricle: in some, at the apex; in others, almost equally numerous, at the base;—as in the case before me, in which there are two aneurisms; in others, between the base and apex;—in Corvisart's at the side, in others at the front. Aneurism is a disease of arteries, never of veins; and it is remarkable, that the disease was never detected but in the left (the arterial) side of the heart; and, indeed, never but in the ventricle, with which the general arterial system is directly continuous. This circumstance accords both with the general observation of the greater frequency of all diseases on the left than the right side of the organ, and in the ventricle than the auricle; and with the other fact, that this individual disease (aneurism) is arterial; or rather, I would say, is a disease of parts containing decarbonised blood; for the pulmonary artery, containing black blood, has not (I believe) yet been seen the seat of aneurism.

Most Frequent in Men.—As far as appears known, all the instances, but one, have occurred in adult males; and *arterial* aneurism occurs eight times more frequently in males than in females.

Symptoms not Known.—This cardiac affection is the first of those in which auscultation renders no assistance. All the cardiac diseases in which it is useful, have been considered. The general symptoms which occur may well, therefore, be supposed, by those who know the value of auscultation, to leave the nature of the disease in doubt. Dr. Baillie says the symptoms "are similar to those which belong to aneurism of the arch of the aorta." And what does Dr. Baillie enumerate as the symptoms of aneurism of the arch of the aorta? First, difficulty of breathing. But that may arise from many other causes in the heart, lungs, or other parts; and has been absent in this disease. Secondly, more or less of pain in the aneurismal tumour, or some other part of the chest. But here is no tumour; and pain in some other part of the chest would certainly never lead

[a] "Morbid Anatomy"; Chapter 2; Section 4.

[b] "Répertoire Générale d'Anatomie et de Physiologie"; Tome 2; Parties 1 et 2.

[c] "Journal Hebdomadaire"; Fevrier 28, 1829.

[d] Dr. James Johnson's "Medico-Chirurgical Review"; July, 1829.

[e] "Dublin Hospital Reports"; Volume 4.

is to a knowledge of the disease, but rather to a misconception of its seat and nature. The pulse, he says, is sometimes irregular; but immediately subjoins, that "often no irregularity can be felt in it." The chief symptoms he pronounces to be "a strong pulsation in the chest, commonly visible to the eye, when the chest is exposed to view." But again immediately subjoins, that he has felt the same kind of pulsation in other cases: for example, in adhesion of the pericardium, slight pericarditis with slight hydro-pericardium, and in ordinary morbid enlargement of the heart. Indeed, no strong pulsation, except palpitation of the heart, and in most cases not even that, has occurred in this affection. The most decided characteristic of the disease, however,—belonging only to aneurism,—he regards as a strong pulsating external tumour, when the aneurism has attained a large size. But aneurism of the heart rarely attains a large size; and I do not know that it ever produced an external tumour. And after all, a diagnosis would be required between aneurism of the heart and of the arch of the aorta. It therefore appears to me,—and I say it with all the respect due to an amiable and industrious man,—that Dr. Baillie would have done better in saying, that there were no particular symptoms of the disease; especially as he never met with more than one example of it.[a]

In Talma, who died of strangely neglected stricture of the rectum, no symptoms had led to a suspicion of cardiac disease.[b] In a patient of Dr. Johnson's—General Kidd, death took place suddenly from rupture of the aneurism, without any previous symptom of its existence. The same happened in Dr. Reynaud's case. In a patient of Cruveilhier's, severe asthmatic paroxysms took place; with a sense of constriction, particularly about the heart, and a peculiar sensation in the arm-pits. These symptoms, together with hardness, fulness, and occasional intermittence of the pulse, and suffusion of the face, led to the suspicion of organic disease in the heart. But, at that time, auscultation was not cultivated. The hardness and fulness of the pulse arose from hypertrophy of the left ventricle.

Case.—A man, aged thirty-two, was admitted into St. Thomas's Hospital on the second of March, 1826;—on account of palpitation of the heart, especially on moving or lying down; inability to lie in any other position than on his back; sudden starting up during sleep; constant dyspnœa, and cough, with a little mucous expectoration. The pulse was regular,—not much quicker than natural; but exceedingly weak. He had discharged large quantities of tape-worm, by means of oil of turpentine; and had suffered severely, during the preceding winter, from rheumatism; of which he still complained. These symptoms gave no information as to the nature of his disease; they led to a suspicion only of some affection of the heart. I was not at that time well practised in auscultation; but found the ventricular impulse of the heart very strong all over the right half of the cardiac region; and therefore concluded, that the disease existed in the right ventricle. In two months, under rest and moderate antiphlogistic treatment, he became much better, experienced less palpitation and dyspnœa; could lie on both sides; and was stronger. The ventricular action was no longer strong on the right side; but was now both loud and strong in the lower part of the left. I could thus form no opinion as to the seat or nature of the disease. The dyspnœa, after this time, gradually increased for a fortnight; and he then died.

On opening the body, two aneurisms were found at the upper part of the left ventricle; but on the right ventricle was a tumour or large tu-

[a] "Morbid Anatomy"; Chapter 2; Section 4. [b] See Page 982.

bercle, the size of a pigeon's egg, with several smaller ones. The force originally observed in the right half of the cardiac region was now explicable, although the aneurisms sprang from the left ventricle. The aneurisms, when I first saw him, were probably not large enough to occasion symptoms so considerable as the tumour on the right ventricle; but, as they increased, decided symptoms necessarily arose in the left half of the cardiac region;—much exceeding those produced in the right by the tumour.

Aneurism of the Auricle.—I have met with a case of aneurism of an auricle;—a part which has never, I believe, been recorded to have laboured under this disease. There was hypertrophy and dilatation of the left ventricle, with extreme ossification and cohesion of the mitral valve;—the auriculo-ventricular opening being proportionally reduced. The sinus of the left auricle formed an aneurism of large size, with very dense and thick layers of fibrin for its walls; and these had reduced its cavity to a very small capacity. The action of the ventricles had been strong, loud, and extended; and a dull sound, more extensive than natural, had been given on percussion of the cardiac region. The hypertrophy and dilatation of these parts, were pronounced during life. The pulse had been feeble, and the breathing very difficult; and the legs had swelled. The feebleness of the pulse, notwithstanding the strong action of the left ventricle, arose from the small quantity of blood discharged into the left ventricle to be propelled into the aorta; but had not been ascribed to this cause, as there was *no bellows-sound or thrill*;—neither the aneurism, nor the constriction of the left auriculo-ventricular opening, had been suspected. The absence of bellows-sound arose from the opening, though constricted, being still perfectly commensurate with the reduced capacity of the auricle; to which it retained its natural proportion; and thus afforded a sufficient outlet to the small quantity of blood to be discharged. The fact is as interesting, as the situation of the aneurism is extraordinary.

The case proves, for the first time, that cardiac aneurism is not peculiar to the left ventricle, nor even to the ventricles: and I may remark, that my case of ventricular aneurism is an additional argument to those already on record and adduced by Dr. Reynaud, of the error of Breschet in supposing aneurisms to be generally situated towards the apex of the ventricle. In this case, the two aneurisms were lined by a smooth membrane, continuous with that of the ventricles; and thus afforded also an additional proof that, in these cases, the internal membrane is not necessarily injured;—as Breschet must also imagine, when he calls these "*false consecutive* aneurisms"; though it must be allowed that he did not consider the ten cases with which he was acquainted, sufficient to afford a perfect history of the disease.

SECTION IV.—CHRONIC CHANGES THE RESULT OF INFLAMMATION.

Induration.—Hypertrophy of the heart, I have stated [a], appears to be of an inflammatory nature. With it is generally united some degree of induration. Sometimes induration exists alone, or in great proportion to the hypertrophy. I believe it is attended by palpitation, a full and rather hard pulse, and frequently by pain in the heart. We must suppose it inflammatory.

[a] See Pages 973, 974, 979, and 980.

Softening.—On the other hand, the substance of the heart is sometimes softened; and the pulse and action of the heart are then feeble and frequent, dropsy takes place, and a disposition to fainting; and the heart is generally found also dilated, and of a deeper or paler colour than usual. This state also may be the result of inflammation; as softening of other organs, beyond all question, frequently is. Yet softening of the heart and all other parts, and even gangrene, probably may occur without inflammation; and sometimes when it occurs with inflammation, the inflammation may not be its cause, but only one of the circumstances of a peculiar condition.

Very acute inflammation of every part generally, I believe, induces a softened state: and, although a softened state may also result from a chronic inflammation, the latter generally causes induration. This is seen with regard to the various muscles of the body, as well as to the various internal organs.

Greatly as modern pathology has been improved by the knowledge that many diseases, formerly not regarded as inflammatory, are so essentially, or to a certain extent; and greatly as medical practice has been improved, by the administration of antiphlogistic measures in such cases, I am satisfied that we are now rather too prone to believe affections nothing more than inflammations, and to treat them only as such;—that many so regarded are not at all inflammatory; or have inflammation, not as a fundamental state, but merely as one circumstance among the morbid actions; or really have inflammation as a consequence; and that the hope of curing them by antiphlogistic measures alone is vain;—whatever relief may be effected by lessening the inflammation which accompanies them.[a]

The deep-coloured and the pale softening of the heart, distinguished by Laennec [b], occur, according to Bertin, the former as an acute, the latter as a chronic, affection. The chronic is often an attendant upon general cachexy; the acute, on pericarditis.

Abscess and Ulceration.—Abscess and circumscribed ulceration are sometimes found. The latter may commence in the lining membrane, or in the pericardium. Whether it be the result of an abscess of the heart, or originate in one of these membranes, it may proceed to perforation; or to such attenuation that rupture ensues,—perhaps on some effort.

Gangrene.—I have not read of gangrene of the heart: but it has been seen soft and black, without any gangrenous smell, from excessive inflammatory congestion of blood; and Cruveilhier gives a view of a heart beset with black patches of congested blood, similar to those observed in what is absurdly called "apoplexy of the lungs." [c]

SECTION V.—RUPTURE OF THE HEART.

Harvey is said, by Morgagni, to have first noticed rupture of the heart. Abundant cases of rupture of the heart, independently of ulceration, are on record; and are compared to rupture of the arteries, arising from violent muscular effort; though generally there is also a want of firmness in the organ.

Usually in the Left Ventricle.—They may occur in every part, but usually

[a] This I stated in my work on Hydrocyanic Acid; Page 105. Andral has many excellent remarks to the same purpose, in his work on Morbid Anatomy. [Translated by Drs. Townsend and West.]

[b] See his Treatise on Diseases of the Heart, translated by Dr. Forbes. Part 2; Book 2; Chapter 9; Paragraph 1. (Third Edition; Page 620.)

[c] See Page 866.

happen in the left ventricle; where the most forcible muscular contraction takes place; and a spot too thin, or soft, or ulcerated, is most likely to occur, and is most exposed to violence; if the heart is made to act forcibly, by mental or muscular causes. It is the apex or its vicinity,—naturally the thinnest part of the ventricle, that usually gives way in general softness or thinness of the organ. Death is usually instantaneous; but sometimes does not happen for several hours;—differences also observed when the heart is wounded.

Case.—An instance of rupture of the heart was witnessed by me, in company with my friends Dr. Roe and Mr. Alcock. The rupture was a zigzag fissure in the front of the left ventricle; not at once discerned on bringing the heart into view, but which had filled the pericardium with blood. The patient,—Mr. Hayes, a highly respectable general practitioner, in Charlotte Street, Fitzroy Square,—corpulent and about sixty years of age, had suffered three attacks of pain about the præcordia with dyspepsia and vomiting, during six days; but had gone out as usual in the intervals. On the morning of his decease, a fourth attack of pain, referred by him to the heart, took place before he rose in the morning; and he gave his assistant directions for preparing him a fomentation. Presently his bell rang violently, and was instantly answered; but he was found dead. The heart was very soft; the fat external to the abdomen excessive; and considerable adhesions existed among the abdominal viscera.

Rupture of the Right Ventricle.—While numerous instances of rupture of the left ventricle are on record, we have very few of the rupture of the right. Yet George the Second perished suddenly of this accident, in 1760: and so, in 1730, did the Princess of Brunswick; whose case, no less than the celebrated one of George the Second, is referred to by Morgagni.[a]

[a] "De Sedibus et Causis Morborum"; Liber II. Epistola Anatomico-Medica, xxvii. 7. "Histoire de l'Académie des Sciences"; 1732. In the same volume, is recorded an instance of rupture of the left ventricle.

Smollett, in his "History of England" (Volume 5, Page 418), makes two egregious blunders, in his account of the king's death. He says:—"On the twenty-fifth day of October, 1760, George, King of Great Britain, *without any previous disorder*, was early in the morning seized with the agony of death, at the palace of Kensington.

"He had risen at his usual hour, drank his chocolate, and inquired about the wind—as anxious for the arrival of the foreign mails: then he opened a window of his apartment; and, perceiving the weather was serene, declared he would walk in the garden. In a few minutes after this declaration, while he remained alone in his chamber, he fell down upon the floor: the noise of his fall brought into the room his attendants, who lifted him on the bed; when he desired, in a faint voice, that the Princess Amelia might be called; but before she could reach the apartment, he had expired. An attempt was made to bleed him, but without effect; and, indeed, his malady was far beyond the reach of art; for when the cavity of the thorax was opened, and inspected by the serjeant-surgeons, they found the right ventricle of the heart actually ruptured, and a great quantity of blood discharged into the pericardium; so that he must have died instantaneously, in consequence of this effusion. The case, however, was so extraordinary, that *we question whether there is such another instance upon record.* A rupture of this nature appears the more remarkable, as it happened to a prince of healthy constitution, unaddicted to excess, and far advanced beyond the period of life when the blood might be supposed to flow with a dangerous impetuosity."

Now we have seen, that a member of the very same family,—the Princess of Brunswick, died not only of a rupture of the heart, but of a rupture of the very same ventricle of the heart, in 1730; and Dr. Smollett's reflections upon the improbability of rupture from the moderate impulse of the blood in the king are groundless; since ruptures of the heart and aorta rarely occur under the most violent impulse, unless there be disease of substance; and when the latter exists, they may occur under the most feeble impulse of the blood. Rupture of the blood-vessels of the head is most common in the aged; as their coats are most frequently diseased in the decline of life.

So far is it from being correct that his

Rupture of the Valves.—The valves alone sometimes suddenly give way; and I believe that immediate extreme dyspnœa and rapidity of pulse, are the usual effects of an extensive injury of this kind. They split either from intensity of disease, from mere fragility, or from some violent effort;—exactly the circumstances in which frequently the inner, or inner and middle coats of an artery crack, and give rise to aneurism. An engraving of a split aortic valve, is given in Dr. Baillie's work. I saw an instance in which the same valves were beset with grains of earth, and obstructed the course of the blood; when suddenly, without obvious cause, all the symptoms were aggravated, and the patient died in a few days; two of the aortic valves were found rent. I have already referred to these two cases.[a] In the "Medical Gazette" for June 20, 1829[b], an instance of rupture of the tricuspid valve is described. The heart was variously diseased, but not particularly the tricuspid valve: and, under an exertion, a snap had been felt in the heart; immediate rapidity and irregularity of pulse had occurred, with syncope, and (I presume) dyspnœa; and the patient had died in six days.

Effects of Ruptured Valves.—If the rupture is not extensive, the irritation of the laceration, and the imperfect function of the valve, give rise to chronic disease;—such as hypertrophy of the substance of the heart, dilatation, and structural change of the valves themselves; and death does not occur for some time. Dr. Abercrombie[c] mentions an instance, in which, after a severe fall on the left side of the chest, death took place in five months; and an aortic valve was found torn at its base,—so as to give the appearance of a ring; and the left ventricle was hypertrophied and dilated. Morgagni found an aortic valve ruptured.[d]

Sometimes the "chordæ tendineæ" of the valves are ruptured. A case is recorded by Mr. Adams, in the "Dublin Hospital Reports", Volume 4; Page 404. The patient lived about a month. Corvisart mentions three instances of their laceration during violent efforts. Laennec found a tendon of the mitral valve ruptured, in eccentric hypertrophy of both ventricles.[e]

Majesty had experienced no particular disorder, that Dr. Nicholls, the king's physician,—in his account of the dissection, in the "Philosophical Transactions" for 1762,—informs us, that "His Majesty had for many years complained of frequent distresses and sinkings about the region of the heart; and his pulse was of late years observed to fall very much upon bleeding."

As if errors were destined on this point, Dr. Forbes (in his translation of Laennec, Part 2, Book 2, Chapter 14) states, that "George the Second of England is often said to have fallen a victim to the same accident as Philip the Fifth of Spain (rupture of the heart); but his death was occasioned by rupture of the aorta."—The words of Dr. Nicholls, however, are the following:—"The pericardium was found distended with a quantity of coagulated blood, nearly sufficient to fill a pint-cup; and, upon removing this blood, a round orifice appeared in the middle of the upper side of the right ventricle of the heart, large enough to admit the extremity of the little finger. The ventricles were found absolutely devoid of blood, either in a fluid or coagulated state."

Aneurism of the aorta existed, but was not ruptured. The middle and interior coats were split, but the external was entire,—as in the first stage of false aneurism; and merely an elevation was produced.

It is at this time amusing to read Junius's letter, calculating on hereditary tendency; and hinting, in 1770, to George the Third (who died in 1820), the possibility of a long minority; as "every true friend of the House of Brunswick sees, with affliction, how rapidly some of the principal branches of the family had dropped off." (Letter 37.—"To the Printer of the Public Advertiser.")

[a] See Page 953.

[b] No. 81; Volume 4, Page 78.

[c] In a paper on the Pathology of the Heart; published in the "Transactions of the Medico-Chirurgical Society of Edinburgh"; Volume 1, Page 49.

[d] Epistle 24; 10.

[e] See his Treatise on Diseases of the Heart", translated by Dr. Forbes. Part 2; Book 2; Chapter 21; Case 47. (Third Edition; Page 668.)

M. Bouillaud found a "columna carnea" of the tricuspid valve torn through.

Generally Complicated with Disease of the Heart.—In all these instances of rupture of the valves and their attachments, there has generally existed some disease of the heart; and most frequently even of the valve itself. But occasionally—just as in rupture of the substance of the heart, and of the inner and middle coats of the aorta—no diseased appearance is discernible; although one must suppose a morbid friability, at least, in those cases where no external force, no effort of voluntary muscles, and no mental excitement,—some one of which is commonly the cause of rupture,—took place.

I met with an instance of a circular hole in two aortic valves, on either side of their septum, from original defective formation. Morgagni once found a hole in one of the leaves of the mitral valve.[a]

SECTION VI.—STRUCTURAL DISEASES OF THE HEART.

Ossification.—The induration of the heart occasionally amounts to a cartilaginous or osseous state. But these changes are almost always originally seated in the lining membrane, or in the pericardium, or in the subjacent cellular membrane. A spot of the heart or its membranes is sometimes so changed; sometimes nearly a whole cavity becomes a bony case. Mr. Burns declares, that he once saw not only complete ossification of the pericardium, but also the ventricles ossified as firmly as the skull, except for about an inch at their apex. The "chordæ tendineæ" are occasionally ossified.

Ossification of the Coronary Arteries.—The coronary arteries are sometimes ossified; and, not unfrequently, the kind of suffering denominated "angina pectoris" is the result. But they may be ossified without such a result; and "angina pectoris" may exist with various structural diseases of the heart, or without any.

Fatty Degeneration of the Heart.—I once saw the muscular substance of the heart completely changed, except at the surface, to fat. A mere layer of red muscular structure covered the internal and external parts of the heart, and the "columnæ carneæ": within, every spot was fatty matter. The patient had been subject to frequent attacks of syncope, palpitation, irregular and small pulse, with dyspnœa, and anasarca.[b] There were five pulmonary veins.

Atrophy of the Heart.—Sometimes the heart wastes,—is atrophied;—becoming small and wrinkled. This is often, though not always, observed after chronic diseases; and especially after phthisis. Pressure, from pericardial effusion or any other cause, has the same effect. The walls of an atrophied heart, it is said by Dr. Bertin[c], may be thinner or thicker than usual, or of their usual dimensions;—their thinness being occasioned by dilatation, their thickness by narrowing, of the cavities. But it appears to me, that if the walls are thickened, we are not justified in pronouncing the smallness of the heart an atrophy; as the external smallness of dimension may arise from violent contraction at death: and, if the walls are di-

[a] Epistle 23; 6.

[b] A case will be found in the "Dublin Hospital Reports"; Volume 2. The symptoms were the same as in my patient. A case was previously given by Dr. Duncan, Jun., in the "Edinburgh Medical and Surgical Journal", for January, 1816; Volume 12; Page 43.

[c] In his "Treatise on Diseases of the Heart"; Book 2; Section 2; Chapter 3; Paragraphs 1 to 3. (Pages 389 and 390 of the Paris Edition of 1824.)

ated, that we are not justified in calling the thinness "atrophy"; because ne original quantity of substance may be in them, and only spread out. f the whole heart weighs less than is natural, then only (I think), we ught to say that the organ is atrophied; and, even then, the smallness of he organ may be an original defect; unless indeed it appears wrinkled, ke a shrivelled apple,—to use Laennec's comparison.

Scirrhous and other Deposits.—The heart has been seen cancerous; it as contained, in its substance and in its cavities, cysts, and true hydatids[a]; nd, in its substance, scrofulous tubercles, scirrhus[b], bone, encephaloid deposit, &c.

I once opened a person who died of repeated hæmoptysis. In the substance of the lungs were hard patches of the deepest red; and, in the ventricles of the heart, innumerable thin globular cysts—containing bloody fluid, and attached by a peduncle—could be squeezed out from among the 'columnæ carneæ."[c]

Cyanosis.—Upon the state of the heart which gives rise to a mixture of enous and arterial blood,—the state termed "cyanosis"[d], I have little to ay. It is usually a congenital malformation; upon which the works of Dr. Farre and Mr. Burns leave nothing to be desired.[e] I have already emarked, that I have seen the admixture rather suddenly begin to increase, in adult age. Bertin believes, that the admixture has occasionally commenced after birth, from an ulcer in the auricular or ventricular septum; —throwing the two corresponding cavities into one.[f] In most cases, the right auriculo-ventricular or ventriculo-arterial opening becomes narrowed; and the right auricle or ventricle or both are dilated and hypertrophied; and the usual ill consequences of that affection are, sooner or later, experienced.[g]

Preternatural Situation of the Heart.—Preternatural situation of the heart occasionally occurs; sometimes congenitally; but oftener in consequence of the morbid presence of solid, fluid, or aëriform substances in the left cavity

[a] In the "Medico-Chirurgical Transactions", Volume 11, is a case of cysts or hydatids in the substance of the heart. Three apparently true animal hydatids, were found in a heart by Dr. Andral ("Précis d'Anatomie Pathalogique", Tome 2, Page 332). Dr. Abercrombie, in the "Edinburgh Medico-Chirurgical Transactions" (Volume 11, Page 53), mentions having found a cyst in the left auricle, apparently containing others collapsed in a dark thick fluid. I may mention that, at Page 58, he gives a curious case of partial cohesion of the sides of the right ventricle, an inch and a half from the bottom;—producing a small cavity.

[b] There has been just placed in the museum of St. Thomas's Hospital, by one of the Physicians, an adult heart, in which the walls of the left ventricle contain many deposits of scrofulous matter,—surrounded by white and almost cartilaginous induration.

[c] I gave the dissection in the "Annals of Medicine and Surgery", 1816. Laennec therefore erroneously considered himself the first who described what he terms "the globular excrescence." See Dr. Forbes's Translation of his "Treatise"; Part 2; Book 2; Chapter 21. (Third Edition; Page 665.) And, indeed, he refers to numerous authors for what appear to have been analogous formations. For the details of this case, see Page 867.

[d] From κυανος, *blue*.

[e] The malformations referred to in Dr. Farre's work, together with my own morbid specimens of diseased heart, are all deposited in the museum of St. Thomas's Hospital; and, with numerous others, constitute (perhaps) an unrivalled collection of cardiac lesions.

[f] See his "Treatise on Diseases of the Heart"; Book 2; Section 6; Article 1. (Page 433 of the Paris Edition of 1824.)

[g] See Bertin's "Treatise on Disease of the Heart"; Book 2; Section 6; Article 1. (Page 436 of the Paris Edition of 1824.) He ascribes the circumstance to the excitement of the right half of the heart by the admission of a portion of arterial blood into it.

A high degree of obstruction in the right auricular or ventricular opening, or in the lungs, will, without any malformation, produce a blueness, approaching to blackness, in the countenance, long before death.

of the thorax,—pushing the heart to the right;—a circumstance which is by no means uncommon. Dr. Abercrombie mentions a case in which the right lung had become solid; and the left, dilated extensively to perform the function of both, had pushed the heart to the right.[a] Increased bulk of the heart itself, or pressure from other parts,—either above (as from aortic aneurism), or from abdominal enlargement below,—will likewise occasion other changes in the situation or the direction of the heart. These may be recognised by the touch.

Fibrinous Coagula.—Although the greater part of the fibrinous coagula observed in the heart and large vessels are produced after death, some are unquestionably produced during life; for they are occasionally organic, and adhere by vessels to the substance of the heart; and symptoms evidently arising from obstruction to the course of the blood, appear during life;—exactly as we find to be the case from the existence of organized coagula in arteries and veins at a distance from the heart. Sudden paralysis of an extremity, attended by loss of pulse in it, and sometimes at length even mortification, has frequently occurred from the production of coagula in arteries.[b]

SECTION VII.—NEURALGIA OF THE HEART.

Like various parts of the body, the heart is subject to neuralgia. I had a case of this kind, where the pain was intense; not only affecting the region of the heart, but darting at the shoulders and back; sometimes dull and aching, at others stabbing; not increased by motion or posture; and unaccompanied by any stethoscopic signs. It occurred in a middle-aged woman, at St. Thomas's Hospital; and the symptoms were removed by iron, but afterwards (I believe) returned.

A second case has occurred to me in the person of a lady, who appears to have laboured under the disease very many years. Besides a constant aching in the lower part of the cardiac region near the sternum, there are frequent stabbing pains,—plunging (to use the expression of most persons afflicted with neuralgia); so that she is compelled to rise and walk the room almost every night. These occur during motion and rest; but most severely during motion. They shoot in all directions, and occur occasionally in distant nerves. As soon as they are over, she is apparently well; and, when they are not very troublesome, sings, dances, or takes horse-exercise. In the first case, the ear discovered nothing morbid in the heart: in this, a slight ventricular bellows-sound is heard. Andral mentions a dreadful case of this kind, which proved fatal; without leaving any trace of disease in the heart, or its dependencies.[c]

SECTION VIII.—ANGINA PECTORIS.

Symptoms.—By "angina[d] pectoris" is meant a sudden violent pain, in some part of the chest near the heart, and especially at the sternum;—a pain which causes the patient to stand still if he be walking, and induces a sensation as if he were about to expire. The pain, at first, is felt only at

[a] "Edinburgh Medico-Chirurgical Transactions"; Volume 1, Page 65.

[b] See Bertin's Treatise on the Heart, Page 447; Mr. Adams, in the "Dublin Hospital Reports", Volume 4, Page 432; "Edinburgh Medico-Chirurgical Transactions", Volume 3, Page 1; and compare with these the "Transactions of a Society for the Improvement of Medical and Surgical Knowledge", Volume 3, Page 448.

[c] "Précis d'Anatomie Pathologique"; Tome 2; Page 344.

[d] From ἀγχω, *to strangle.*

ne spot,—in the situation I have mentioned; but at length it extends to he shoulder, darts through to the spine, goes down the arm, and occurs at he end of the fingers. In general the pain is confined to the left side; hough there are a few cases where it has extended to the *right* shoulder, nd down the *right* arm, and even down the front of the loins; but that is sually after it has existed for some time (longer or shorter) at the sternum, nd down the left arm. There is not necessarily palpitation; for we may ave this affection without any palpitation at all.

Pathology.—Dr. Haygarth, of Bath, has collected a vast number of cases f this description; and has inferred that these symptoms are characteristic f disease of the coronary arteries. He does not say "characteristic of *ssification*", as some make him; but "characteristic of *disease* of those rteries";—whether it be induration, or the formation of cartilage, or of one. But it is now ascertained, that "angina pectoris" does not charac- erize any particular affection of the heart. We may have it without ossi- ication, or any perceptible disease of the coronary arteries; and, on the ther hand, we frequently find ossification of the coronary arteries, without he symptoms called "angina pectoris." Angina pectoris is very well de- cribed by Dr. Heberden, in the Second Volume of the "Transactions of he College of Physicians."[a] It is not one of the common symptoms of isease of the heart. In the greater number of instances in which the eart is affected with disease of any kind, we have not the symptoms of angina pectoris"; and although it is a fact, that we frequently have these ymptoms when there is ossification of the coronary arteries, or great ossi- ication of the mouth of the aorta; yet it is also a fact that we may have hem in almost any disease of the heart whatever; and also that we may ave them without any ossification at all.

Distinguished from Gastrodynia.—Such symptoms, it is now well known, will take place without any disease of the heart. A few years ago, there were ublished some cases, accurately described as "angina pectoris", but in which no disease of the heart was found after death. The truth is, I be- ieve, that gastrodynia (spasmodic pain of the stomach) frequently resem- les this affection. The left side of the stomach is situated close to the eart; and a violent pain of the stomach, frequently shoots upward; some- imes as far as the shoulder, and even down the arm. Cases of pure spasm- dic or neuralgic pain of the stomach, will give way to stramonium, prus- ic acid, and remedies of that description; and are shewn to be diseases of he stomach, not only by their ceasing entirely, on the exhibition of reme- lies calculated to relieve functional disorders of the stomach, but by acidity, —perhaps vomiting; and by various other symptoms, indicating disease of the *stomach*, and not of the *heart*. In such cases, I have known persons seized with a violent pain, when they have moved quickly;—just the same as when there has been disease of the heart itself.

Distinguished from Neuralgia.—The heart is certainly subject to pain of a neuralgic character. I have seen several cases of persons who have had violent pain, at different times, in the region of the heart; and the differ- ence between it and what is called "angina pectoris", I have found to be this;—that the latter is only felt when the patient moves about; whereas a neuralgic pain is felt quite as severely when the patient is sitting still. Fre- quently, too, there is pain darting in other distinct nerves of the body. The pain is of a stabbing character; and although it may be made worse by the

[a] Page 59

patient jolting himself about, yet, when he is perfectly still, it will frequently come on in the most violent way. Another diagnostic mark is, that neuralgia is not particularly disposed to dart through the left arm; nor is it attended with a "dying" sensation;—as though the individual were about to expire.

Treatment.—I have relieved "angina pectoris", more by prussic acid than by any other remedy. If there be organic disease of the heart, we cannot relieve it to the same extent as we can a *neuralgic* affection of the organ; and I do not know that I ever did much good in such cases.

CHAPTER IV.

DISEASES OF THE AORTA.

SECTION I.—AORTITIS.

Symptoms.—I formerly mentioned[a], that the lining membrane of the heart and aorta was subject to inflammation, and sometimes simultaneously with the pericardium. In the case of the heart, I believe that the symptoms are, increased general sound, force and frequency of action, with more or less pain or uneasiness: and when the former continue for a length of time, without the peculiar auscultatory signs of organic disease, or proportionate pain on pressure (as observed in pericarditis), we certainly may infer the existence of this inflammation.

The lining membrane of the aorta is generally inflamed at the same time; and when the affection extends along the descending portion, there is frequently a sense of smarting in the direction of the spine, and in the abdomen a violent pulsation, not only of the aorta, but even of the iliacs; without any perceptible enlargement of the vessels, the existence of any tumour in its neighbourhood, or such a smallness of any of the arteries as might render it probable that the aorta was narrowed in any part, and thus forced into violent pulsation.

Causes.—Aortitis seems caused by all the circumstances which produce inflammatory affections of the heart, and perhaps by disease of the heart itself. Either hypertrophy of the left ventricle gives rise to inflammation of the aorta, or the converse happens, or they spring up together; for they are frequently conjoined.

Morbid Signs.—Of the intensely bright redness of the inner surface of the inflamed aorta, and the impossibility of ascribing it to any thing but inflammation, I formerly spoke[a]; as well as of the occasional effusion of fibrin. It appears as a red stain; and sometimes the middle coat appears more loaded with blood than usual.

Chronic Changes.—But we far more frequently discover the chronic change of structure in this vessel. Yellow spots are seen every day: often a yellow curdy substance can be squeezed through the inner membrane, under which it is deposited;—the membrane having become friable, and under distension giving it issue. Sometimes the deposition projects into the canal of the artery, like a tubercle. Frequently spots and patches of bone are seen bare, and in contact with the blood: originally deposited below the inner membrane, I believe, and exposed by its cracking and becoming destroyed. Sometimes all the coats are thickened and indurated. Ulceration is occasionally seen, and fatal hæmorrhage has been thus produced;—the extenuated outer coat (perhaps the only one remaining) giving way under

[a] See Page 949.

some exertion or strong action of the heart. More commonly the aorta, like other arteries, dilates.

SECTION II.—ANEURISM OF THE AORTA.

Varieties.—Either all the coats dilate together throughout the circumference of the vessel, or in one spot, so that a pouch is formed: or, the inner or middle coat cracking, or (which is less frequent) ulcerating, the blood distends the external into a pouch; and this gradually gives way also, and hæmorrhage occurs: or the surrounding parts adhere to the vessel; and thus hæmorrhage is prevented, till these likewise ulcerate or burst. Occasionally the three coats first dilate generally or partially; and then the internal and middle give way, and the external continues to dilate alone. The middle coat often cracks at the same time as the internal.

Condition of the Vessel.—Both the simultaneous dilatation of the three coats, and the rupture of the internal, nearly always arise from far more than mere debility of structure,—generally from some disorganization: at least some change of colour, some deposition, or unusual appearance, is nearly always observed at the same time.

True and False Aneurism.—The partial dilatation of the three coats of the aorta and other arteries, is by some termed "*true* aneurism"; while others restrict the term to the dilatation of the middle and external or of the external;—the internal or the internal and middle being ulcerated or ruptured. Those who apply the term to the partial dilatation, call the instances in which one or more coats are ruptured,—"*false* aneurisms." Yet all allow that, whether the three coats dilate together or only the middle and external,—the internal being cracked or destroyed,—the morbid condition of the vessel giving rise to the change is much the same. If partial dilatation of all the coats occurs first, and then rupture of the inner coat in one spot of the dilatation, both kinds of aneurism exist.

Most Frequent in the Ascending Portion.—This disease most commonly takes place in the ascending portion or the arch of the aorta;—the extension usually occurring at the anterior or lateral portions of the vessels, and inclining to the right side: and dilatation, general or partial, usually precedes the ulceration or rupture of the inner and middle coats.

Rupture usually Transverse.—Aneurism frequently exists without giving rise to any symptoms: and as the aorta within the pericardium is detached,—is without the possibility of surrounding parts becoming adherent to it, and preventing the escape of blood when its coats entirely give way, sudden death from this cause frequently surprises persons apparently in good health. The rupture is usually transverse, and has been seen throughout the circumference of the vessel; though limited rupture is much more common; and, when confined to the internal and middle coats, it is almost universally transverse.

If the inner and middle coats only are ruptured, blood escapes under the external; and sometimes separates it, to a greater or less distance. Laennec saw it separated from the commencement of the aorta to the iliacs;—giving the appearance, at first sight, of a septum in the middle of the vessel. When, after an interval varying in length, the external coat ruptures, the opening may be in a different direction from the fissure in the internal and middle coats.

Case.—A woman was admitted by me into St. Thomas's Hospital, on account of severe pain of the left half of the head, face, and neck, and of the

left shoulder. I ordered thirty leeches to be applied; and, during their application, she suddenly screamed with pain in the region of the heart, fell back, and expired. On examination, the pericardium was found distended with clear serum, and a very large coagulum of blood; which had escaped through a small longitudinal rent in the outer coat and pericardial covering of the aorta. The outer coat was separated from the internal and middle into a pouch; which contained a portion of adherent fibrin, precisely similar to the fibrin found in aneurisms, and a quantity of ordinary coagulum; without any morbid appearance of structure. In the internal and middle was a transverse slit. The latter had, no doubt, taken place some time before death; the longitudinal fissure at the moment of decease.

Case of George the Second.—In George the Second, the aorta had undergone the first half of this process: the internal and middle coats of the aorta presented a transverse fissure, around which was a coagulum under the external coat; which would soon likewise have burst, perhaps longitudinally,—exactly as in this case of mine; and, had no rupture of the right ventricle occurred, as I formerly described [a], sudden death would ultimately have taken place, from the rupture of the aorta.[b]

Mode of Rupture.—In two instances, an aneurism of the pericardial aorta burst into the pulmonary artery. When the disease is situated in the arch of the aorta, the rupture may take place into the trachea, the œsophagus, the pericardium, or the pleura. The descending thoracic aorta usually bursts into the pleura, œsophagus, or posterior mediastinum, or even into the lungs. Aneurisms of the pectoral aorta most frequently burst into the left pleura. But aneurisms of the arch and descending aorta sometimes destroy life by compressing the organs of respiration or the œsophagus.

Symptoms.—When a certain size is attained by an aneurism of the ascending aorta, a tumour is usually formed at the fifth and sixth ribs of the right side: when at the anterior part of the arch, the tumour is at the third and fourth of the right side: when at the superior part of the arch, it is above the sternum and clavicles. The strongly pulsating character of the tumour shows its nature, even should the tumefaction subside considerably for a time; as happened, from repeated venesection, in three cases of this disease that I treated; and in one of which the tumour, at one time, actually pointed.

There is frequently cough, with mucous and bloody expectoration; dysphagia; dyspnœa, even orthopnœa; attacks of spasmodic suffocation; pain in the right shoulder, axilla, inner side of the arm in the course of the nerves (which may be tender), and up the right side of the neck and head. Pricking pains may be felt in the tumour.

Previously to the appearance of any tumour, there may be no sign of disease; or the signs which present themselves may be very uncertain: and persons continually perish of aneurismal rupture of the aorta, apparently in

[a] See Page 986.

[b] In the track of the aorta, we found a transverse fissure on its inner side, about an inch and a half long; through which some blood had recently passed under its external coat, and formed an elevated ecchymosis. This appearance showed the true state of an incipient aneurism of the aorta; and confirmed a doctrine which I had the honour to illustrate by an experiment, to the satisfaction of the society, in the year 1728; namely, that the external coat of the aorta may (and does) often control an impetuosity of the blood, capable of breaking the internal or ligamentous coat.—*Extract from a Paper read to the Royal Society; November* 26, 1761. *By Frank Nicholls, M.D., F.R.S., Physician to his Majesty.*

perfect health. Laennec declares the diagnosis to be difficult[a]; and confesses that he had frequently not suspected the disease when it existed, and suspected it when it did not exist.[a]

Violent pulsation of the carotids has created a suspicion of the disease; but may arise from mere excitement of the heart, hypertrophy of the left ventricle, dilatation of them, or from any obstruction to the course of the blood in other directions;—as in the descending aorta or the sub-clavians. Dulness of sound on percussion of the superior sternal portion of the chest, and to the right of that spot, as well as smallness and irregularity of pulse, arise from many causes. A bellows-sound or a thrilling sensation, given to the hand only or chiefly when applied *above* or to the right of the cardiac region, may justly give a strong suspicion of the disease. But neither the bellows-sound nor the thrill always occurs. In four cases out of seven that I have seen of the disease, as well as in cases of aneurism of other arteries, neither occurred.[b] Laennec never observed the thrill before the tumour had become visible externally.

Diagnosis.—Laennec, however, considers that the chief diagnostic sign of an aortic aneurism, is a strong and *single* pulsation; discernible by the ear in the region of the aneurism, synchronous with the pulse at the wrist, stronger and louder than the action of the ventricles, and unaccompanied by the sound of the auricles.[c] In three instances of aneurism of the aorta under the sternum, he was (according to Bertin[d]) mistaken: but would not have been, Bertin contends[d], had he applied the stethoscope over the sternum. Bertin asserts, that whenever an aneurism of the aorta exists, as well as of any other artery, a strong single sound may be perceived in it, distinguishable also from the beating of the heart by its greater intensity[e]: and he maintains, that if the stethoscope is applied *upon the sternum*, in aneurism of the substernal aorta, the disease may be recognised with facility before it is visible[f]; and that Laennec does not appear to have applied the instrument in this situation.[d] Bertin discovered the disease in two cases in which there was no tumour.[g] Aneurism of the descending aorta, he considers, may be recognised by the same phenomenon at the pectoral spine.[h]

The aneurismatic pulsations (Bertin adds) are so peculiar, intense and sharp, that they cannot be described; and a person who has once heard them can never mistake them.

[a] See his Treatise on Diseases of the Chest, translated by Dr. Forbes. Part 2; Book 2; Chapter 25; Section 3; Subdivision 3; Head "Signs." (Third Edition; Pages 689 to 692.)

[b] Laennec states, that a bellows-sound occurs frequently in aneurisms of the aorta and other arteries; but that, as it is not constant, and may be heard sometimes when no aneurism exists, it cannot be considered among the signs of aneurism.—("Treatise on Diseases of the Chest", translated by Dr. Forbes. Part 2; Book 2; Chapter 25; Section 3; Subdivision 3; Head "Signs"; Pages 690 and 691 of the Third Edition.)

[c] See Dr. Forbes's Translation of Laennec's Treatise. Part 2; Book 2; Chapter 25; Section 3; Subdivision 3; Head "Signs." (Third Edition; Pages 690 and 691.)

[d] See his Treatise on Diseases of the Heart. Book 1; Chapter 2; Article 2; Section 3. (Page 144 of the Paris Edition of 1824.)

[e] See his Treatise on Diseases of the Heart. Book 1; Chapter 2; Article 2; Section 3. (Pages 143, 144, and 146 of the Paris Edition of 1824.)

[f] See his Treatise on Diseases of the Heart. Book 1; Chapter 2; Article 2; Section 3. (Page 145 of the Paris Edition of 1824.)

[g] See his Treatise on Diseases of the Heart. Book 1; Chapter 2; Article 2; Section 3. (Pages 143 and 144 of the Paris Edition of 1824.)

[h] See his Treatise on Diseases of the Heart. Book 1; Chapter 2; Article 2; Section 3. (Pages 145 and 146 of the Paris Edition of 1824.)

I once discovered aneurism of the ascending aorta and of its arch, before any pulsating tumour appeared, by this strong pulsation to the right of the sternum and at its upper part, synchronous with the pulse, stronger and louder than the ventricular action of the heart. But then the aneurism was very large, though it formed no external tumour;—having extended chiefly backwards and to the right.[a] Yet neither in that case, nor in those in which a pulsating tumour existed, can I say the pulsations appeared peculiar. The pulsations, as heard, were double;—the sound of the aneurism was (of course) heard with the action of the ventricles, but the sound of the auricles was also distinctly heard in the region of the aneurism; and the frequent occurrence of this circumstance is mentioned by Laennec. The same was the fact in the cases with tumour, when the stethoscope was applied to the latter; although the impulse was of course single. In that case a bellows-sound was heard; and in it, and also in all the cases with tumour where the bellows-sound was heard, the sound was double;—occurring both at the moment of the pulse and afterwards; and that sound which was heard after the pulse, was much louder in the aneurism than in the heart.

I presume that a bellows-sound is heard *with* the pulse, if the mechanical state of parts produces any difficulty to the course of the blood, or if there is general dilatation of the vessel as well as aneurism; so that the blood is checked when flowing on into the narrower healthy portions. The second bellows-sound possibly arises from the elasticity of the parts impelling some of the blood from the dilated portion, after the action of the left ventricle.

Treatment.—In a case of this description, nothing can be done but to enjoin perfect rest, and deprive the patient of all stimuli;—giving him that nourishment which is least likely to quicken the pulse. Bleeding, from time to time, is exceedingly useful; as it relieves the sufferings of the patient very much. We know that, in aneurism, nature fortifies the part, by producing adhesions around it; but there is frequently more inflammation than is useful; and there are frequently pricking, stabbing pains, together with violence of the heart's action; and all these are diminished by bleeding. The blood is buffy and cupped, in such cases; because there is inflammation going on. It is of the greatest use to bleed from time to time; and to keep the patient low and quiet. These are not cases to be neglected. We may not be able to save life; but we may diminish the pain very much.

[a] I lately had a patient with enormous aneurism of the ascending aorta. It extended to the left, upwards, and backwards; so that its summit adhered to the highest ribs under the left scapula; and a pulsation, with a double sound, existed many months before death at the lower right anterior part of the chest; corresponding with the situation of the apex of the heart on the left. No aneurism, nor any thing but the healthy lungs, existed at the seat of pulsation: and this must have been produced by the reaction of the aneurism from the upper posterior left ribs, upon the lower anterior right part of the chest. No one suspected aneurism.

BOOK V.

DISEASES OF THE CHYLOPOIETIC VISCERA.

CHAPTER I.

DISEASES OF THE PERITONÆUM.

SECTION I.—PERITONITIS.

Symptoms.—The first disease of which I shall speak, after passing the diaphragm, is inflammation of the peritonæum ;—"peritonitis." It is, of course, attended by pyrexia,—general feverishness.[a] Although the whole body is hot, yet generally the abdomen is hotter than other parts. The pulse, for the most part, is rather small. It is quick, sometimes wiry, sometimes hard, and sometimes soft. There is no invariable pulse in peritonitis; except that it is always quick. More frequently it is small than full; and perhaps more frequently rather hard than soft. There is great variety as to the appearance of the tongue. Sometimes it is tolerably clean,—at the utmost only whitish; sometimes it is covered with a thick, creamy mucus; and sometimes it is rather dry. There is no very great index to the disease, either in the appearance of the tongue, or in the character of the pulse; but the abdomen is always very tender on pressure; and the tenderness is too general for one to suppose that any particular organ is inflamed. One of the modes of distinguishing peritonitis from inflammation of a particular organ, is by observing that the tenderness of the abdomen is not in the seat of any particular organ whatever; but is more or less general. As the peritonæum stretches all over the abdomen, and usually a great proportion of it is inflamed, the patient is most frequently easier on his back, than in any other position; and sometimes, to obtain all the ease possible, the patient lies with his knees spontaneously raised. In general, patients cannot sit up,—on account of the abdominal viscera gravitating so much as to produce painful distension; and therefore they are easiest in a lying posture. Besides the tenderness, there are very frequently pricking pains of the abdomen,—as if needles were running into different parts; and occasionally there is a sharp, cutting pain. The abdomen is usually very tense. As it is a mere membrane that is inflamed, the bowels are not in general particularly disturbed. They are regular, or at the utmost only slightly confined; and are easily opened. There is no obstinate constipation.

[a] See Pages 85 and 264.

Although the inflammation is usually very general, yet it may be more severe at one spot than at another. Consequently there is more pain at one part than at another; and if that part be situated over any particular organ, then the function of that organ is more or less disturbed. If, for example, at any particular period of the disease, the membrane covering the stomach be inflamed, vomiting is induced;—if it be the portion which partially covers the bladder, then there may be very great irritation of the urinary organs. In the former case we have vomiting; in the latter, strangury.

Diagnosis and Prognosis.—As the inflammation spreads, it attacks one part after another. It is the peritonæum at large that is inflamed; and therefore the tenderness is general, and the pain diffused; and any disturbance of function that exists in the abdominal viscera, is trifling in proportion to the general pain and uneasiness. It is in this way that we distinguish it from inflammation of any particular organ. This disease, when acute, may last about a week before it proves fatal; but if it remit, it may of course last much longer.

Morbid Appearances.—After death, the appearances found are nothing but those which are usual in inflammation of a serous membrane;—for example, a quantity of serum of a whey-colour, more or less turbid, with flakes of fibrin. It is rare to find the serum bloody. The fibrin is frequently effused in a gelatinous form, both in the parietal and visceral portions; and perhaps adhesions are thrown out, so that there are bands. Now and then the secretion resembles pus; and now and then it is *really* pus. As to the redness of the peritonæum, that may be either in little stars,—a collection of red points, or diffused in patches. The peritonæum, like most other serous membranes, becomes rather thicker than usual. It is not so translucent as in health; and, now and then, it is quite pulpy. When the peritonæum covering the alimentary canal is inflamed, the redness will sometimes spread inwards, even to the villous coat; but it is very rare to find inflammation of the parietal portion spread outwards, towards the abdominal muscles. When the portion covering any particular organ is inflamed, we may find the organ itself affected; as, for example, the omentum or the mesentery; so that we may have "omentitis", or "mesenteritis", or any other *itis* we may choose to manufacture out of the name of the organ, and the termination "*itis*" added to it.

Puerperal Peritonitis.—This disease very often occurs in a puerperal state; and by some it is thought occasionally to be contagious. It is called, when occurring in that state, "puerperal *fever*." Sometimes it will take place immediately after delivery; and sometimes many days afterwards,—whether the patient is sickly or not; and, on the other hand, it will sometimes take place during the latter period of pregnancy. Whether it be a contagious fever or not, it certainly is very often epidemic; and one might say "*en*demic"; for this disease (puerperal peritonitis) frequently prevails to a great extent at a particular period; and sometimes it prevails only in particular districts.

Causes.—Peritonitis is very frequently a cause of death in cancer of the womb, or various other diseases of the uterus, or of the ovaries. Whenever cancerous or other ulceration occurs in these parts, and exists for some time, the peritonæum around the ulceration comes to be inflamed; so that peritonitis is a common termination of organic diseases of these parts. Peritonitis sometimes occurs, also, after a rupture of the stomach or intestines, from ulceration. It sometimes takes place from a hernia;—either from the operation for it, or the hernia itself; from lithotomy; from "paracentesis abdominis";—from wound, or mechanical injury of any sort, inflicted on the

abdomen. It is frequently consequent upon the application of cold; and especially cold and moisture applied when the body is over-heated;—just the same as any other inflammation.[a]

Treatment.—The *treatment* of the disease is easy enough. It consists of general bleeding, followed by an abundance of *local* bleeding (by means of leeches), a rapid affection of the mouth by mercury, and keeping the bowels well purged the whole time. Cupping would produce great pain. Some prefer fomentations, and others blisters. Perhaps, it is not a matter of importance which we apply; but if we have bled as much as we dare, and still want to do more, then blisters will be the great point of treatment. Some have recommended the external application of cold to the abdomen, in such a case; but I have never employed it.

Treatment of the Puerperal Form.—In that form of the disease which occurs in connexion with pregnancy, or the puerperal state[b], it is found that a great variety of treatment is necessary. We may have cases where there is active inflammation, demanding a vigorous antiphlogistic treatment (such as I have now mentioned); whereas, in others, the very utmost that can be borne is the application of leeches. Patients are seized with more or less pain in the abdomen; but the pulse is feeble; and if we bleed them, they will certainly sink so much the sooner. All that can be done, therefore, is to apply a few leeches, give a moderate quantity of mercury, and exhibit opium freely. So slight is the inflammation, in some of these cases, and so great the loss of power, that after death the peritonæum is not found red, but rather pale; and it will have very soft lymph lying upon it;—shewing that there was an inflammatory state, but that it was attended with extreme weakness. Where the pulse is feeble, and the patient's countenance expressive of great debility, opium is far more suitable than bleeding; but if the tenderness seem to indicate bleeding, a few leeches will be all that is proper. In such a case as this, even purging has been found to be too severe a measure; but there can be no objection to a moderate quantity of mercury;—using such a preparation as will not produce an affection of the bowels (Hydrargyrum cum Creta, for instance). The application of warmth and moisture, will be found very serviceable. Dr. Gooch, who (as far as I can observe) has treated the subject well, strongly recommends the application of bran, moistened with hot water, and placed between two pieces of linen. A bran-poultice appears to afford very great relief.

The peritonæum, therefore, may occasionally be in an inflammatory state; attended with such extreme weakness, that the common remedies for inflammation can hardly be put in practice. This is somewhat analogous to what I mentioned respecting hydrocephalus;—that occasionally children have all the marks of that complaint, and yet no signs of inflammation are observed after death.[c] In the case before us, however, the membrane is inflamed; but the debility is out of all proportion to the inflammation. The treatment of peritonitis connected with the puerperal state, especially after delivery, requires to be much varied.

Chronic Peritonitis.—Inflammation of the peritonæum is very frequently a *chronic* affection; and in that case there is pain on pressure;—that is to say, there is tenderness, and likewise pricking pain. There is almost always a feeling of tension; and sometimes that is more complained of than the pain itself; but there is not necessarily any tension to be discovered; for sometimes the integuments are quite flexible. Of course

[a] See Page 122. [b] See Page 999. [c] See Page 551.

there is pyrexia. The pulse is constantly quick; there is more or less thirst; the skin is generally more or less dry; the tongue is foul, and either white or yellow towards the back. The breath, in this disease, is very frequently fetid; the face sometimes assumes a doughy aspect; the bowels generally are torpid; and frequently there is ascites, from the chronic inflammation of the membrane causing an excessive secretion. As the inflammation is of a chronic character, of course the body wastes. The internal functions are very much deranged. The stools are very copious, and generally of a white-brownish colour;—not being so fully impregnated with bile as they should be; and the mesenteric glands are frequently diseased. In fact, when chronic peritonitis occurs in young persons, it is for the most part a scrofulous disease; and is connected with more or less affection of the mesenteric glands. After death, we find excessive redness and thickness of the membrane; and an effusion of serum and fibrin.

Treatment.—The *treatment* of the disease consists in the frequent application of leeches; the frequent use of the warm-bath, general or partial; warm applications,—such as the bran-poultice I mentioned [a], applied constantly day and night; or (as some have recommended) *cold* applications, frequent blisters, and a regular purging with calomel. The contents of the intestines are very abundant. The diet should be mild. After the disease has lasted some time, if there be no very great excitement, we may try mild tonics;—the mildest form of iron, for instance; but during the greater period of the disease, antiphlogistic measures, mildly carried on, constitute a preferable mode of treatment.

SECTION II.—ENLARGEMENT OF THE MESENTERIC GLANDS.

If, along with chronic peritonitis, the mesenteric glands are enlarged,—or if, indeed, they are enlarged *without* that affection,—we may, or may not, have a tumour. The mesenteric glands are frequently much diseased, without producing a tumour; yet they are sometimes so diseased, that there is a general hardening of the abdomen. When peritonitis exists, in the greater number of cases we can only infer disease of the mesenteric glands from the scrofulous look of the patient, from his wasting away, and from there being something more than what chronic inflammation of the peritonæum can produce. When there is tumefaction from disease of the mesenteric glands, frequently a great deal of it is from flatulence; so that if we strike with the fingers, we have a very considerable sound. Sometimes tubercular matter is deposited in the peritonæum itself; so that, besides chronic peritonitis, we have scrofula of the peritonæum. It is by no means easy to make out the exact nature of such a case as this. It is pretty clear that there is peritonitis, and that there is likewise scrofula; but whether there are tumours or not, or whether the disease affects the mesenteric glands, or the peritonæum itself, is not always an easy matter to decide; nor is it of any consequence.

Symptoms.—Occasionally the mesenteric glands acquire a very large size; and, before that, there is a great sense of dragging in some particular direction. In those cases which are very bad, and where there is scrofula in the abdomen at the same time, there is great emaciation, together with

[a] See Page 1000.

sallowness of the complexion,—sometimes a sort of marble-white; and a hectic flush on the cheek,—at any rate, at certain parts of the day. The eyes look clear and glazed. Occasionally, in the course of the day, there is deep lancinating pain in some parts of the abdomen. The stools are generally abundant;—foul, frothy, and imperfectly tinged with bile. Occasionally there is great disturbance of the stomach; so that patients complain of a burning sensation in that organ. The lips frequently swell; are of a deep red colour; and crack, from ulceration in the corners. There is also feverishness. Although the pulse is constantly quick, yet there are exacerbations. When the patient does not sweat on falling asleep, the skin is frequently quite dry. The emaciation, in these cases, is often extreme; and the ends of the fingers become enlarged;—exactly as in phthisis.

These are the general symptoms of scrofula of the mesenteric glands, and of peritonitis. The symptoms are always much more severe, and the emaciation is greater, than in simple inflammation of the peritonæum; but still it is often difficult to say whether the latter affection exists alone, or whether the two complaints are united. It is only by finding that the disease will not give way to common antiphlogistic measures, that we begin to suspect, at last, that there must be something more than inflammation of the peritonæum. Occasionally it is not so much the *mesenteric*, as the *lymphatic* glands that are diseased;—particularly the glands of the loins.

Most Frequent in Children.—All these affections occur more frequently in children, than in adults; but occasionally they occur in the latter.

Effects of Mesenteric Disease.—If the mass of tubercular substance be very great, it may produce peculiar effects, by its pressure on various parts. From pressure on the ureters, we may have more or less suppression of urine; by pressure on the gall-ducts, we may have jaundice; and by pressure on the pylorus, we may have vomiting. Some have supposed, that when the mesenteric glands are enlarged, the emaciation is the consequence of the chyle being interrupted in its course; but even if the chyle be not obstructed, the scrofulous disease is sufficient to account for the wasting of the body. In fact, some experimenters say, that they have always found an injection pass freely through the absorbent glands; although they were enlarged in various degrees. Many have asserted this.

Morbid Appearances.—The havoc which is found in these cases, is sometimes dreadful. The whole of the intestines may be glued together. Sometimes there is ulceration of the peritonæum itself;—the intestines within being sound. Occasionally the ulceration makes the peritonæum quite thin. It even ulcerates through; and then we find ulceration of the intestines, and chronic inflammation of the mucous membrane of the intestines, and of the lacteal glands. Frequently the lumbar and dorsal glands, are all in a state of enlargement and suppuration; so that there is extreme suffering, and the most decided hectic before death; and, after it, we certainly have the most frightful spectacle that can be seen in morbid anatomy. This is entirely a scrofulous affection.

Treatment.—When the disease does not give way to ordinary treatment,—to the application of moisture, warmth, and steady purging; or moderate purging, local bleeding, and similar remedies, we may suspect there is something more than chronic inflammation of the peritonæum; and, on meeting with such a case as this, it may be right to exhibit iodine in its various forms; and if we can discover a tumour in any part, or any general hardness of the abdomen,—so as to make it probable that the mesenteric glands are enlarged,—it may be given from the first. We

should also rub in iodine, in the form of hydriodate of potass, if the patient can bear it; but there is frequently too much pain for it to be borne at all. The hydriodate of potass will often be borne, when the iodine itself cannot. But these are very unsatisfactory cases to treat; and frequently all that we can do, is to send people from the unhealthy situation in which they may reside, to the fresh air.

SECTION III.—ASCITES.

Sometimes, although the chronic inflammation of the peritonæum is very inconsiderable, yet the effusion is exceedingly great. Sometimes, indeed, there is scarcely any mark of inflammation to be found; but we have a structural change of the peritonæum, and a great deposition of water. The peritonæum becomes thick, and assumes a satin-whiteness. In fact, it looks like a piece of satin-ribbon; so that it may be doubted whether this state is inflammation; but it is of an inflammatory nature. When this effusion is very considerable, we call the disease "ascites" (from ασκος, *a large abdomen*).

Causes.—When ascites is not the result of acute or decided inflammation, we find (in most cases) that there are marks of structural change; and some ascribe it to disease of the liver;—so frequently is that organ affected at the same time. Where, however, the peritonæum is diseased, the portion covering the liver is very thick, quite white, and opaque; and I believe that ascites does not arise from disease of the liver, but from a structural change in the peritonæum itself. Some ascribe it to an obstruction in the liver or spleen. An obstruction may exist in those organs; but if the ascites arise from that source, it is very odd that we do not find a varicose state of all the veins, effusion into the intestines, and changes of that description. I have seldom opened a case of ascites, in which the liver was not diseased, in some part or other.

Symptoms.—Dropsy of the peritonæum is characterized by a fluctuating and elastic equable tumefaction of the abdomen. At first it only inconveniences the patient when he is sitting upright, and fluctuation is discovered only at a certain point; but, as the disease extends, the tumefaction becomes universal. The best mode of discovering the fluctuation, is to place the hand against one part of the abdomen, and then to give a gentle tap with the fingers on another. Occasionally the integuments, or the peritonæum, are very much thickened; and it is then necessary to give a good *sharp* tap; but, for the most part, a very *gentle* tap will lead us to feel the fluctuation. Sometimes the fluctuation does not exist throughout; and occasionally the peritonæum differs in thickness at various parts; so that it is necessary to tap from above downwards, and in various ways. There is in general, as in most other dropsies, very little urine; but however much the abdomen may be distended, there is generally little dyspnœa, so long as the chest remains free. So long as there is not disease of the heart, or pleuritis, or bronchitis, it is surprising how well patients will breathe with a very large abdomen. The tumefaction begins, of course, in the lowest part; and gradually ascends, till the whole abdomen is distended.

Progress of the Disease.—This affection, after a time, is followed by œdema of the legs; but sometimes the latter takes place first; and the ascites is nothing more than the result of a general tendency of the cellular membrane of the body, and serous membranes, to secrete fluid. But where

there is not this general disposition to dropsy, and its occurrence in the abdomen is a local disease, swelling of the legs frequently does not take place for a considerable time. Shakspere describes Falstaff as having a *decrease* of the *legs*, and an *increase* of the *belly*.[a]

Prognosis.—If the disease be the mere effect of acute inflammation, subdue that, and the dropsy will cease; but when it does not arise from that source, or is not the result of any discoverable inflammation, the prognosis is generally bad; and more especially if we can discover disease of any of the abdominal viscera.

Characters of the Fluid.—The fluid that is found after death, or which we let out, is generally yellow and glutinous; and the longer the disease lasts, and the more frequently the patient is attacked, the darker it generally becomes, and the worse becomes the case itself; because the peritonæum falls more or less into disease, and perhaps becomes quite soft.

Treatment.—The *treatment* of the disease must depend, in the first place, on the fact of there being any inflammation or not. If we discover inflammation, generally speaking, we have merely to treat that; but if there is no inflammation, but simply a swelling of the abdomen, we may frequently get rid of it by purging the patient briskly with elaterium, or any other hydragogue purgative;—such as jalap or cream of tartar.

Elaterium.—Elaterium is better than any other purgative[b]; and patients will take it for a considerable time, every day, or every other day. It is necessary, however, to begin the dose very carefully; for one person will not bear above a quarter of a grain, whereas I have given others five or six grains. Much depends upon the preparation; for nothing is more adulterated than elaterium. Some houses prepare it very carefully, and some very badly; but when we have a tolerably good preparation, we should give a quarter of a grain, and ascertain how far the person to whom it is given can bear it. If we give a grain at first, it may produce such violent vomiting and purging, as to cause great distress. Some patients will bear the dose increased to five grains; but generally the average quantity is from half a grain to a grain and a half. While exhibiting this every day, or every other day, it will be good practice to support the patient with wine; so that while we drain him well, we make him some sort of amends for it. It is astonishing, how much fluid may be got away; and while there is no rule for the dose, yet the object is to discharge as much liquid from the alimentary canal as possible,—according to the patient's strength.

Iodine and Mercury.—Purgatives are certainly among the best means we can employ. Neither leeches nor blisters do much good. If there is organic disease of any sort, we may give mercury, iodine, and remedies of that description; but frequently, with all these, we do not succeed; and are obliged to tap the patient. I do not know that there is any harm in tapping early. On the contrary, it may be of great use in preventing the parts from becoming so stretched, that they will not contract again. Others have thought the same; but I have not a series of cases treated on each plan. It is a fact with respect to dropsy of the ovaries, that the more we tap, the more harm we do. The sooner we tap the patient, the sooner must she be tapped again. In ovarian dropsy, the greater the length of

[a] *Sir John Falstaff.* You that are old, consider not the capacities of us that are young.

Lord Chief Justice. Do you set down your name in the scroll of youth, that are written down "old", with all the characters of age? Have you not a moist eye, a dry hand, a yellow cheek, a white beard, a *decreasing leg*, an *increasing belly*?

"*King Henry the Fourth*"; *Act* 1; *Scene* 2.

[b] See Page 190.

ime we can postpone the operation, the longer we may still put it off; but his is not the case in dropsy of the peritonæum.

Diuretics.—If we choose to treat the disease with diuretics,—which is requently a good practice,—squills, digitalis, and mercury, answer exeedingly well. This is not so certain a practice as treating the case by ydragogues, which are also diuretics; for if we adopt it, we frequently nd that the kidneys will not act; and yet, on tapping the patient, they ill act directly. It is common, when the abdomen is in a state of great istension, for the kidneys to refuse to secrete; but if we take off the nsion, the patient will make a great quantity of water. We may observe is, whether patients are taking diuretics or not. It is always a useful ian, when the water is diminishing, to have the abdomen well bandaged; r to have a thin belt, producing equal pressure throughout; which is aparently of very great use.

Precautions in Tapping.—As to the mode of operating, and the part to e selected for the purpose, I need not say any thing on that subject. It ould be well, however, before proposing the operation to a surgeon, carelly to ascertain whether the disease exists;—to ascertain, not merely that ere is fluctuation, but fluctuation from a collection of water in the periœum; because the urinary bladder will occasionally become enormously istended. I have seen it so distended, that the person has been supposed have ascites; but on drawing off the urine, the ascites entirely disapeared. This disease sometimes coexists with pregnancy; and pregnant omen have been tapped for ascites with success. Sometimes it will coxist with a diseased ovary. I have known instances where the ovary was s large as a child's head; and where, in addition to that, there was ascites ll around it.

Tympanites.—Occasionally air is collected in the peritonæum; and this one of the diseases called "tympanites." Sometimes the intestines are xceedingly distended with air; so that the person becomes very large, and ne tumour gives rise to a sound like a drum; whence its name (from τυμπανον, *a drum*). But, properly speaking, tympanites is a great collection of r in the peritonæum; and I believe this usually takes place from an aperure existing in the intestines;—so that air escapes.

ECTION IV.—ORGANIC DISEASES OF THE PERITONÆUM.

The peritonæum is subject to some other diseases;—such as to become rtilaginous, or even bony; and to have hydatids, or scirrhus, or fatty mours deposited in it. The same remark applies to the omentum.

Diseases of the Abdominal Glands.—The lymphatic glands within the bdomen, besides being subject to the disease I have mentioned (scrofula) [a], re sometimes found after death to have become indurated,—almost changed cartilage; and to have suppurated, independently of all scrofula;—to ave pus collected in them, in small quantities, or in drops. These glands re also subject to melanosis, to scirrhus, and to the formation of earthy oncretions; and so likewise are the *mesenteric* glands; but we cannot ake out the real nature of the affection, till after death. When the inner rface of the intestines is much diseased, we are almost sure to find the esenteric glands also affected. When there is scirrhus, or cancer of the testines, all the neighbouring glands, lacteals, and absorbents, are com-

[a] See Page 1001.

monly enlarged, and labouring under the same disease. But we cannot discover this during life; unless, by chance, some particular tumour is produced.

Cysts in the Abdomen.—The peritonæum (or, at least, the sub-peritonæal cellular membrane) is likewise subject to the formation of cysts. Occasionally cysts are found in other organs,—projecting into the peritonæum. Sometimes the ovaries will become dropsical;—cysts being formed in them. Occasionally large cysts are attached to the concave surface of the liver,—sometimes to the centre, and in other instances to the side. Besides general dropsy of the peritonæum, therefore, we frequently have large serous cysts. In these cases the tumour is not general, but local;—does not occur at the lower part particularly, but may take place anywhere in the abdominal region. It usually occurs at one side, in the first instance, and arises from one of the ovaria. The fluctuation is local. Though the tumour most frequently arises from the ovaria, yet I have seen a large cyst at the epigastrium, attached to the liver. Now and then there are small cysts attached to the spleen; and, at last, the tumour will become so excessively large, that it is impossible to say whether there is ascites or not. The whole peritonæum will become filled. So again, with respect to the ovaries, we may not be able to say whether there is ovarian dropsy or not.

Quantity of Fluid in Ovarian Dropsy.—It is surprising to see how much water is sometimes collected, in cases of ovarian dropsy. I once saw an old woman, who had had the disease many years, and never would be tapped. At last, a certain quantity of water was let out; and we found that it amounted to eighty-four pints. The diaphragm had been pushed up to the fourth rib; the chest was exceedingly small; but the size of the abdomen was immense. That, however, was nothing to what other people have seen. M. Chevalier says, that he once saw one hundred and thirty-six pints removed;—all of which must have existed at once. The case is mentioned in the third volume of the "Medico-Chirurgical Transactions."[a] It was drawn off at three or four times. The health, in these instances, is not affected, as it is in dropsy of the peritonæum; so that a woman at Paris lived to be tapped three hundred times. Another woman was tapped one hundred and fifty-four times. In the course of that period she had three children; and was tapped two or three times during each pregnancy; so that she lost no time, but went on bearing children and water too. At least twenty pints were removed at each time; and she was tapped, at various periods, during twenty years. There is another case recorded, where six thousand six hundred and thirty-one pints were taken away. It was not all removed at once; but was drawn off at eighty operations, performed in the course of twenty-five years;—so long do women sometimes live in this affection. I suppose they kept a very accurate account. In one year this woman had four hundred and ninety-five pints taken away. The case is mentioned by Dr. Mortimer, in the "Philosophical Transactions." There is an account, by a celebrated French surgeon, of a case where four hundred and twenty-seven pints were taken away in ten months. A case is mentioned by Mr. Carruthers, in his work on inflammation, where a woman was tapped nineteen times in three years. A German author mentions an instance, where a person was tapped one hundred and forty-three times. A few years ago, an advertisement appeared of a woman who wished people to go and see her (and pay for it, I presume); and who stated that she had been tapped one hundred and twelve times, and had had two thousand eight

[a] Page 40.

undred and eighty-eight pints taken away from her. She came from hepstow. I had not time to see her; but she had the certificate of a me-cal man;—stating that he had performed one hundred and twelve opera-ons, and had removed two thousand eight hundred and eighty-eight pints. Whether the case is true or not, is of little consequence; because, without oubt, great quantities have been taken away. It is no matter whether ex-tly six thousand six hundred and thirty-one pints were drawn off,—as entioned in one of the foregoing cases. Five thousand will do very well illustrate the fact, that people in this disease will live very long, suffer an mense secretion of water, and bear the operation of tapping an extraor-nary number of times.

Characters of the Fluid.—The fluid, in ovarian dropsy, is often exceed-gly greasy; so that a quantity of iridescent, or at least whitish shining atter is seen on the surface; and, if rubbed in the fingers, will form an ctuous mass. I have collected it; and found that it would melt and rn, like any waxy matter. It emits a bright flame, and is insoluble in ater. Dr. Bostock mentions, in the fifteenth volume of the "Medico-hirurgical Transactions"[a], that in a case of very old hydrocele, he found e serum mixed with a portion of this unctuous substance. He conceives to result from a change which the fluid has undergone, subsequently to its iginal deposition. In order, however, for that to have taken place, it ust have been of very long standing. He found it to be analogous to that easy matter which is called "adipocire." He terms it "albumino-serous atter"; and says it is distinct from cholesterine. It is not the same as at which is found in the liver, the urine, and certain biliary calculi; ough it is of an analogous nature. Something like this has sometimes en found in the thyroid gland, and in the fluid of various tumours.

Tapping in Ovarian Dropsy.—In dropsy of the ovarium, I should cer-nly make it a rule to defer the operation of tapping as long as possible: st, for the reason I mentioned before[b];—that it is a fact, (and also a mmon opinion among the vulgar,) that when we have once tapped a pa-nt, she soon requires to be tapped again; and, secondly, because, although an early period of the disease there may be many cysts, yet in general y ultimately open into each other; so that we have only one great ca-y. Hence, in tapping early, we most probably draw off only a portion the fluid by the operation;—the cysts being distinct, and not freely in mmunication with each other.

Iodine and Mercury.—In these cases, the only remedies that (so far as I aware) are of any use, are iodine, and sometimes mercury. Indeed, best practice, in cases of encysted dropsy of the ovaria, is to support patient's strength; to put off tapping as long as possible; and to give medicine whatever, except it be iodine. It is in vain to attempt to ex-absorption by diuretics; and by purging we only nauseate the stomach, l take away the appetite. I have seen cases of encysted dropsy of other ts of the abdomen yield, apparently, to the free exhibition of iodine in-nally, and its application externally; and I have seen it succeed partially dropsy of the ovarium. I have fancied that the power of this remedy been increased, in a trifling degree, by combining it with mercury.

Very often, when an ovarium is enlarged, there is no fluctuation to be nd for a long time. The walls are solid;—solid substance is deposited; l it is not till the fluid has accumulated to a considerable extent, that can discover fluctuation. Encysted tumours of the abdomen, especially

[a] See Page 154. [b] See Page 1004.

in young women, are partly solid and partly fluid; and occasionally, on squeezing the part, we find small moveable tumours, having portions of cartilage sometimes deposited in them. In some cases, they contain hydatids. I had a case, in 1828, in which there was a tumour of this description; and which I concluded was a tumour of the ovarium. Fluctuation was not very apparent; but still there was fluctuation. I was giving this patient considerable doses of calomel,—on account of there being a large quantity of solid substance, apparently of very great hardness,—when she was seized with violent vomiting and purging, accompanied by intense pain. Whether the vomiting and purging arose from the calomel, I will not say; but she had been taking it for some little time; for I fancied there might be solid matter, as well as a collection of fluid. In the course of one night, the tumour entirely disappeared; after having resisted every other means for some months. It might be that the tumour, in this case, had burst into the peritonæum; and that the fluid had been quickly sucked up by the absorbents of the peritonæum, and as quickly secreted by the vessels of the kidney. Or it might be, that violent purging being set up, a great discharge took place from the intestines; and the absorbents went to work, and reduced the tumour. However that may have been, the fluid re-accumulated; and the tumour became as large as ever;—and that after no very great lapse of time. One would hardly suppose, that the absorbents within the tumour were sufficient to produce such rapid absorption. It is more likely that the tumour had burst at some part. We are told, that occasionally the fluid has been discharged by the vagina;—that tumours of this kind have ruptured into the peritonæum;—that the fimbriated extremities of the fallopian tubes have set to work, and have poured the fluid into the uterus; and that thus it has been discharged through the vagina. There are several cases on record, of women falling down with ovarian dropsy; and beginning, very soon, to discharge a quantity of water from the vagina; which discharge has continued till the swelling has disappeared. It is sometimes difficult, in these cases, to know whether the water comes from the vagina or the urethra. If it come from the former, we must suppose that the tumour has ruptured, and that the fallopian tubes have pumped up the fluid; whereas, if it come from the latter, we must suppose that the vessels of the peritonæum have sucked it up, and that it has then been re-secreted by the kidneys.

Dropsy of the Fallopian Tubes.—Occasionally we may have what perhaps may be, and sometimes is, called "encysted dropsy of the abdomen";—arising from a fallopian tube being closed at each end, and a great quantity of fluid being accumulated within.

CHAPTER II.

DISEASES OF THE PANCREAS.

Affections to which it is Liable.—The diseases of the pancreas with which we have to do, are all structural. We do not know whether there is any *functional* disease to which it is liable; unless it be the formation of stone. We do not know what office the pancreas performs, either when it is *out* of order, or when it is *in* order. We know nothing about it. No one would refer a symptom that he has, to mere functional disease of the pancreas. It is very seldom that it is the subject of *acute* inflammation. I never met with such a case. But now and then it is diseased in a *chronic* manner; especially when there is disease of a neighbouring organ.

The most common affection of this organ, is either common induration, or that particular disease called "scirrhus." Dr. Baillie says that he once saw an abscess in it[a]; and, now and then, common ulceration is seen. It is said to be sometimes ossified; and sometimes to have hydatids. Sometimes it is wasted, and sometimes it is very large; but, for the most part, this organ is not found diseased in dead bodies; and whenever it is, I believe the disease has evidently been of a chronic form.

Diagnosis.—The diagnosis of structural disease of the pancreas, must be exceedingly difficult. Dr. Pemberton, in his work on Diseases of the Abdominal Viscera[b], says there is deep-seated pain in the epigastric region; especially if one hand be placed at the back, and the other on the stomach. However, the pain may not be felt; or we may have pain there from an affection of the stomach;—so that very little, I conceive, is to be learned from that. He says there is more or less sickness, gastrodynia, and emaciation; but I should think that, in general, it must be a mere guess,—even if the person is right,—when he pronounces that the patient is labouring under disease of the pancreas.

Pancreatic Calculi.—Now and then a calculus exists in the pancreatic ducts. I opened a patient, not long ago; and was surprised to find calculi in the pancreatic duct. I forget what was the matter with him. The appearance was exactly the same as that given in one of Dr. Baillie's engravings. We know that the duct of the pancreas runs the whole length of the organ; that it is fine at one end, and large at the other; and that the ramifications of it, altogether, look like a feather. I believe these calculi are always homogeneous; and there must have been at least a hundred in the case that I opened. The duct represented in Dr. Baillie's engraving, had attained an enormous size. Pancreatic calculi were analyzed by Dr. Wollaston; and were found to consist of carbonate of lime in the human subject, and phosphate of lime in the ox. But these topics are more the subject of Morbid Anatomy, than of the Practice of Medicine.

[a] "Morbid Anatomy"; Chapter 12; Section 1.

[b] "Practical Treatise on Various Diseases of the Abdominal Viscera. By Christopher Robert Pemberton, M.D." Chapter 4. (Third Edition; Page 63.)

CHAPTER III.

DISEASES OF THE SPLEEN.

The next disease of which I will speak, is an affection of the spleen. We know nothing of disordered *function* of the spleen, any more than of disordered function of the *pancreas*; but structural diseases of the organ, and inflammation of it, are sometimes exceedingly evident. Like the pancreas, it is very rarely affected with *acute* inflammation, or with suppuration. Now and then, in peritonitis, that portion of the membrane covering the spleen is inflamed; but the substance of the spleen is seldom affected in that way.

Chronic Splenitis.—When it is the subject of *chronic* inflammation, there is pain in the region of the spleen;—pain far back on the left side, higher than the kidney; but there are no symptoms of chronic inflammation of the kidney;—such as a retraction of the testicle, pain down the thigh, pain in the testicle, and an unnatural desire to make water. There is an absence of the symptoms of inflammation of the kidney.

Hypertrophy of the Spleen.—It is not uncommon to see the spleen enlarged after ague. I formerly stated[a] that this disease is called "ague-cake" by the common people; but technically it is termed "hypertrophy of the spleen." When it is in this state it is generally harder than natural. The size that the spleen will attain is very considerable. I have seen it reaching the pelvis; and extending from the navel towards the other side. We may easily distinguish between an enlargement of this organ, and an enlargement of the liver, by this circumstance;—that, on applying the fingers, we find the edge is vertical; whereas, in enlargement of the liver, the edge of the tumour is horizontal. The hypertrophied spleen has sometimes weighed twelve pounds. Hoffmann mentions finding one that weighed fifteen pounds; and Morgagni, on second-hand information, mentions a case where the tumour weighed thirty-five pounds.

Causes.—This disease will occur in children, and I have frequently seen it in infants. It generally arises after ague, or after the patient has been exposed to malaria. I met with a singular instance of this enlargement, some years ago. A woman had two children; and she herself had had ague, but they never had. I rather think she had lived in an aguish part of the country, before the children were born. One of them had enlargement and induration of the spleen, and died. After a time, the same disease began in another child; and I believe it is going on now. I have no doubt but that it will kill it. On opening the body of the first, we found the spleen enlarged, and very hard; but, in other respects, the structure appeared healthy. There was no unnatural appearance in it.

Constitutional Effects.—Patients, in this disease, are generally very pale. The blood is not proper in *quality*, if it be in *quantity*;—it is deficient in fibrin, and likewise in red particles. The wasting of the body is not in

[a] See Page 272.

proportion to the paleness. The patient's bulk remains pretty good, for a long time; although he will become blanched,—in a state of anæmia. Now and then there is a little ascites. The peritonæum covering the spleen becomes affected, like the rest of the membrane; and produces a larger secretion than before. The diagnosis is very easy, long before the spleen has attained to a large size.

Treatment of Hypertrophy.—With regard to the *treatment*, it would be merely that for any chronic inflammation, or induration. I believe that, if the tumour attains any very great size, nothing can be done; but I have diminished it by the administration of iodine, externally and internally. I have successfully treated many cases in this way; but I have seen others in which treatment of this description failed. If there be pain on pressure, local bleeding, mercury, and the common remedies for inflammation, will be proper. Where the disease has arisen from malaria, it would certainly be well to give the sulphate of quinine; for I have seen improvement take place where the constitution has suffered from malaria; and I have also seen enlargement of the liver much diminished, and give way, with very little other trouble. If, therefore, there had been any exposure to malaria, I should give the remedies for ague; but iodine has frequently, I know, a considerable effect in diminishing diseases of this description. Sometimes there is no pain whatever; and there, of course, we should not think of applying leeches, or bleeding the patient. But if there be pain on pressure, local bleeding ought to be resorted to, in proportion to the general affection.

Induration and Softening of the Spleen.—Sometimes, without any enlargement, we find the spleen exceedingly *hard*,—cutting exactly like liver; and sometimes, on the other hand, it will become exceedingly *soft*. Very often where, during life, we could discover no particular ailment referrible to the abdomen, the spleen is soft. If it be not preternaturally hardened, we may, by working it up in our hand, bring it to the consistence of currant-jam; but in various diseases we find that the spleen, on being cut, is soft.

Congestion of the Spleen.—The spleen suffers a great accumulation of blood, when there is any obstruction in the organs of respiration. It is supposed by some, that the size of the spleen may depend very much upon the mode in which patients die. If they die after long-continued dyspnœa, we may find the spleen large; although, during life, it was not so enlarged.

Tubercles of the Spleen.—Tubercles, of various kinds, are found in the spleen; and I met with a singular instance of a large number of vessels in the spleen in a state of ossification.

Pancreatic Calculi, &c.—Calculi have been found in the spleen; but diseases of this organ are not very apparent, unless the organ itself becomes enlarged. It is said that people can do as well *without* this organ, as *with* it; and, since the time of Galen, persons have amused themselves with cutting out the spleens of the lower animals; and have said that they perceived no difference afterwards. It is said that the spleen, as well as the pancreas, has been absent congenitally; but such things must be exceedingly rare.

CHAPTER IV.

DISEASES OF THE LIVER.

SECTION I. HEPATITIS.

We will now proceed to consider the diseases of an organ far more important than the pancreas or spleen;—namely, the liver. It is very subject both to acute and to chronic inflammation.

Symptoms of Acute Hepatitis.—When the liver labours under *acute* inflammation to any considerable amount, the symptoms are pyrexia and constant pain, chiefly in the right hypochondrium. The greater part of the liver is on the right side; and therefore we have the pain chiefly there. There is likewise a sense of tension, or weight. It is said, that if the *surface* of the liver suffer, there is mere tension; whereas, if the *substance* be affected, then a weight is experienced; or if it be the peritonæal coat which is inflamed, then we have a greater degree of pain on pressure, and pain of a sharp character. The pulse is said to vary accordingly as we have inflammation of the peritonæal coat, or inflammation of the substance; but we cannot depend much upon that. We have different kinds of pulses, in various circumstances. The pain extends up to the scapula, goes through to the back, and very frequently to the right shoulder. The patient lies best on the *right* side; because, if he lie on the *left*, the whole mass of the liver (situated as it is chiefly on the *right* side) drags towards the *left*, and all the parts are put on the stretch. We find, in disease of the *heart*, that he lies best on the right side; and this is also the case in disease of the *liver*; but the situation of the uneasiness makes the difference between the two diseases very remarkable. There is difficulty of breathing, and an affection of the chest, in disease of the liver; but not so great as in disease of the *heart*. The difficulty of breathing arises from the motion of the liver, in respiration, in accordance with the ascent and descent of the diaphragm. There is likewise, from the proximity of the liver to the diaphragm, a dry cough; and if we have any doubt about the situation of the pain,—whether it is just on one side the diaphragm, or on the other,—we have only to apply the stethoscope. If it be disease of the *liver*, there is no alteration of the sounds; whereas, in an affection of the *chest*, we find the various signs which I mentioned before.[a] From the proximity of the liver to the stomach, there is very frequently nausea and vomiting. Very often there is a little jaundice; and sometimes *complete* jaundice.

Termination in Suppuration.—This acute inflammation frequently terminates in resolution; and sometimes in suppuration. The latter circumstance is rare in this country; but in hot climates it is very common. Occasionally,—as I mentioned when speaking of suppuration of the brain[b],—the pus is secreted in small drops throughout the organ; but in other

[a] See Pages 799 to 809.

[b] See Page 531.

cases it forms one immense abscess; and sometimes both circumstances occur. The quantity of matter which will be collected in this way, is sometimes enormous. There are various ways by which nature gets rid of this pus. Occasionally an adhesion forms between the two parts of the peritonæum,—the loose and the visceral; and the matter points externally. Sometimes an adhesion takes place to the stomach, sometimes to the intestines; and I think the matter more frequently finds an outlet in that way, than in any other. Sometimes nature does not succeed in forming adhesions; and then the matter is poured into the peritonæum. Now and then an occurrence takes place less favourable than the discharge of the pus, into the stomach and intestines;—adhesions take place to the diaphragm; and the matter is discharged through the air-passages. We have cases on record, in which the pus has discharged itself into the gall-bladder; and cases still more rare, in which it has presented itself, not at the *front*, or at the *side*, but at the *back*. Cases of this description have been mistaken for lumbar abscess. Occasionally the matter has been discharged with the urine; and there is one case upon record, in which an abscess emptied itself into the "vena cava"; and death was the consequence. Sometimes the abscess does not discharge itself at all, but there it remains; and patients have died with a large abscess in the liver;—the existence of which was not known before. If the matter be disposed to discharge itself externally, it is evident enough; if it discharge itself into the stomach, we have vomiting of matter; if into the intestines, we have a quantity of matter in the stools; and if it discharge itself by the air-passages, you have cough, and many of the other signs of phthisis.

Terminates in Chronic Hepatitis.—But more frequently than otherwise, perhaps, the *acute* disease subsides into the *chronic* form. If the inflammation be situated on the surface, we shall have great chronic inflammation;—there will be great pain, especially on pressure, and (in all probability) ascites,—from the peritonæum being affected. If the substance only is diseased and the peritonæum escapes, we have merely a dull heavy pain there; and very frequently no ascites at all. Of course chronic inflammation of the *substance*, and of the *surface* of the liver may be conjoined;—the same as in the acute form; and the former, as well as the latter, will produce an abscess, and be followed by all the structural diseases to which the part is subject.

Common in Fevers of Hot Climates.—The *acute* form of the disease is very common in all the fevers of hot climates; and hepatitis is continually united with all other inflammations of the abdomen;—with enteritis, peritonitis, gastritis, and all the other inflammations of that region. The *chronic* form is very often united with dysentery. It is very common for a person to have chronic *dysentery*, and chronic *hepatitis* at the same time.

Causes.—The *causes* of hepatitis, whether acute or chronic, are the common causes of inflammation;—getting wet, exposure to cold, and other similar occurrences. It appears to be much predisposed to by continued heat; the disease, at least, is very common in hot climates. It is said that long-continued heat alone induces pure hepatitis; whereas, if the long-continued heat be united with the cause of fever,—such as malaria and other things,—then we have a combination of hepatitis with various fevers.

Diagnosis.—As to the *diagnosis*, the disease is easily distinguished from inflammation of the chest, in the way I have mentioned;—by the absence of all auscultatory signs; by the situation of the pain; and by there being nausea and vomiting. It is distinguished from gastritis by the situation of

the pain, which is much to the right side; while, in gastritis, it is in the epigastrium, and more to the *left* side,—from the stomach being to the left of the epigastrium. We may have symptoms at the epigastrium in hepatitis; but we have also considerable pain on the right side. It is distinguished from peritonitis by the local nature of the pain; for, in peritonitis, there is inflammation at other parts of the abdomen.

Morbid Appearances.—On examining the liver after it has been in a state of common inflammation, we find that it is the convex portion of the liver that is generally inflamed. There may be red points, lymph, and turbid serum upon it; and the peritonæum may perhaps be thicker than it should be. In chronic inflammation, we find adhesions; and the bands are very strong. Sometimes there are white patches on the surface of the liver; and the peritonæum becomes white, opaque, and soft. If the substance have been inflamed, there is usually a general redness; and the size of the liver is increased,—from the quantity of blood it contains. Sometimes the redness is only partial; and then the red plates, mingled with the parts naturally pale, give it a mottled appearance. In cutting the liver, generally a large quantity of blood flows out; and we must remember that, without inflammation, the liver frequently suffers a great congestion of blood. In the disease called "purpura", there is great congestion of blood in the liver. After asphyxia, chronic bronchitis, all diseases of the heart, and all obstructions to the course of the blood through the heart or lungs, we find the liver in a great state of turgescence; so that, on cutting it, the blood pours forth, and the vessels look like sinuses. In infants who have been asphyxiated at birth, the congestion of blood in the liver is occasionally so great at the part under the peritonæal coat, that sometimes it will burst through it into the abdomen. Sometimes, in inflammation of the liver, there is hæmorrhage into the substance of the organ; and sometimes the blood will *rupture* the substance of the organ. I presume there must have been some degree of softness of it previously. We may find a great mass of blood, or several little collections of it; sometimes it is coagulated, and sometimes not; occasionally we may find it in the vessels, and sometimes not;—accordingly as it has oozed from one, or from several.

Treatment.—We have now to consider the *treatment* of acute and chronic hepatitis; and this may be dismissed in a very few words. It is the simple common treatment of inflammation; and, for the most part, it is very successful. We have only to make our diagnosis;—to ascertain that it is disease of the liver, acute or chronic; and to treat it accordingly. It was once supposed (as we find mentioned in works published twenty or thirty years ago), that mercury ought not to be given in *acute* inflammation of the liver, because it stimulated the organ; but that it was proper in the *chronic* form. The truth is, however, that both forms require the same treatment. The terms "*acute*" and "*chronic*" refer merely to the *duration* of the disease; and there is no difference between them, except that the symptoms are less urgent at one time than at the other; and whatever is good in the one, is beneficial in the other in a less degree. But, independently of that consideration, I do not know that mercury has any extraordinary power in stimulating the liver, in the way that has been supposed. It was thought it would give a bilious tendency, when there was not one; and it is possible that mercury may produce bilious evacuations, when it is long continued; but I am sure that mercury, pushed on to ptyalism, is just as useful in active hepatitis, as in any other active inflammation. I do not know that it will do any good by its specific action

on the liver; but it will by its general tendency to subdue active inflammation. Purgatives are particularly useful in inflammation of the liver;—much more so than in inflammation of the chest; because they act as local means, and prevent a great quantity of blood from going into the "vena portæ"; and therefore less gets into the liver.

Treatment of the Chronic Form.—The *chronic* inflammation requires the same treatment as the *acute*, only carried on less violently,—carried on chronically;—not doing all we have to do in a day or two; but carrying on our measures for some weeks, or even months. The moderate exhibition of mercury—not to produce a rapid ptyalism, but so as to keep up a gentle affection of the mouth—is useful. Long-continued purging is very beneficial in chronic disease of the liver; and hence the Cheltenham waters do great good in this affection, by draining the abdomen generally. Some have conceived that acids are useful as tonics; and the nitric and muriatic acids were very famous some time ago; but I do not know that there is any particular use in them. I have always succeeded in treating chronic inflammation of the liver, by the same means that I employ in any other inflammation;—more or less loss of blood, general or local, and the moderate exhibition of mercury. I have never found it necessary to make any difference between treating inflammation of the liver, and inflammation in any other part. Some have thought that dandelion does good; but I have never seen its virtues in affections of this kind.

Treatment of the Suppurative Stage.—As to the suppuration which sometimes occurs, that requires to be treated on common principles. If the abscess point to the skin, of course a knife may be applied, and the matter let out;—just as in any other abscess: only that it might be dangerous to let out a great quantity at once. It should be done gradually, in order that the part may slowly contract. If the discharge take place inwardly through the lungs, or the intestines, we have only to lessen the irritation by narcotics,—as in other cases; and this will also be required on opening the abscess.

SECTION II.—STRUCTURAL DISEASE OF THE LIVER.

Symptoms.—Many diseases of the liver are called "chronic hepatitis." The liver is subject to a vast number of structural diseases; and these pass as chronic hepatitis. Indeed, it is very often impossible to make the distinction. At the outset, there is pain on the right side, pain at the shoulder, perhaps a little jaundice, tenderness in the region of the liver, feverishness, and wasting; and we may say that the patient is labouring under chronic hepatitis. We treat him accordingly; but without success. On the contrary, the disease obstinately remains; and at last, perhaps, the liver becomes much thickened, and very much enlarged. Sometimes it is enlarged and hardened, from the very first;—simply as the result of inflammation; and sometimes it may be subdued by the common remedies of inflammation. I am quite sure that the liver will inflame from mere turgescence of blood; and perhaps without inflammation,—from mere congestion,—it will become very large. I am sure that the bulk of the organ will alter, according to the quantity of blood in it; for I have seen it large, and very soon (in a week or two) it has been small again. I have no doubt that internal organs will vary very much. They will suffer (if I may so speak) a sort of *erection*, from the congestion of blood. Certain it is, that the liver will sometimes be large from blood; and by active

measures will be brought down, in a very short space of time, to the natural state.

But supposing we have used the remedies for inflammation, and that the disease does not cease, and that the size of the liver does not diminish, then we have reason to suppose that there is something more than chronic inflammation;—that there is a change of structure; and it is of no use to push on, with activity, the means for remedying inflammation. Indeed, we should only break up the constitution by them. It may be necessary, if there be pain and tenderness, to bleed occasionally (either by cupping or leeches), to exhibit mercury, and to order low living; but if we push these things far, we frequently break up the patient's constitution, without affording him any relief. It is often necessary to support the strength well, and even to give the patient stimuli, in order to enable him to bear up against this organic disease.

Diagnosis.—With regard to the *signs* of organic disease of the liver, we may sometimes make it out very well, by the edge of the liver being well defined;—running across, and being hard, and even sharp. Sometimes the most easy way of discovering an indurated liver, is not by pressing hard down around the region of the organ; but by putting our hand over it, and suddenly bringing down the fingers. Frequently the liver is an inch or two from the surface; and if we press it regularly, we may not feel it; but if we press the integuments down upon it, we feel it in a moment. Occasionally we may discover *tubercles* in the liver.

Varieties of Organic Diseases in the Liver.—With regard to chronic disease of the liver, we must recollect that the liver, like the kidney, consists of two parts; the one sanguineous and red; and the other white or yellow,—containing bile. They are not divided; but throughout the liver there are two constituent parts, lying in juxta-position. Now sometimes it is only the *red* portion of the liver that is hypertrophied; so that the organ is enlarged and red. Sometimes it is the *biliary* portion;—the bile-tubes are all in a state of hypertrophy; and then we have a *pale* liver,—a liver enlarged and pale. Sometimes, without being enlarged at all, it will be pale. The *red* part is *atrophied*,—the vessels shrink; and the *biliary* part is *hypertrophied*; or, if not hypertrophied, it is *indurated*; or, if not indurated, it remains as it was; but as it has a preponderance over the *red* portion, the liver looks *pale*. These changes sometimes occur throughout the liver, and sometimes only in spots; so that here and there one portion of the liver is firmer and redder than it should be; while, perhaps, in other instances, the *biliary* portion is hypertrophied here and there,—giving it a mottled appearance.

Gin-Liver.—Sometimes the hypertrophied portion of the liver has the appearance of white lines running along it; and sometimes of granules,—varying in size from that of pins' heads, to that of hazel-nuts. There is a difference of opinion, among morbid anatomists, with regard to this affection; which has been called "gin-liver", and which is the most common of all organic diseases of the liver. Dr. Baillie and others supposed that it was caused by minute yellow tubercles throughout the liver; and Andral imagines that it is a mere hypertrophy of the biliary portion. Cruveilhier has given a good delineation of this disease; and has called it "small brown tubercle." I suppose, as it is a "*gin*-liver" in this country, it is a "*brandy*-liver" in others. Perhaps "*alcohol*-liver" would be the best name. It occurs in spirit-drinkers in *one* country, just the same as in *another*. There is the same punishment for them all. I presume that the constant use of alcohol, induces a chronic change of the biliary portion of the liver;—

causes it to become hypertrophied, and indurated;—just as any serous membrane will become (from other circumstances) indurated, opaque, and hard. This is the history of this particular matter.

Sometimes this morbid change occurs more in one lobe than in another. Sometimes the liver is increased altogether; and sometimes, instead of being *increased*, it is *shrunk*. The liver generally feels very hard on the external surface. Frequently it is indurated in particular portions; but wasted on the whole. I think that, in by far the greater number of cases, a "gin-liver" is of a bright yellow colour; and generally there is more or less ascites. The peritonæum over the liver is generally more or less diseased. It is particularly opaque and hard.

Fatty Degeneration of the Liver.—Perhaps the disease to which the liver is most liable, is that of becoming fatty. The liver is sometimes exceedingly fat. We know that the liver naturally contains fat and cholesterine; and these matters will sometimes exist in a great degree. When the liver has degenerated into this fatty state, instead of being indurated, it is usually soft and flabby. Sometimes it is greyish or whitish; and such is the quantity of fat deposited, that on cutting or handling it, our fingers become greasy; and in those parts which are the most fatty, it appears as if there were no blood there at all. This disease, like every other, will affect either the whole liver, or only portions of it. This state is frequently united with phthisis. It is a disease seen continually;—without the person having been addicted to drinking, or having imbibed any bad habits. It frequently occurs in young persons.

Encephaloid Disease of the Liver.—The liver is also subject to encephaloid disease;—to what is called "fungus hæmatodes." This is much more rare than either of the other forms of disease to which I have adverted[a]; but when fungus hæmatodes has existed in the extremities, then it is very common for a collection of this nature to take place in the liver. Occasionally, I believe, encephaloid tumours are said to be found in the liver, without the disease occurring in other parts; but more frequently they are found in combination with disease of the extremities. These tumours are, of course, white; and sometimes there are tuberæ, producing an elevation on the external surface;—bumps. They are of various sizes;—some existing near to the surface, and some towards the centre of the organ; and, when cut, are found to contain a brain-like substance.

Scrofula, Scirrhus, and Melanosis of the Liver.—The liver is also subject to another disease,—to a new formation; namely, *scrofula*. Scrofulous tumours take place, from time to time, in the liver; and they are, of course, white. The encephaloid tumours look exactly like them. Cruveilhier has given some good representations of them. The scrofulous disease is sometimes mixed with *encephaloid* matter,—with "brain-like" substance; and sometimes there will be a mixture of *scirrhus* with it. I have frequently seen scirrhus in other parts, with scrofula deposited in its neighbourhood; and so it is in the liver. Occasionally *melanosis* exists in the liver;—the black deposit of which I formerly spoke.

The foregoing are the chief organic diseases of the liver. Besides inflammation, we may have enlargement from congestion of blood, or from abscess;—we may have the red part hypertrophied here and there,—so as to give the organ a mottled appearance; and indurated at the same time,—so as to give us red tuberæ;—"tubercles", as they have been called in this country; but I would rather say "tuberæ." Then we may have the

[a] See Pages 1012 to 1017.

biliary portion hypertrophied; and that is called "gin-liver." In addition to that we may have encephaloid tumours;—resembling the brain in structure, consistence, and colour; and perhaps with blood effused in them here and there. Lastly, we may have scrofulous and scirrhous tumours, and melanoid deposit.

Size which the Liver may Attain.—Mr. Gooch, a surgeon, mentions that he saw a liver which weighed twenty-eight pounds. I have frequently seen it reaching into the pelvis. It is a curious circumstance, that we sometimes meet with a liver thus enlarged, which has caused no suffering at all. The patient has never complained of pain; but has felt weak, and has wasted a great deal. This is particularly the case in women. I have frequently examined women in this state; though, during life, they were not known to have disease of the liver. They never drew attention to the abdomen; but merely said they were weak. It shews the necessity, when we cannot understand patients, of having them placed in bed; and of examining them from the throat downwards,—over the heart, lungs, and abdomen. In that way we continually meet with something, which was not in the least apprehended.

Hydatids of the Liver.—The liver is very subject to the formation of hydatids. The kidneys and the liver are the two organs of the body, which are most subject to the formation of hydatids. The true animal nature of these hydatids, has not (I believe) been pointed out in the human subject; though it has in sheep. In the latter they have been observed to have a contractile power; but this has not been noticed in human beings. The appearance, however, is so much the same, that one must suppose them to be real hydatids. They are sometimes inclosed within others;—like pill-boxes. Sometimes they are attached by peduncles, hanging one within the other; and sometimes they grow to the outside of each other. A representation of them is given in Dr. Baillie's work. Sometimes they are attached to the liver externally;—hanging to it; but, generally speaking, they are enclosed in a cyst. Sometimes they are found in the middle of the substance of the liver. The cyst which contains them is usually hard, even cartilaginous. I believe they have two coats; and, when dead, they have no longer a globular appearance; but are like skins, or half-dried mucus. In sheep, I believe, they are seen to have a neck and a mouth.

I had a very remarkable instance of this description, in a lady who had laboured under chronic hepatitis for fifteen years. At last she began to cough, and to spit hydatids; and died. On opening her, I found a large cyst of these hydatids, attached to the concave portion of the liver, on the right side. In the middle of the liver, there was another sac filled with them. Ulceration took place, and they made their way through the diaphragm;—the cyst emptying itself partly into the air-passages. Under all this the irritation was so great, that she died.

Worms in the Liver.—Worms have sometimes been found in the human liver; and a lumbricus has been found in the ducts; but I should rather think it was not a native; but a wanderer that, being on its travels from the intestines, lost its way.

Treatment.—In all these cases, it would be quite fair to have recourse to iodine, in the form of iodide of potassium,—both internally, and rubbed over the indurated part. I have seen large livers,—reaching to the umbilicus, and below it,—reduced by the steady use of iodine, and sometimes iodine combined with mercury. But it is frequently necessary, while doing this, to support the patient well;—especially if we exhibit mercury.

Not only should mercury be given with caution, but we should support the patient well; because the dose that is necessary to do good, tends to impair the constitution. Iodine, however, may be made to do good without injuring the patient. Setons may, perhaps, be serviceable.

The greater number of these cases cannot be distinguished during life. We can tell that there is organic disease, by feeling that the liver is very large and very hard, by the patient wasting away, and becoming sallow and jaundiced; and sometimes we find there are tuberæ (bumps) in the region of the liver; but very often it is impossible to say what exact structural disease there is. If we have seen "fungus hæmatodes", or scirrhus, in other parts of the body, we may suppose the disease in the liver to be of that nature.

SECTION III.—JAUNDICE.

The next disease of the liver which I shall describe, is one in which the secretion (instead of passing out properly into the intestines) is absorbed, enters into the blood, and tinges the skin and the urine yellow. I need not say that this disease, in common language, is called "jaundice";—a term which is derived from the French word "*jaune*" (yellow).

Synonymes.—In brutes it is called "the *yellows*." In medical language it is called "icterus"; which is said to be the name of the golden thrush; and by looking at that bird, like the Israelites looking to the brazen serpent in the wilderness, it was thought that those that had the disease would be cured.[a] The thrush; it was said, would die. In ancient nations, the cure of disease was often attempted by looking on certain things; and I suppose it had its origin from what occurred to the Israelites. In Latin, jaundice is termed "morbus *regius*",—"the *royal* disease"; and the reason given by several writers is, that in this affection persons require many kinds of amusements, that none but kings or royal persons can command. It is also called, in Latin authors, "morbus *arquatus*";—from the patient having the various hues of the rainbow ("arcus"). It is also mentioned under another name,—"*aurigo*." I presume this has its origin from "aurum" ("gold"). The word "*jaundice*" is simple, and a very fine name for "yellow." In the case of poor people it is called, in plain terms, "the yellows"; but if a lady have the disease, it is termed "*jaundice*."

Symptoms.—This disease is marked by yellowness of the skin, eyes (conjunctivæ), roots of the nails, and urine. This disease may occur without the fæces being pale; but generally they are so. The parts which are first seen to be yellow, are the nails and eyes; and they are the parts that remain yellow longest. It is simply for this reason;—the "half-moon" of the nails (as it is called), and the conjunctivæ of the eyes being naturally so very white, we discover in them the slightest tinge of yellow.

Varieties in Colour.—The yellow is not always of the same cast. There is a *bright*, a *dark*, and a *green* yellow; and some persons labouring under jaundice, are of a dark olive-colour, so that it borders upon green; and therefore we sometimes hear of "*green* jaundice." If a person be naturally swarthy, when labouring under green jaundice he looks very dark; and then he is said to have "the *black* jaundice";—so that we have a

[a] Moses made a serpent of brass, and set it upon a pole; and it came to pass that, if a serpent had bitten any man, when he beheld the serpent of brass, he lived.—"*Numbers*"; *Chapter* 21; *Verse* 9.

green-yellow and a *black*-yellow. It is a contradiction of terms; but it shews the variety of hues under which the disease appears.

Yellowness of Vision.—Occasionally it has happened that patients have "seen yellow." It was maintained, by some, that that was *always* the case. Dr. Pemberton says he saw this occurrence twice; and that, in both cases, the jaundice was not very intense. On the other hand, we every day see cases of intense jaundice, without any yellowness of the vision. Hoffman says, that twice he saw patients, who declared that every thing appeared yellow. It has happened to me to have two patients labouring under jaundice, who made the same statement. In July, 1826, I had (in St. Thomas's Hospital) a case of icterus, where there was albugo of each eye,—particularly of the left. Into this eye ran two large red vessels, and with it the patient "saw yellow"; but the right eye, which had no inflammation before the cornea,—into which no large vessels were running, saw things in their natural colour. In 1827, I had another hospital-patient, who "saw yellow" with both eyes; and in him the conjunctiva immediately around the cornea,—quite at the edge of the orbit, was greatly inflamed. In 1831, I saw a patient labouring under jaundice; and he said that, at the beginning of the disease, he "saw yellow." He did not know whether his eyes had been inflamed; but there were several tolerably large vessels running, not quite to the cornea, but pretty close to it. When patients "see yellow", it is from the serum of the blood being conveyed before the pupil, through the cornea. It must be accounted for in that way. In the second case of this occurrence which I met with, I was prepared for inflammation of the eye, by having noticed what I did in the first case. I looked carefully at the man's eye, the instant he told me that he "saw yellow", and I found, as I expected, that it was in a state of inflammation. Whether this will always be observed when patients "see yellow", I do not know; but it affords an explanation of the circumstance, and is worth investigating. If a person labouring under jaundice be blistered, the fluid from the blister is yellow; and the serous fluids within the body, are found to be of the same colour.

The Blood loaded with Bile.—It is worthy of remark, that the blood of jaundiced patients is loaded with bile. Hunter thinks that the artificial mixture of bile with the blood, produces coagulation; but I think that a quantity of bile much too small to effect coagulation of the fluid, may nevertheless be sufficient to give a tinge to the serum.

Internal Symptoms.—Besides these visible symptoms in jaundice, there are several others. Patients generally complain of languor, and very frequently of drowsiness, but still more frequently of a dead weight,—a load at the epigastrium; and of tenderness, and sometimes actual pain, at the hypochondrium. In fact, this is a disease which every day occurs in conjunction with hepatitis; and is, in many cases, merely a symptom of it. There is frequently loss of appetite, nausea, and vomiting; and there is one curious symptom in the disease, which is very common indeed; and that is an itching of the whole surface. People say they "could tear themselves to pieces."

Occurs at all Ages.—Jaundice, like so many other diseases, occurs both in young and old persons. Infants often have it a few days after birth, and some perhaps at birth; and the oldest persons are liable to it. In infants, it appears to be produced from the very slightest causes; and it is cured with the utmost ease. In general, it is a slight disease, arising from slight causes; and may be cured by slight remedies.

Yellow Skin not Peculiar to Jaundice.—Sometimes we see yellowness of

the skin, not as the result of jaundice, but in fever; namely, that which is called "*yellow* fever." The yellowness is not universal in this case. It occurs particularly about the neck; and it appears rather to arise from a disordered state of the blood, or an altered condition of the blood as to some of its constituents;—exactly as we see it in bruises. After a certain part of the blood has been absorbed from an ecchymosis, a degree of yellowness remains; but that is not jaundice. Occasionally, after the bites of certain serpents, and the infliction of wounds by the bite of certain animals, the skin will become yellow; but this does not appear to be jaundice.

Predisposing Causes.—Some people would appear to have a constant predisposition to this disease; and it may be hereditary. Persons who have been in warm climates, are much more predisposed to the disease than others.

Exciting Causes.—The *exciting* causes of it, are any circumstances that will produce inflammation and congestion of the liver. Whatever will produce hepatitis, or cause great congestion of the liver, will produce jaundice. It may arise, not only from cold and wet, and from long-continued heat, but also from the suppression of a discharge; by which a congestion of the liver will be produced. It will arise from any thing that causes an excess of bile; for occasionally the fæces, in this disease, are not white. Bile passes into the intestines; but so much is secreted, that all does not escape; and a portion goes into the blood. Malaria seems to have a tendency to produce it in hot climates, and in the hot seasons of other climates. Persons exposed to the influence of malaria, are very subject to have more or less jaundice among them, as well as other hepatic affections.

Local Causes.—It may be produced by a variety of *local* causes;—any thing which will cause pressure upon the parts through which the bile is conveyed. Mere costiveness has been known to give rise to it. Tumours occasioned by an enlarged pylorus, or by an enlarged head of the pancreas, —tumours of the omentum,—diseases of the liver,—the lodgment of a calculus in the ducts, are also common causes of this disease. If a portion of liver becomes harder than it should be, and perhaps rather enlarged, the bile may be obstructed in the liver itself. Sometimes pregnancy causes it. I have frequently seen jaundice in pregnancy;—not, however, as the result of pregnancy; but as the result of inflammation of the liver; and which disappeared under the treatment for common inflammation, while the pregnancy went on. It is supposed to be occasionally produced by thick bile; if there be any obstruction to the bile, its fluid parts may be absorbed, and it will thus become inspissated; but there is no proof that this is the *cause* rather than the *effect* of the jaundice. It has been known to be caused by a lumbricus sticking in a duct of the liver. I mentioned, when speaking of worms in the liver, that a lumbricus has occasionally (as was supposed) lost its way, and wandered into the liver[a]; and if it stick there, it may cause jaundice. If the ducts themselves become thickened by chronic inflammation,—if they become hypertrophied, their canal may be so much diminished, that the bile cannot easily pass; and consequently we have jaundice. I have seen jaundice from a great many of these causes; and in 1829 I met with a case, in which it was occasioned by a great number of fatty deposits, all round the ducts. Sometimes the ducts are impervious from original malformation. There are a few instances of this upon record. It would appear sometimes to be produced by spasm. I have known

[a] See Page 1018.

some persons, on eating certain articles, to be seized with violent pain at the pit of the stomach; and the next day an attack of jaundice has appeared. It has been produced by mental causes. Many persons have become yellow from fright. I believe that, in general, people from fright look *blue*; but sometimes, from being exceedingly frightened, persons will have a fit of jaundice. Occasionally the disease has arisen, not from terror, but from long-continued grief and anxiety of mind.

Enlargement of the Ducts.—When the ducts have been obstructed, they are generally larger than they should be; and Dr. Heberden is said to have seen them dilated to an inch in diameter. Sometimes, however, no obstruction is found. I have opened several persons who have died, not *from* jaundice, but *with* it, in whom I could see no obstruction whatever; and Sir John Pringle mentions, in his work on Diseases of the Army, that one of the army-surgeons told him of a case of jaundice, in which there was no obstruction; but in which the slightest compression caused the bile to flow.[a] Andral, I find, says that he has seen the same occurrence.

Artificially Induced.—We may produce this disease artificially, by opening the abdomen, and passing a ligature round the intestines, a little below the "ductus communis choledochus." Portal has done this (he says) in six dogs; and they all became jaundiced. If we tie the lymphatic duct, the same circumstance will occur; and the absorbents of the liver have been seen, after such an experiment, to become loaded with bile. It has been said, however, that the blood from the lymphatic veins was found, in such an experiment, to stain paper yellow;—much more so than the blood from the choledochus.

Pathology of Jaundice.—There was a doubt at one time whether, in jaundice, the bile found its way to the blood by means of the absorbents, or by regurgitation to the veins. A short time ago, it was not supposed that the veins would absorb. Before the absorbents were discovered, it was supposed that the veins performed that office; but afterwards, no one allowed that they would absorb at all; and now again it is said that they *do* absorb.[b] While it was believed that the veins did *not* absorb, some contended that, in jaundice, the absorbents took up the bile; and others contended that it worked its way into the veins. Experiments were then made; and it was observed that the absorbents of the liver were loaded with bile; and that the *lymphatic* veins were more tinged with it than the *jugulars*. If the veins absorb as well as the absorbents (properly so called), we may suppose that, as the greater portion of bile which found its way into the whole system of blood, passed through the lymphatic veins, those veins would contain a greater portion of bile than any others.

Prognosis.—With regard to the *prognosis* of this disease, it must depend entirely on the cause. Jaundice is nothing more, in most cases, than a symptom of some disease; and according to the nature of that disease must be the prognosis. Some are very ill in jaundice, and die *with* it; and others labouring under it go about with little indisposition;—they scarcely know that they are ill; they only look very yellow. In that form of jaundice in which the yellow verges to green, and which has been called "*green* jaundice"[c], recovery is very rare. When we see an individual labouring under jaundice, with his eyes yellow enough, but with a skin of an olive-hue, we may (without asking a question) fear that the individual has a disease, from which he will not recover. Dr. Baillie says that, in the whole

[a] "Observations on Diseases of the Army. By Sir John Pringle."

[b] Consult, on this subject, Dr. Graves's Lecture on the Absorbents; of which a new edition has been published.

[c] See Page 1019.

of his practice, he never saw more than two persons recover from green jaundice. Generally, where the jaundice is of this green hue, there is some organic disease of the liver;—either of the whole or of a portion of it.

The disease sometimes lasts a very long time. The fæces are in general white; but very often they are bilious. Dr. Baillie says that, in green jaundice, the fæces are usually white,—as in other kinds of the complaint; but he has often seen them very pitchy. He says that there is but little pain felt; that there is seldom any ascites; and that he seldom knew it arise from intemperance. The reason that he assigns for the latter circumstance is, that it so frequently occurs in women. Some women, however, are intemperate enough. He considers it as a symptom of something which is fatal. Dr. Cheyne mentions that the jaundice of children is dangerous, if it be of a saffron-hue. In children the complaint is generally trifling; but sometimes it is not. Mr. J. Pearson (a surgeon of great practice in London, a few years ago) said that he knew a family where there had been eleven children, ten of whom died of jaundice within the month;—the disease having begun a few days after birth; and that the eleventh died of the same disease at six years of age;—evidently shewing the hereditary nature of the disease. What was the cause of it in this family, I do not know.

Treatment.—In the *treatment* of jaundice, we have first to consider whether any inflammation exists;—whether it is a case of hepatitis; and if it be, we must treat it on the common principles of inflammation of the liver;—in proportion to the weakness on the one hand, or the strength on the other. In cases of jaundice, mercury answers better than any other purgative. I have frequently made experiments, and have exhibited common purgatives in some cases, and mercury (so as to affect the mouth) in others; and I am sure that patients have recovered more quickly by the latter mode, than by the former. In mild cases, however,—where there is only congestion of the liver,—the disease will yield to common remedies; and many cases will get well of themselves. But if the disease be more severe, it would be right to employ mercury, and perhaps to bleed in the arm.

Treatment of the Spasmodic Form.—The disease may be characterized more by spasmodic pain than by inflammation. There may be occasional pain at the pit of the stomach, or on the right side, rather than constant pain and tenderness; and in that case the hot-bath and opium are among the best means. But in such cases as these, if we find the patient's pulse constantly quick and strong, one of the best antispasmodics we can employ is bleeding. If the pain is not constant, but comes on at intervals, and not with a constant severity, we may look upon the disease as, to a certain extent, spasmodic; and there opium and the hot-bath will be very useful. But if there be general tenderness besides, and bleeding be at all admissible, it will answer exceedingly well. It will be more effectual, and much better, to combine the opium with a full dose of calomel. This will prevent constipation, and produce a free discharge from the alimentary canal. In these spasmodic cases, in addition to the common treatment for hepatitis, we should give a large dose of calomel (ten or twelve grains), and a few doses of opium;—perhaps two grains, or more, in a dose. A poultice over the part is also very useful.

This sudden pain with jaundice, is no proof whatever that the case is one of gall-stones. Where there is no jaundice at all, but where a patient is seized with sudden pain at the pit of the stomach, many persons say he has gall-stones; and if, in addition, there be jaundice, then they consider

the matter as certain. But mere spasm of these parts will produce this violent pain, and perhaps giddiness likewise. We may suspect that there are gall-stones, but frequently we have all the symptoms without it; and we have no right to assert that a person has gall-stones, unless we see them pass, or they have been discharged. When we consider that, from eating something which is indigestible, a person will be seized with violent pain at the pit of the stomach, and the next day will have an attack of jaundice, it is clear that this occurrence may be produced without the presence of gall-stones;—it is obviously caused by something which has irritated the parts.

Chronic Jaundice.—The greater number of cases of jaundice yield to purgatives, or to the treatment of hepatitis; and if we find such severe pain as I have now mentioned[a], anti-spasmodic treatment will generally get rid of it. But the disease sometimes lasts a long time,—becomes *chronic*; and it is necessary, after we find no more pain,—no tenderness on pressure, to make the patient take free exercise, to have the parts well rubbed, to recommend the use of the warm-bath, to exhibit mercury,—so as to produce a mild affection of the mouth, for a greater or shorter length of time,—and to make a free use of purgatives. When the disease becomes chronic, it will frequently go away under the use of these means. The parts seem to fall into an atonic state. Supposing that the affection continues in spite of all these means, then we generally have reason to suspect that there is disease of the liver. If there is induration or enlargement of the organ, or a degree of ascites, or any kind of dropsy; if persons waste more and more; and especially if the tinge becomes green, after having been the plain ordinary yellow;—then we must form an unfavourable prognosis, and suspect disease of the liver. In the case of enlargement and induration, it is pretty well proved; and then the remedies for diseased liver should be employed. Setons over the part, and the exhibition of iodine, will be the best means that can be resorted to; and we must keep up the patient's strength as much as possible.

With respect to this chronic jaundice, Van Swieten records a curious case; which was cured by making a man imitate Nebuchadnezzar. Van Swieten says that he persuaded a poor man, in an obstinate case of jaundice, to live upon grass for two years, except during that part of the winter when there was none to be got. He made him eat the tenderest grass, and also that which was first mowed; and he made him take that which was in flower. The man "confessed that, for some time, this diet did but little please him; but after a time he was well contented, and could easily distinguish the best pastures by the flower of the grass." This I can imagine. At last he became a general nuisance to the farmers; for Van Swieten says that he was obliged to eat his diet secretly; and that the farmers, finding he had so large an appetite, often gave him a quick repulse. The man, however, was perfectly cured.

SECTION IV.—BILIARY CALCULI.

Symptoms.—We can do nothing to dissolve gall-stones; but when they are passing, we may lessen the pain. It is said, that when they pass, the pulse is not quickened, as in inflammation; but that, on the other hand, it frequently becomes slow. I believe that this is generally the case; but the same circumstance will occur in a case of pure spasm. Sometimes how-

[a] See the previous Paragraph.

ver, the pulse is increased to above a hundred; there is sudden pain in the part; and there is vomiting. Sometimes there is *great* pain, which is relieved by pressure;—it is mere *spasmodic* pain. Sometimes there is shivering. The patient has no increase of temperature; and the treatment will be the same as that for spasm; because we cannot say whether there is a stone or not. But if the patient have passed gall-stones before, and the same symptoms occur again, then we are authorized in concluding that they arise from gall-stones.

Usual Seat of Gall-Stones.—These stones are found in the ducts of the liver itself; they are also found in the gall-bladder, in the cystic duct, and in the "ductus communis choledochus." If they exist in the cystic duct, of course they will not produce jaundice, unless they happen to be so large as to press upon the "ductus choledochus", or the hepatic duct; but though they will not produce jaundice, yet they will obstruct the course of the fluid from the gall-bladder; and it will become distended, to a great amount, by its own secretion. There is, at St. Thomas's Hospital, a very extraordinary specimen; in which, from an obstruction in the cystic duct, the bladder went on secreting mucus, till at last there was what is called dropsy of the part; but no obstruction of the cystic duct can produce jaundice. There must be obstruction in some of the ducts of the liver, in order to produce jaundice; but gall-stones are found in all parts of the organ.

These calculi are most frequently found in the gall-bladder itself; next to that, in the cystic duct; next to that, in the "ductus choledochus"; and next to that, in the hepatic duct. There can be no doubt, therefore, that they are generally formed in the gall-bladder itself.

Their Number.—The *quantity* of stones found will vary, from one to an immense number. It is said by Dr. Baillie[a], that a thousand have been found at once in the gall-bladder. The preparation is now to be seen in Dr. Hunter's collection.[b] An incision is made into the bladder, to shew that it is crammed full of stones. Dr. Baillie has given a representation of the case. I once took out of the gall-bladder of a patient at St. Thomas's Hospital, between three hundred and four hundred stones; which had given rise to no symptoms during life. The patient had not complained of the least pain; nobody knew that there was any thing extraordinary in his inside; and he died of a very different disease. Nothing is more common than to open persons who have died of disease unconnected with the liver, and who have never complained of a pain in the side; and yet to find several gall-stones.

External Aspect.—These biliary calculi are sometimes rough, and sometimes smooth. They acquire a smooth surface from lying and rubbing against each other; but this very same circumstance causes them to be angular. They have a sharp corner and edges; although the surface between the angles may be perfectly smooth. Those in the centre are generally oval.

Some of them are white, others are black; some are black externally, and white internally; and some have a shining and semi-transparent fracture.

Size of Gall-Stones.—Gall-stones are seen of all sizes;—from mere grit, to the size of the gall-bladder itself. They will very often pass without pain; for I have found them in the motions, without any pain having occurred. If they are very large, they will occasionally produce no pain;—provided they lie still, and do not attempt to escape; but if nature make

[a] In his "Morbid Anatomy"; Chapter 10; Section 9. [b] At Glasgow.

an attempt to get rid of them, the pain is very considerable. Dr. Heberden mentions [a], that in the gall-bladder of Lord Bath (preceptor to George the Third), there was found a stone which weighed two drachms; and yet that it caused no symptoms. They were surprised to find the stone there. Dr. Baillie says that he saw one the size of a hen's egg.

Mode in which Gall-Stones Escape.—They will pass through the ducts even when very large; for the ducts will dilate incredibly. We know that the female urethra may be dilated to so great an extent, that a large stone may be extracted from the bladder, without an incision. A very large calculus has been known to pass through the "ductus communis choledochus", without ulceration having been discovered after death. Dr. Heberden, as I have already mentioned [b], states, that once the "ductus communis" was distended to an inch in diameter; but not unfrequently, when the stones are large, they will escape by an abscess,—just as pus will do from the liver,—either externally or internally. Adhesions may take place externally, between the gall-bladder and the parietal peritonæum. An abscess forms; and the stone comes out through the abdominal parietes. But, more frequently, adhesions take place between the bile-passages and the intestines; into which the stones escape, and are discharged by stool.

Size they may Attain and yet be Discharged.—It is astonishing how very large a calculus nature will get rid of, and yet the patient do well. A calculus two inches and a quarter in length, three and a quarter in circumference, and weighing one ounce, two drachms, twenty-three grains, was discharged from a person who lived after it, and did perfectly well. Dr. Pemberton states that a stone has been discharged, two inches and a quarter in length, and one inch and a quarter in breadth. In the "Medical Gazette" for March 1, 1828 [c], there is an account of a stone an inch and three quarters in length, three inches and a quarter in breadth, and weighing two hundred and seventy-eight grains. A stone measuring an inch and three-eighths in length, and three inches and three-eighths in transverse circumference, is mentioned in the twelfth volume of the "Medico-Chirurgical Transactions" (Page 255). It had passed by ulceration; but the individual died. There is a curious instance of one an inch and six-tenths in length, and an inch and one-tenth in breadth, which was expelled, and the patient recovered. As it went down the intestinal canal, it stuck in the sigmoid flexure of the colon; and there gave all the signs of strangulated hernia;—so that, before its escape from the intestines, it did serious mischief. Yet there had been no suffering previously. It was not known that the cause of the disease was a stone.

Constituents of Gall-Stones.—Some of these stones appear to be nothing more than inspissated bile; and these are bitter to the taste, soluble in water, and burn to a cinder. But the greater part of the biliary calculi are not of this description. They are of an oleaginous character; and, if melted, will take fire, and burn like wax. The shortest way to ascertain their nature, is to scrape them a little; and they very soon melt. Some are resin, some are cholesterine, and some are picromel.

Internal Appearance.—Those gall-stones which are waxy (I only use the word in the common vulgar acceptation,—meaning "to burn like wax"), are of a greasy character, are laminated within, and are frequently crystallized. Sometimes, however, they are oleaginous. Generally they

[a] In the "Medical Transactions, published by the College of Physicians in London"; Volume 2; Page 134.

[b] See Page 1022.

[c] No. 13; Volume 1; Page 370.

re in plates,—laminated; but sometimes there are crystallized radii, passing rom within outwards. Occasionally they are a mere amorphous mass. Now and then they have been found to contain phosphate of lime; but hen stones in these parts contain this material, it is doubtful whether they re biliary concretions. Two cases of this kind are related by Andral; ut there had been such obstruction, that no bile could have entered the all-bladder, for some time. The cystic duct was obstructed; and calculi ppear rather to have been the result of a secretion of the inner surface of he gall-bladder;—just as stones may be found in the urinary bladder.

SECTION V. DISEASES OF THE GALL-BLADDER.

With regard to diseases of the gall-bladder itself, I may mention that it rarely ulcerated. Occasionally its coats are very thick; occasionally it is ypertrophied; and it has been known to be completely ossified. Sometimes it will waste away; sometimes it will have tubercles in it; and sometimes there are hydatids in its substance. Now and then it has been uptured. A woman came one day to St. Thomas's Hospital, and fell own dead; and, on opening her, the gall-bladder was found to have been uddenly ruptured. Death, I understand, took place instantly.

CHAPTER V.

PATHOLOGY OF THE STOMACH AND INTESTINES.

Before commencing the consideration of particular diseases of the stomach and intestines, it may be advantageous to give a short general account of the morbid appearances observed in this part of the body. But, in the first place, I shall direct attention to the varieties which are observed in the *natural* state of the parts;—according to the portion of the canal which we examine, and according to the age of the patient.

Natural Appearances.—If we examine the inner surface of the stomach and intestines of a living animal, that is making no effort at all,—so that its circulation is perfectly free, that surface is found to be rather redder than the inside of the cheeks;—the mucous membrane of the former, is rather redder than the mucous membrane of the latter. In some animals, after death, the mucous membrane is pale, or at the utmost only slightly coloured; but here, again, much depends on the mode in which the animal dies. If we kill it by putting a stop to respiration, these parts will become of a very red colour, or very dark; and there will be great congestion of blood. But if, on the other hand, we kill the animal by hæmorrhage, these very parts will look paler than they were during life. The internal surfaces of the body, are liable to exactly the same changes of colour as the outer. If a person die from strangulation, the surface of the body will perhaps be of a dark red colour,—more or less; whereas, if he be bled to death, he will become pale. Now we are to generalize these changes; and be prepared to expect circumstances quite analogous in the inner surface.

Causes of Increased Redness.—If we look at the stomach during digestion, or if we look at the inner surface of the upper part of the small intestines during chylification,—when their great function is going on,—we shall find the parts redder than at any other time. This, of course, will occur at different periods of the day;—according to the shorter or longer time that has elapsed since food was taken into the stomach. Any obstruction to the return of the blood, will make these parts redder than they should be; and perhaps darker. Hæmorrhage may take place from the inner surface of the stomach, or from the inner surface of the intestines,—from the great accumulation of blood; and, as impediments to the circulation are very common just before death, we, more frequently than not, find these inner surfaces red and dark-coloured;—at any rate, *partially* so.

Colour Influenced by Decomposition, Situation, and Age.—I mentioned formerly,—when describing deceptive appearances with regard to inflammation,—that we may produce these changes at pleasure, accordingly as we examine a body a *longer* or a *shorter* time after death;—having first placed a certain part in a dependent situation, so that the blood may gravitate in a certain direction.[a] If we place a certain portion of the intestines in a de-

[a] See Page 77.

endent situation,—lower than the rest, the blood will of course gravitate
) it; and if we allow a long period to occur before we examine the in-
estines again, according to the length of that period, the situation of the
arts, and the quantity of blood in the body, shall we (cæteris paribus) find
iem darker. From the natural arrangement of the parts, we generally
id that those portions of the intestines which are in the pelvis, are of a
arker colour than the others; and the *posterior* surface of the stomach, is
arker than the *anterior*;—merely from the gravitation of the blood; and,
course, darker and darker will the appearance be, according to the length
time before making the examination. If the examination be delayed for
great length of time,—so that decomposition takes place in any degree,
id the blood is allowed to transude from the blood-vessels,—we shall find
xtensive patches of red, and stains along the course of the veins;—just as
e observe on the external surface. If a still longer period transpire, the
hole of the parts are red. If the blood completely transude from the
essels, it will dye the whole substance; and, from the solid portions being
ecomposed, we shall actually find more fluid than the blood itself will
ford.

In persons in whom the intestines have been diseased during life, we
id them of a paler hue lower down, than higher up. The lower down
e examine them, the greater (generally) is the paleness. They are also
ile in youth, and in the young adult period; but in the fœtus these very
arts are naturally of a rosy hue, and in old age they are of an ash-colour;
id not only so, but the veins are seen to be very large. These are the
ief varieties as to *colour*.

Varieties in Thickness of the Mucous Membrane.—But there are, like-
ise, different appearances with regard to *thickness*. The mucous membrane
naturally thickest in the duodenum, and thinnest in the colon; and the
ere circumstance of an accumulation of blood, just before death, or after
at event, will occasion it to appear thicker than it should be,—without
y disease of that particular part; while it always appears thinner in
rsons who die in a state of anæmia,—who are bled to death, or who have
t rallied a little for some time before death, or who die suddenly in an
naciated condition.

Consistence of the Mucous Membrane.—There is a great difference, too,
the *consistence* of the mucous membrane in different parts. Generally
ose which are by nature *thickest*, are also by nature *firmest*. At the py-
ic end of the stomach, the mucous membrane is always thicker in health,
d more consistent, than at the other extremity; and it is a natural cir-
mstance for the mucous membrane to peel off, in large portions, from the
ner surface of the stomach. The consistency of the mucous membrane
ries, according to the time at which we make the examination. It al-
ys becomes less, in proportion as time elapses after death; and, more
rticularly, if the surface of the stomach be exposed to the air. If it have
mediate contact with the air, it loses its consistency much more quickly
an it otherwise would.

Influence of the Gastric Juice.—The consistency is also variable,—accord-
g to the quantity of gastric juice which the stomach contains; for the
stric juice will soften the inner surface, and indeed the whole stomach.
is softened state has been seen, very frequently, in persons who have
ed in perfect health. Where they have been suddenly destroyed by me-
anical violence, or by any violence not acting till the moment of death,
e mucous membrane of the stomach has been found softened; whereas,

in persons who have been weak, and in whom we might expect such softening from disease, we continually find no such appearances. It has also been found, that not merely the mucous membrane, but the whole of the coats of the stomach together, have been softened in these circumstances; and even perforation has taken place; and still further effects have been observed in the other abdominal viscera, from their immediate contact with the part in which perforation took place. On this account it was supposed, by John Hunter, that the gastric juice will not act on a *living* part; but that it has the power of acting on *dead* animal substances; and will therefore act on the stomach, when life is no longer present to resist it. There has been a great difference of opinion on this point. When it was first promulgated it was doubted. It was afterwards believed; but many French writers again doubt it; though I believe we shall see no good reason to suppose it doubtful, if we consider that, at the same time, the parts of the stomach with which the fluid comes in contact are softened; and it is singular that this softening particularly takes place at the posterior part,—where the gastric juice must chiefly have gone. Thus we may have considerable morbid appearances, without any previous disease;—simply from the effect of the gastric juice. At any rate, it is considered that, when the stomach is softened, we may be justified in saying, that the appearances are simply the effect of death;—whether the individual was in health before, or died from an affection of the stomach; and whether it is at the posterior part of the stomach or not; and whether, at the perforation, the parts are rubbed off or not.

Hypertrophy of the Mucous Follicles.—Many morbid appearances take place in the intestines, particularly in the mucous follicles. With regard to hypertrophy of the heart, the walls of the left ventricle are naturally thicker in children, than in adults; and many parts in children have been supposed to be hypertrophied, when the greater proportionate thickness of them was simply a natural circumstance. Now the mucous follicles are much more distinct in children than in adults. In fact, in healthy adults they are not particularly seen, except in the cæcum and duodenum; and sometimes, again, at the lower part of the ileum; but in children they are generally distinct enough, through the whole length and breadth of the intestines. These mucous follicles are often seen to be very large after diarrhœa, and other diseases attended by irritation in the alimentary canal; but sometimes they certainly are very large, without our knowing that the individual had suffered any previous disease of the alimentary canal.

Inflammation may not leave Redness.—There can be no doubt that a degree of inflammation may exist in the alimentary canal during life, and yet leave no marks after death. It may happen that the bleedings which were instituted, have taken away the redness of the part, and left it perfectly pale; although the powers of life were destroyed by the disease, or (as in some cases) by the remedies. At any rate, it is possible for the disease to kill; and yet for no redness to be discovered after death. We see a similar occurrence upon the surface of the body, when patients have had erysipelas at the time of death. It is not uncommon to see the parts far less red than during life; and perhaps they are not red at all. Again: we see that redness may exist in all these parts, without any inflammation whatever;—that it may be the result of decomposition, or of some mechanical impediment. If the redness be of an inflammatory nature, or if it have been produced by inflammation, it ought to exist in the minute vessels;

out still it is to be remembered that redness may occur there, as well as in the large ones, from mechanical obstruction. If the redness exist only in the larger vessels, it is mere congestion; which may arise from many causes, independently of inflammation. If there is mere over-distension of the *large* vessels, that cannot be considered inflammation; for if it were, it ought to exist in the *minute* vessels. But even though congestion of blood should exist in the latter, it would not be a sufficient reason for its being inflammation. When the redness arises from inflammation, the large vessels may be over-distended too; but, in inflammation, the *small* vessels are *first* overcharged, and ultimately the *large*; whereas, in mechanical obstruction, the *large* vessels are first over-charged, and ultimately the *small*.

Parts liable to Redness.—The redness may affect the mucous membrane simply in its continuous surface, or it may affect the villous coat, or it may affect the follicles, or it may affect two or three of these parts together. If it affect merely the villous coat, we have simple red points; and it is in the stomach and lower part of the ileum, that this inflammatory redness is chiefly found. This redness is of all degrees of shade. The villous coat may be transparent or not. If it be the follicles which are inflamed and red, there are frequently red circles around them; and perhaps also on the summit. If these widen and form a border, the follicles are of a uniform redness.

Hypertrophy of the Mucous Membrane.—The mucous membrane is sometimes found thickened; and sometimes it is firmer than usual, and will peel off in large portions. If this occur anywhere, it is sure to be met with in the stomach, and large intestines. When it is hypertrophied, sometimes it is as smooth as usual; but sometimes it occurs more at one spot than at another; and the mucous membrane is then exceedingly rough;—that is to say, the hypertrophied parts being very partial, the membrane becomes rugged. It is polished enough; but still it gives a feeling of ruggedness;—it has depressions and elevations. Sometimes the hypertrophy is such, that portions hang into the canal;—we have it really in processes. When it is hypertrophied, there are various degrees of consistency, and various degrees of colour. Sometimes, along with the hypertrophy, there is great irritation, and a great accumulation of blood. Occasionally we have hypertrophy of the villi, and sometimes only the follicles will be enlarged. When the latter occurrence takes place, sometimes the orifices of the follicles will diminish; and if they diminish, they will at last close, or nearly so; and then the secretion accumulates beneath, and dropsy takes place. If the contents happen to be solid, of course we cannot apply the word "*dropsy*"; but the follicles are distended with a soft, thin, caseous substance. Occasionally the mouth of the follicles increases very much. Sometimes they increase by ulceration; and these overgrown follicles are generally seen, like all other morbid appearances, at the lower part of the ileum, where it ends in the colon.

Hypertrophy of the Sub-Mucous Cellular Membrane.—Sometimes it is not the mucous membrane which is hypertrophied, but the cellular membrane under it;—the sub-mucous cellular membrane. Occasionally it becomes very bulky, or very hard. It falls into a state of scirrhus, and becomes as hard as cartilage. The disease which is called "scirrhus"—a specific induration and hypertrophy[a]—frequently takes place. Sometimes, when it has begun there, the membrane on the other side becomes

[a] See Page 220.

hypertrophied too; but I believe that when scirrhus affects the alimentary canal, it is the cellular membrane under the mucous membrane, that is first attacked. The other coats will sometimes remain healthy for a great length of time; but hypertrophy, ulceration, and other diseases, may take place. This particular affection of the sub-mucous cellular membrane, is very commonly seen at the pylorus; but it seldom takes place, except after the middle period of life has passed. In this affection, it is common for the orifice of the pylorus to become lessened; and the stomach behind frequently acquires an immense size. If hypertrophy and induration (true scirrhus) take place in the small intestines, it generally gives rise to stricture. The canal of the intestines where it is situated, will be diminished; so that stricture is the consequence. We may have a stricture from other causes; but this is a frequent source of it. This change is rarer in the small intestines, than in the stomach; and rarer in any part of the large intestines, than in the rectum. The rectum comes next to the stomach, in point of frequency of this affection.

Atrophy.—Occasionally the reverse change takes place. Instead of the alimentary canal being *hypertrophied*, it will become *atrophied*;—it will become much thinner than natural. The coats will waste away. I do not mean that they will be destroyed; but they will become thinner and thinner, until the alimentary canal becomes quite transparent. Atrophy most commonly occurs at the splenic end of the stomach; and, next to that, at the lower end of the ileum.

Softening.—Then, again, these parts sometimes *soften*. It is the mucous membrane that is, most frequently, the seat of this disease;—it will become quite pulpy. There are all degrees of softness, till it is absolutely lost; and the disease exists in various directions. When the mucous membrane becomes softened, sometimes the colour is quite natural, sometimes it becomes pale, sometimes it is a dead white, and sometimes it is blue;—just as in the case of the brain. I pointed out that, when the brain is softened, there is sometimes a rosy hue of the parts all round. The change of colour in the intestines, is sometimes produced by the loss of vital energy; and sometimes it is the result of inflammation. This softening is very common after chronic diseases;—after phthisis, for example. Sometimes, where we find this softening to be very great, there has been nothing more than anorexia (loss of appetite), and some degree of indigestion. It is common to find this state where persons have been dyspeptic. This affection is, in other respects, similar to the softening of the brain. Occasionally it is *acute*,—takes place rapidly and suddenly; and occasionally it appears to be a very *chronic* change. When it takes place as an acute affection, there is generally a red tongue and vomiting; but sometimes I have seen it where the patient, a short time before, was in perfect health. The same circumstance has been observed, with regard both to the stomach and to the intestines. Sometimes, in the case of the intestines, the disease follows diarrhœa.

Gelatinous Softening.—This softening, though it is most usual in the mucous membrane, may extend to all the coats; and the intestines, though at first sight they may seem healthy, yet when examined, appear like jelly. This general softening of the stomach, is most frequent in the splenic end; and I presume that, very frequently, it really results from the operation of the gastric juice; but that, I imagine, is only one cause of the disease. Cruveilhier has given some good representations of this disease. In these cases we may brush the membrane all away. This softening is not to be ascribed to any decomposition of the part. In the case of the

stomach, no doubt, it will arise from the gastric juice; but if it occur in other parts of the alimentary canal, it must be supposed to have taken place during life; for the intestines do not become soft by decomposition, unless a considerable degree of time has elapsed. The *brain* will soon become soft; but the *intestines* retain their consistency for a considerable time.

Experiments on the Gastric Juice.—Some experiments were made at Stutgard (at least, cases were published there) in 1818, upon the effect of the gastric juice in producing this softening. Animals were examined before putrefaction had taken place, and the softness was seen in many cats and dogs; so that it appeared to arise from the gastric juice. If they were allowed to remain till putrefaction had taken place, even then there was not more softening, than in those which were examined sooner. The fluid taken from the inner surface of the stomachs of two children, who had died with this softened state of the mucous membrane, was introduced into the stomach of some dead adults; and it soon caused a solution of the solids; whereas, when it was put into the stomach of a live rabbit, it had no effect. I consider this a great confirmation of John Hunter's opinion;—that this softening of the stomach is mainly attributable to death.[a] But it is said, that if the eighth pair of nerves was divided,—so that the powers of the stomach were impaired,—then the gastric juice occasioned softening during life;—exactly as it did in *dead* animals. If these experiments were correct, they were exceedingly curious.

Softening the Result of Inflammation.—There can be no doubt that common softening of the stomach and alimentary canal, is sometimes the result of inflammation; for we see symptoms of gastritis during life, and signs of inflammation after death. But gelatinous softening of the stomach, is frequently seen in children, who have not suffered from inflammation; but who have been in a general ill state of health;—who have been weaned when they were not able to bear it, and have not been supplied with proper food afterwards. Thus it appears occasionally in a cachectic state; and very often the parts all around are perfectly healthy.

Ulceration.—I will now make a few remarks respecting *ulceration* of the alimentary canal. This is found most frequently in the two lower fifths of the ileum; and, with respect to the large intestines, it is seen more frequently in the cæcum than in other parts. It is seen more frequently in the stomach, than in the jejunum, or the duodenum; but it is seen in all parts of the ileum more frequently than in the stomach; and it is seen more frequently in all parts of the large intestines, than in the two upper fifths of the ileum. This ulceration may exist in the centre of inflammatory spots, or in the centre of red patches. Sometimes we find diffused redness. A long tract of the intestines will be red; and we observe ulceration here and there. Occasionally ulceration occurs in parts more or less melted down; and frequently it takes place in hypertrophied follicles;—both in the "glandulæ *solitariæ*", and in the "glandulæ *aggregatæ*." With regard to the "glandulæ solitariæ", when they enlarge and do not discharge their contents, they become distended, and are more or less firm;—so that they acquire a conical appearance. They then lose their conical form, and have a central depression on their top;—exactly like a variolous pustule. Their orifices sometimes simply enlarge; sometimes they ulcerate down merely to the level of the mucous membrane; sometimes they ulcerate below it; and then, if they run into each other, a frightful ulceration

[a] See Page 1030.

is produced. Of course the ulceration may go on, till the alimentary canal is perforated; till there is a way through it into the cavity of the peritonæum. Ulceration, like softening, may either be an *acute* or a *chronic* affection. Occasionally we see ulceration in the midst of gangrene. Gangrene is a rare occurrence in these parts; but occasionally there is ulceration and gangrene all around. Sometimes we see ulceration of scrofulous tubercles. There are scrofulous tubercles deposited under the mucous coat, in the cellular membrane; and sometimes we see them under the peritonæal coat, and cellular membrane. In this situation they will enlarge, ulcerate, and go through the same process as in the lungs. It is rare to find them ulcerate outwards, towards the peritonæum; but I have seen a few instances of this occurrence. Most frequently the tubercles ulcerate through the mucous membrane into the intestines. This is sometimes seen in phthisis. There has been a minute abscess in the cellular membrane, under the mucous coat; and the latter has ulcerated through.

Ulceration is seldom the effect of acute inflammation of the *stomach*; but it is a common result of inflammation of the *intestines*. The ulceration is sometimes solitary; but sometimes there is an infinite number. In the stomach, however, they are seldom numerous. They are of all sizes; and they take all directions. Some extend down the course of the canal; and some transversely. Then, as to the edges, we find them just as various. Sometimes they are natural; sometimes they are very thick; sometimes they are very hard; and sometimes they are very soft. The nature of the ulcerations depends upon the depth of the ulcer. If only the mucous membrane be ulcerated through, the case is very different from what it would be if the cellular and muscular coats were ulcerated too; for then we should have peritonitis. There is no proportion between the depth and the length of the ulceration. The intestine between the ulcerations may be in various conditions. Sometimes it is healthy, sometimes it is unhealthy. Not only the mucous, but the cellular coat underneath, varies much as to its condition.

There is no doubt that these ulcers will heal;—just like ulceration in other parts of the body. Every now and then we find ulcers in the intestines in various stages. Some are open ulcers; some are half cicatrized; and others are *entirely* cicatrized. We find portions of the intestines which have evidently been in a state of ulceration, but which have healed; and it is very interesting to meet with an ulcer half healed; for then there can be no doubt of the nature of the affection.

Perforation.—Persons who are not known to be particularly ill during life, are sometimes found, after death, to have an ulceration in the intestines, or stomach. They have had some little illness; but perhaps no one knew of it;—they were in apparent health, when they were suddenly seized with violent pain in the abdomen; and they died from perforation having taken place, and peritonitis being set up. Occasionally this takes place where the patient is labouring under some other disease in the abdomen;—that disease not having been known to exist; but, more frequently, it occurs where persons have suffered from a gastro-enteritic affection. Mere softening will produce a perforation;—just as ulceration will do; and sometimes a slough will give rise to the same circumstance; though that is very rare. In brutes, perforation has taken place; and the coats of the intestines have sometimes lost their continuity by distension, occasioned by gases. In horses, this has been known to take place in consequence of vomiting; for vomiting will not occur in them, unless there be such a violent effort as is dangerous to animal life. It has occurred in human

beings when the stomach has been diseased. If the stomach be thin, mere vomiting has sometimes caused perforation. Perforations from these various causes are seen, most commonly, in the stomach, and particularly at the lower end of the organ. There can be no doubt that some perforations take place after death; but when they do not, there is generally violent peritonitis.

Rupture.—Blows on the abdomen will sometimes rupture the stomach and intestines. It might be supposed that, in all cases where violent peritonitis took place from this circumstance, the contents of the stomach would be effused; but that is not the case. It is said, that sometimes very little irritation has been produced, and only chronic peritonitis. But I believe the cases must be very rare;—at least, I have never met with one. Sometimes the opening has been completely blocked up by nature, by means of a piece of omentum or something else; and no mischief has occurred. Sometimes adhesions have taken place, and a fistulous opening has been the consequence; so that some persons have discharged the gastric juice from their stomach, while others have had an artificial anus. In the case of the rectum, these perforations will occur; and we have what is called "fistula in ano." Sometimes one portion of intestine will perforate into another. Two portions lie together; nature produces an adhesion; one of them becomes perforated; and an opening takes place in the fellow convolution. Occasionally the intestinal canal has been seen perforated from without. When an abscess occurs in the liver, or a stone from the ducts or gall-bladder has got into the intestines, these parts will become perforated from without. Various tumours have been known to ulcerate into the intestines.

CHAPTER VI.

DISEASES OF THE STOMACH.

SECTION I.—ACUTE GASTRITIS.

Symptoms.—Gastritis, or inflammation of the stomach, is characterized by an acute and constant pain at the pit of the stomach. This pain is increased on the slightest pressure; and it is likewise increased on swallowing any thing;—particularly if it be hot, or acrid. There is generally also,—provided the disease is violent,—a great sense of tightness across these parts. These symptoms arise simply from the *locality* of the inflammation; but there are others dependent on the *function* of the part which is inflamed. We have nausea, retching, and even vomiting itself;—especially when any thing is swallowed. Sometimes also there is hiccup (singultus). A burning sensation is generally experienced; which, for the most part, extends up the œsophagus, and is felt even in the pharynx. It is not uncommon for the epigastrium itself (the external portion of that part of the body in which the inflammation resides) to be hotter than the rest. There is generally thirst, great anxiety, and not unfrequently a feeling of great debility. The pulse is quick, small, and perhaps hard; but there is a great variety in this respect;—just as in inflammation of other parts. The acute form of gastritis, if it be violent and not speedily remedied, soon proves fatal.

Frequently Preceded by Spasm.—Very frequently, this disease is preceded by merely a spasmodic pain of the part. It is not uncommon (as I shall mention particularly when describing what is called "disorder of the digestive organs") for persons to be seized with sudden pain at the pit of the stomach;—running through the back; affecting respiration; drawing the patient together; perhaps relieved, at any rate not increased, by pressure; not attended by a sense of heat, but perhaps by a sense of cold; and unattended by any great thirst. So far from the pain being increased by heat or stimuli, it is generally diminished by them. This is evidently a state of spasm; but after it has existed for a longer or shorter time,—if it be not remedied, or if it do not cease spontaneously,—it very frequently degenerates into, or gives rise to, or is followed by, inflammation of the part. We shall then find the treatment we were at first adopting, highly improper. The administration of stimuli does harm; and if we omit the common treatment of inflammation, the patient is very liable to slip through our fingers. We must carefully remember, therefore, that there are two descriptions of pain attacking this part of the body;—the one entirely spasmodic, the other inflammatory; but that the spasmodic very frequently terminates in an inflammatory state.

Causes.—Gastritis is produced, in the first place, by the common causes of all inflammations; cold applied to the body, especially when the body is

heated. Sometimes it is produced by cold applied to the inner surface of the stomach, when the body is over-heated. Sometimes, when a person is very hot and takes cold drinks, before inflammation comes on there is a state of extreme debility. Occasionally the power of the stomach seems almost destroyed; the person is very faint; the pulse is small; and sometimes death ensues without any re-action taking place. We sometimes hear of ladies dying suddenly, when they have been drinking cold water, or eating ices, while they were hot. The danger does not arise simply from being hot; for the hotter we are, the more good does cold do. It is not even the simple circumstance of sweating, that makes it dangerous for a person to go into the cold bath, or to roll himself in the snow,—which the Russians do when there is no necessity for it; but it is the circumstance of the individual being exhausted, that makes the abstraction of all stimuli dangerous.[a] If we meet with a patient who has an affection of the stomach from exhaustion, the best mode of treating it, is to give a large dose of opium, together with stimulants. If the person recover from this state, it is possible that inflammation may not arise. But sometimes, without such a depression as this, the application of cold to the surface when the body is exhausted, may produce inflammation;—just as in other cases. The external application of cold may produce inflammation of the bowels.

Occasionally gastritis is produced by the sudden cessation of gout. When gout suddenly ceases in an extremity, inflammation of the stomach will occasionally arise; and that of a very dangerous character. But another state of the stomach is frequently induced in these circumstances;—namely, a violent spasm of the part (gastrodynia);—a state to be treated, perhaps, by brandy. Gastritis sometimes occurs sympathetically with an affection of the kidney;—when the kidney is severely affected in various ways. When a stone is on its passage from the kidney, the stomach generally sympathizes; so that vomiting occurs, and sometimes real gastritis takes place. It will sometimes arise from sympathy with the state of the womb. The womb, when diseased, frequently gives rise to nausea and vomiting; and sometimes the irritation may amount to inflammation. This state is very often induced by the passions of the mind. A sudden emotion of the mind, of a very disagreeable character,—great grief,—sudden surprise of an unpleasant description,—a sudden and severe shock,—will sometimes give rise to a spasmodic pain here ("spasm of the stomach", as it is called); and sometimes to actual gastritis. Great fatigue will have the same effect. Of course it is a disease that is easily produced by any acrid matter. Many poisons, properly so called, produce inflammation of the stomach; but any acrid matter whatever, or any stimulus (properly so called),—such as a large dose of cantharides, or corrosive sublimate,—or any thing else that can irritate the stomach, may produce gastritis. It occurs likewise in other diseases. In fevers, gastritis of more or less intensity is very common. I mentioned that, in the fevers of hot countries, there is a burning heat at the pit of the stomach[b];—deserving to be considered as active acute gastritis.

Morbid Appearances.—On inspecting the stomach after death, the redness is very seldom universal. It is very seldom that the whole of the inner surface of the stomach is inflamed. Sometimes this is the case; but generally it only takes place at a particular part. When peritonitis exists, that portion which covers the stomach may be inflamed,—the same as any

[a] See Page 120. [b] See Page 330.

other part; but in general gastritis, properly so called,—gastritis independent of inflammation of the peritonæum,—merely produces local effects on the mucous membrane of the stomach; though occasionally it extends to the cellular membrane between the coats. This disease very seldom induces gangrene. I never myself saw such a thing; but occasionally gangrene does take place. Very seldom does it produce abscess; but occasionally an abscess has been found between the coats of the stomach. We are more likely to meet with gangrene of the stomach after acrid substances have been applied, than in any other circumstances. If caustic substances have been taken, then we may expect gangrene. A slough is produced, which may or may not be thrown off.

Care Required in Determining the Cause.—This disease may arise from acrid or poisonous matters introduced into the stomach, without our being able to discover any trace of them. It is very possible for a patient to have vomited every thing which he took, or for the ingredient to have passed into the intestines, and so to have escaped from the body; and yet sufficient inflammation may have been induced to destroy life. Although it is very possible that death may ensue from things taken into the stomach, we are never justified in saying that inflammation of that organ,—that the various morbid appearances which we see there, have been owing to poison, unless we prove its presence;—unless we discover it in what has been vomited;—unless we find it contained in the alimentary canal, or in what has been discharged, or in a vessel of the contents of which the patient clearly partook. If it were not for an accurate knowledge of this circumstance, we might suspect that poison had been taken, without there being any justifiable reason whatever for the opinion; for the appearances within the stomach, may be precisely the same as those induced by taking poison, or some other injurious matter; when it is simply common inflammation, and the effects of it.

Treatment.—As to the *treatment* of the disease, the first point is undoubtedly to discover the cause. It is of very great importance to know whether the disease has arisen from any thing taken into the stomach or not; because, if it have, our first object must be either to effect its removal, or to destroy its power. I need not say, that the most ready mode of emptying the stomach, is to employ a stomach-pump. This is much better than giving an emetic; because emetics add to the irritation, or they may fail. The most powerful medicines are those of an acrid kind. Sulphate of copper is one of the best; and, next to that, sulphate of zinc. These operate immediately, and produce little nausea. Ipecacuanha produces great nausea, and may not effect the purpose after all;—at least, there is less probability of its succeeding, than in the case of sulphate of copper. When we have recourse to the stomach-pump, it would be as well to employ an antidote. If a poisonous acid have been taken, it is better to pump in *magnesia*-water than *plain* water; but if an alkali have been swallowed, then we should have recourse to diluted vinegar. The best plan, in all cases, is to fill the stomach with warm water;—to pump it *in*, and pump it *out*, till the fluid comes out quite clear, and we are satisfied that nothing remains. Provided a stomach-pump is not at hand, an emetic should be had recourse to; but notwithstanding we have done all this, and emptied the stomach immediately, we shall find it of the utmost importance to go on treating the gastritis, as though we had done nothing of the kind. After arsenic or corrosive sublimate has been taken, and the stomach has been washed out, and there is no fear from the immediate effects of the poison,

gastritis may nevertheless exist, and destroy the patient; or, at any rate, produce great danger; and we must have recourse to the common treatment of gastritis.

When the disease arises from simple cold, or after poisons, it may be necessary to bleed generally or locally. Cupping can hardly be borne; but leeches should be repeatedly applied over the part; and when we cannot employ them any more, blisters should be had recourse to. Cold drinks are grateful to the patient; and there can be no objection to ices. There is intense heat, and a great sensation of thirst; and the greatest comfort imaginable seems to arise from cold draughts. The best plan is to consult the patient's feelings. If he like cold drinks, let him have them; or if he like ices, there is no reason why he should be debarred from them. We should follow the same rule as in inflammation of the surface;—change these *cold* drinks occasionally for *warm* ones, and let the patient regulate the temperature. Of course it is necessary to keep the intestines in a free condition; and I should imagine it would be better to do this by clysters, than by any other means. The stomach should be left as quiet as possible; and therefore I would trust this part of the treatment entirely to injections. With regard to the exhibition of mercury in these cases, I hardly know whether it is necessary or not, or whether it would be injurious or not. I have occasionally administered it where I was afraid that death would take place, without seeing the stomach irritated by it; but if we remove the cause (which is something acrid), have recourse to bleeding, give the patient cold drinks, and keep the bowels freely open, the inflammation of the stomach is, in general, disposed to subside.

Conjoined with Other Diseases.—Inflammation of the stomach is very common in many acute diseases. It frequently occurs in erysipelas; and is sometimes evanescent,—will go away without any treatment, if we keep the patient low; but occasionally it requires local treatment. In fevers we must look out for gastritis. In the continued fever of this country,—properly so called,—and many other acute affections, this disease is very likely to spring up; and therefore, in these affections, we should always, from time to time, examine the state of the abdomen.

SECTION II.—CHRONIC GASTRITIS.

Symptoms.—Gastritis is much more frequently a *chronic* than an *acute* affection. When it exists in a *chronic* form, the symptoms are much the same as when it is *acute*; only they are less intense. There is a great sense of heat within the stomach, rising from the œsophagus into the pharynx; great thirst; tenderness of the part on pressure; loss of appetite; nausea; and frequent vomiting. The tongue is *generally* red somewhere;—either at the tip, the sides, or all over; but we may have inflammation of the stomach, more or less violent, without redness of the tongue. We must not depend on the tongue alone. There is generally redness of the tongue; but we are not to say that the other symptoms do not shew gastritis, because the tongue is absolutely white, or not much affected. In these chronic cases, there are generally dyspeptic symptoms;—such as a great flatulence, great acidity, and a sense of sinking at the pit of the stomach. The latter is a very common symptom; and, to remove it, people generally take wine and brandy, and make things worse. The want of attending properly to this point, occasions very absurd treatment. I have

seen persons, in this affection, have draughts of æther and ammonia, and things of that description;—all of which may be grateful for a time; but which, as patients frequently themselves say, ultimately produce great uneasiness. It is always right, when treating dyspepsia, to ascertain whether there is an inflammatory state of the stomach; for that organ may be in a condition requiring stimuli of all kinds; or, on the other hand, requiring the application of leeches, and making all stimuli and effervescing draughts exceedingly improper. Many persons labouring under dyspepsia, clearly have gastritis; for there is great pain on pressure; and because they feel a sinking sensation, they drink wine and brandy, and eat meat. I have seen them get completely well, by changing their diet,—without taking any medicine whatever; and, in other cases, by applying leeches.

Treatment.—As to the *treatment* of the disease, it is simple enough. Avoid stimuli, apply leeches from time to time, keep the bowels open, and remedy acidity.

A very slight degree of tenderness at the epigastrium, however, is not sufficient to make it necessary to apply leeches, or to lower the patient. When an individual is subject to occasional attacks of pain in the stomach (gastrodynia), there is always tenderness;—merely from the part being stretched. If we have spasms in the calf of the leg, next day the part is sore;—merely from the muscular fibre having been stretched; and if nothing is done to make it worse, it will go away. There is no occasion to apply leeches to the epigastrium, simply because it is tender. There has been, for a certain time, an attack of spasm; which has left a little tenderness of the stomach; and it will yield best to stimuli;—just as a slight degree of inflammation of the eye, is more easily dispersed by washing it with brandy and water, than by any other means. But if there be much tenderness on pressure, and heat extending up the throat, then stimulating remedies would be improper. It is also to be remembered, that a sensation of heat in these parts generally arises from acid in the stomach; and that by giving alkaline substances, we entirely remove it; but we may also apply leeches. If, however, we give alkaline substances (such as magnesia and carbonate of soda), a much smaller number of leeches will destroy the acidity. Frequently this is the result of an inflammatory state; and the best way to cure it is to employ leeches; but to prevent the acidity from doing much harm, we should give antacid remedies; or, if there be morbid irritability, such a medicine as prussic acid will be of great service. But of that I will speak hereafter.

Accompanies Other Diseases.—Chronic gastritis is an accompaniment of many other diseases;—just as it frequently takes place after *acute* gastritis. It is very common, in diseases of the heart, for persons to have more or less gastritis; which, if it rise to any amount, aggravates all the other symptoms. There is tenderness on pressure; and this, perhaps, extends over all the parts; and we find that, some time before, the patient has had disease of the heart. So, again, it is by no means uncommon for a person in phthisis to have more or less gastritic affection. In various chronic diseases, gastritis comes on from time to time, and requires to be remedied; or the symptoms of the original disease will be increased. It is well to ascertain, occasionally, the state of the abdomen, when the patients are labouring under chronic affections;—the same as when they are suffering under acute.

a. Ulceration of the Stomach.

Absence of any Diagnostic Sign.—When gastritis has existed any time, it may perhaps ulcerate the stomach. Such an occurrence is by no means uncommon. I know of no symptom indicative of ulceration of the stomach; and have frequently met with it by surprise. I have known that the patient had chronic gastritis; but there was no symptom that led me to suppose that, in addition to gastritis, there was ulceration. The symptoms are the same in both cases;—tenderness, thirst, a sensation of heat there, dyspepsia, and perhaps emaciation. Sometimes we find pain at one particular part of the stomach; but that may occur without any ulceration. There is no certain diagnosis. We may fancy it to be the case, but our conjecture may be wrong; and we may find nothing but chronic inflammation.

b. Rupture of the Stomach.

Symptoms.—If the ulceration proceed to an aperture, there generally occurs, suddenly, a fresh set of symptoms. There is sudden severe pain in the epigastrium; and, in a case which I saw, there was also intense coldness; so that the patient held a glass of boiling water to the part, without feeling it warm,—without being at all annoyed by it. He also drank water so hot, that I could not have put it to my mouth. Affections of the stomach are frequently attended by a want of power to generate heat.

Generally followed by Peritonitis.—This pain, after it has existed for a certain time, is generally followed by peritonitis. There is a paper on this subject by Mr. Travers, in the eighth volume of the "Medico-Chirurgical Transactions"[a]; in which he states that the diagnosis, in a case of this description, or in perforation of the intestines, would be sudden pain in one part of the abdomen (in the case of the stomach, at the epigastrium), radiating from the part; and he considers that the pain would never cease. In a patient of mine, where there was an aperture of the stomach, the symptoms were these. (I had never seen her before; but she was tall and very spare, and was said to have been long dyspeptic.) One day, after dinner, she was seized with a sudden pain in the stomach. It was impossible for me to tell whether this was more than a spasmodic pain; for it was not aggravated by pressure. I gave her laudanum, of which she took sixty drops; but, finding no relief, she took more; and so she went on till, in a few hours, she had taken three hundred drops; and after that the pain ceased. It is not correct, therefore, to say that the pain never ceases. I afterwards found some cases published in France, and also one by Dr. Carmichael Smith, in which the pain went away; and therefore we are not to be sure that the stomach and intestines are not ruptured, because the pain ceases. After twelve or eighteen hours, my patient again had pain enough; for the whole of the peritonæum became inflamed together. This inflammation could not be removed, and she died. From the suddenness of the pain, the great prostration of strength, the smallness of the pulse, and the sinking of the patient, we may imagine that there has been a rupture of the stomach or intestines; and we are not to imagine it the less because, after a time, the pain goes off. If the patient live long enough, peritonitis occurs, from rupture of the alimentary canal; and this cannot be remedied, because there is a local disease which keeps it up. I mentioned before[b], that these perforations sometimes take place without any sudden symp-

[a] Page 231.

[b] See Page 1034.

toms;—that, occasionally, *slow* peritonitis occurs, and gradually leads to ulceration.

Treatment.—In these cases of rupture, I should recommend the free exhibition of opium; and, when inflammation comes on, the application of leeches. These measures will lessen the suffering, although we can do no further good.

Morbid Appearances.—If the destroyed portion of the stomach owe its condition to an ulcer produced by the gastric juice, the edges are not so smooth, as in cases of simple ulceration; for the gastric juice does not act so very locally; but the parts all around suffer, and become soft. I believe that, where the stomach has been injured, after death, simply from the action of the gastric juice, there is a softened state of the parts immediately around. It should be recollected that the latter circumstance occurs, particularly, at the splenic end of the stomach; whereas common ulcers take place anywhere; and in the latter case a patient, previously in good health, speedily perishes. Occasionally, notwithstanding that the stomach is ulcerated, no serious mischief arises; because nature produces adhesions around the stomach, and glues it to the liver, the peritonæum, or the omentum; so that, although the stomach is perforated, no aperture exists. Of course there is injury from the ulceration; but none from the perforation.

Presence of Pus.—Pus is sometimes found within the coats of the stomach; and sometimes it has been seen diffused throughout the whole of that organ. Between the coats, there has been one sheet of pus; bounded by the peritonæum on one side, and probably by the mucous membrane on the other;—the muscular coat having been destroyed. But sometimes it has been found between the muscular coat and the mucous membrane, and between the muscular coat and the peritonæum. Sometimes a collection of pus takes place in one particular spot. Pus has been found, it is said, on the inner surface of the stomach; but when we recollect that this part is naturally covered by mucus, and that sometimes this is secreted in great quantity, one hardly knows whether there is really an alteration in the secretion. Still there is no reason why the stomach should not form pus on the inner surface; and no doubt it does; exactly like other membranes; especially as it has been found, occasionally, on the *external* surface.

Effused Fibrin.—It is a very rare thing to find *fibrin* effused upon the inner surface of the stomach; yet there is not a mucous membrane that may not form fibrin, under violent inflammation. It is stated by authors, that occasionally a false membrane (as it is called) has been noticed on the inner surface of the stomach. I believe this most frequently occurs in children. It is *before* puberty rather than *after* it, that fibrin is formed in the œsophagus. If we find a false membrane in the œsophagus, it generally terminates at the cardiac orifice of the stomach. So rare is it for fibrin to be formed within the stomach, that even if the œsophagus has produced it, the false membrane has generally been seen to end at the cardia. A layer of fibrin sometimes occurs in the throat; but it has not often been seen to extend lower than the œsophagus.

SECTION III.—STRUCTURAL DISEASES OF THE STOMACH.

Besides common inflammation and its effects, with which we are now acquainted, the stomach is liable to peculiar structural diseases. Scirrhus, open cancer, encephaloid disease, and melanosis, will occur in the stomach; and will all take place in various parts of it; but they most frequently take

place at the cardia and the pylorus. This accords with the general rule that I mentioned[a];—namely, that the *orifices* of cavities are most frequently the seat of structural disease.

Symptoms of Scirrhus.—When scirrhus exists, there may be pain at the spot which is affected; and that pain may go through to the back, and be increased on taking food. Besides pain, there may be all the symptoms of indigestion; and there may be great nausea and vomiting; so that nothing can be retained on the stomach. If it be the *cardia* which is the seat of the affection, the food is generally rejected immediately. I have seen an instance where, the moment the food reached the cardia, a heaving took place; the patient felt as if he were being destroyed by wind; and he said the complaint was nothing but wind. Sometimes the food will pass the cardia, and be rejected immediately, or five or ten minutes afterwards. But if it be the *pylorus* in which the disease resides, then the food will generally be retained for some time;—perhaps for half an hour, or more. There is no general rule for the time. There may be pain in the region of the cardia, or pain in the region of the pylorus. In the case of the cardia, we may find great difficulty in passing a probang into the stomach, for there may be a stricture at the part; but when the pylorus is affected, there is not only severe pain in that region, but at last there is a tumour. In that case, there is generally emaciation, and a sallowness of look;—such as might be called "cancerous cachexia." The vomited matter is sometimes very offensive,—sometimes bloody; and sometimes the eructations are exceedingly fetid.

Absence of Prominent Symptoms.—Nothing, however, is more common, than to have dreadful disease in these parts, with scarcely any symptoms whatever. Every practitioner must have seen extreme disease in the stomach,—great ulceration of it,—decided cancerous and other malignant diseases of this part,—without any pain worth naming;—without any vomiting till just before death, and without any other symptom than perhaps extreme weakness, paleness, and some obscure uneasiness about the stomach; and perhaps not even that. It is sometimes quite extraordinary to open stomachs, and see the disease which exists there, without any symptoms having taken place, or symptoms of a very slight character. When the pylorus is affected, we occasionally have jaundice, from pressure on the hepatic duct, or on the "ductus communis choledochus." Occasionally in this disease, as well as in an affection of other parts of the stomach, there is vomiting of a very fetid secretion, and sometimes of blood; and the blood will pass through the pylorus to the intestines, so as to appear in the motions.

There is not one of the local symptoms of this complaint, that may not be absent. Sometimes there is no vomiting; sometimes there is no pain; and it is only by a very careful observation,—indeed, by considering that there are no signs of derangement of other organs, that we frequently make up our minds that the disease is probably situated in the stomach. Sometimes there is very little more than dyspepsia; and sometimes people eat well, and are but little troubled with indigestion; but, at last, there is generally more or less hectic.

Obscurity of the Symptoms.—These scirrhous formations and cancerous ulcerations, as well as other organic diseases, may of course exist at any part of the stomach, as well as at the two extremities; and the symptoms are generally the same. The symptoms are much less likely to be ob-

[a] See Page 224.

served in the stomach, if no obstruction is produced. If an obstruction be produced in the pylorus, then we have disturbance; or if it occur in the cardia, there is great difficulty of swallowing, and great pain when the ingesta reach the part. In the case of the pylorus, the stomach becomes so distended,—from the difficulty with which the contents pass out,—that vomiting generally occurs. When there is an obstruction at the pylorus,—either from scirrhus (which is the most common), or any other disease,—it is generally noticed, that the stomach acquires a very large size;—owing to the difficulty with which the contents pass through the pylorus.

Morbid Appearances.—If scirrhus exist generally in the stomach, the organ becomes very thick throughout, and its cavity is diminished. The mucous membrane looks puckered and ulcerated. When the disease is situated about the pylorus, it may occasion the stomach to become of an immense size; whereas, if it exist throughout the stomach, it may produce very great contraction; for scirrhus causes a shrinking, and produces a contraction of the parts all around, which spreads throughout the stomach; and, in the case of the pylorus, produces such a contraction there, that the food will not pass through. Dr. Baillie mentions that, occasionally, there is simple stricture of the pylorus or the cardia, independently of malignant disease. These two parts are subject to stricture,—just as the urethra is,—without any organic disease whatever.

Treatment.—With regard to the *treatment* of this affection, it is merely palliative. Support the patient's strength, and give narcotics, in order to alleviate the suffering and vomiting. There is no medicine with which I am acquainted, that produces so much alleviation in these organic diseases, as hydrocyanic acid. It frequently *arrests* the vomiting for a long time; but it always *lessens* it very considerably. If there be very great pain, it is necessary to employ opium, in order to reduce it. I have used iodine in these cases; with (as I have thought) a certain degree of advantage. In one case of scirrhous pylorus, I exhibited iodine and prussic acid together; and the disease appeared to stop. I have no doubt that the patient laboured under scirrhous pylorus; for I felt the tumour, and the patient had a sallow look, and vomited for a long time. I gave him these medicines as a forlorn hope, and he was much better; but, in a great number of cases, I have not seen any such result as this; and sometimes there has been no benefit whatever.

With regard to stricture of the cardia, some good may be done by mechanical means,—by passing a bougie;—taking care not to pass one so large, as to occasion suffering to the patient. In the case of a contracted rectum, benefit has been said to be derived by the passage of a bougie. Although organic disease cannot be remedied, yet the effect of it in lessening the canal may be diminished; but great care should be taken not to employ it in such a way as to cause injury.

I mentioned [a], with regard to stricture in the œsophagus, that sometimes there is a *scirrhous*, and sometimes only a *common* stricture; and that, besides these diseases, which can be treated only by a common bougie, the parts are subject to spasmodic stricture. The latter case occurs particularly in females; who will sometimes, for weeks together, be unable to swallow; and then they will swallow very well. These cases are to be treated by improving the general health, by the cold-bath, and by pleasant occupation of the mind.

[a] See Page 784.

SECTION IV.—HÆMATEMESIS.

There is one disease to which the stomach is very liable; and that is hæmorrhage. Without the presence of any malignant disease,—without any *organic* disease,—frequently without any inflammation that can be discovered, and frequently without any danger whatever, a quantity of blood is discharged into the stomach. It is usually dark and in large clots. When describing "hæmoptysis", or "spitting of blood", I stated that one could not infer, because in these cases the blood was black, that it was venous blood; for if arterial blood be poured forth into a cavity, and lie there, it will acquire a venous character.[a] Its nature is not to be ascertained from the colour; but when we consider that patients will pass a vast quantity of blood in this way, it seems most probable that it proceeds from the veins, where the motion is very slow. We cannot but conceive that, if it came from the arteries, patients would suffer much more depression. We know that a great quantity of blood is sometimes discharged from the pelvis,—flows from the lower part of the alimentary canal, attended with no very great loss of strength; and there the blood is, for the most part, black.

Symptoms.—Hæmatemesis[b] is usually marked by nausea and vomiting;—if not by the latter, yet by the former; and by the sensation of a load at the pit of the stomach,—at the epigastrium and left hypochondrium. Sometimes, in addition, there is great pain there on pressure. The blood, besides being thrown up by vomiting, is frequently discharged by stool.

Causes.—This disease occurs very frequently in persons who are dyspeptic; though I do not mean to say that this affection is a symptom of dyspepsia. It occurs far more frequently in females, than in males; and it is common in women whose catamenia are suppressed or diminished. In some persons, it will return at intervals; and occasionally it is periodical.

The ordinary form of the disease,—like a great discharge of blood from the intestines themselves,—is for the most part without danger. Persons *may* die from it; but, for the most part, they recover. Still it may be a very dangerous disease. It may proceed from an ulcer, and we may not be able to stop it; but, for the most part, it would appear that great congestion has gradually taken place in the neighbouring parts;—in the stomach, and most probably in the liver and spleen, and all around; and then this blood, half out of the circulation, is poured forth; and nature is very much relieved by it. It is, for the most part, a passive hæmorrhage.[c] It sometimes arises from an obstruction in the liver and spleen; as well as from the want of secretion by, or discharge from, the womb. It is frequently observed in hepatic and splenic diseases. The danger chiefly depends upon the source whence the hæmorrhage proceeds. An aneurism of the aorta has sometimes opened into the stomach, and given rise to the disease. Occasionally this hæmorrhage is only a part of the affection called "purpura hæmorrhagica"; which I formerly described.[d]

Case.—I once saw a patient die suddenly, from this affection. I am not aware that he had hæmorrhage before; but he had some pulmonary complaint. He suddenly fell back, and died in a minute or two. Blood came from his mouth; and, on opening the stomach, it was found to be filled to the utmost with blood; which formed a large mould of the organ. I

[a] See Page 863.
[b] From αἱμα, *blood*; and ἐμεω, *to vomit*.
[c] See Page 150.
[d] See Page 504.

could discover no disease whatever of the part, or any vessel that let it forth. Sometimes, in this affection, the internal surface of the stomach is pale; and sometimes it is in a state of great congestion.

Treatment.—It may be necessary to take blood from the arm; or it may be necessary to apply leeches plentifully all over the stomach, and then to order blisters. But for the purpose of stopping the hæmorrhage, it is best to give the patient cold drinks; and, if possible, iced water. Give scarcely any food; and not only take care that what he drinks is aqueous, but that it is as cold as he can bear it. The oil of turpentine is one of the very best remedies that can be employed. I do not know that I ever failed in stopping hæmorrhage of the stomach with it. It should be given in small quantities;—twenty or twenty-five drops, every six, or every four hours. If it should create sickness, it is advantageous to unite hydrocyanic acid with it. They may be given conjointly; or the acid may be given a few minutes before. The acid has not the power of stopping the hæmorrhage; but if there be any nausea, it enables the stomach to bear the turpentine much better. I have the highest possible opinion of *lead*, in passive hæmorrhage; but here we can apply the oil of turpentine to the spot which is the seat of the affection; and although I never saw it do good in hæmorrhage from the *lungs*, yet it is superior to lead in the case of the *stomach* and *intestines*. The effect of it, when it comes in immediate contact with the part, is very great; but still it is necessary to keep the patient perfectly quiet. I have had a large number of cases of this disease; and I believe every one of them has done well. I do not remember a case, where the turpentine had not a decided effect in stopping the hæmorrhage.

The foregoing are the principal diseases of the stomach,—with the exception of dyspepsia; which is so connected with an affection of the liver and alimentary canal, that I will bring them altogether under one name,—"derangement of the digestive organs"; and will describe them hereafter.

CHAPTER VII.

DISEASES OF THE INTESTINES.

SECTION I.—ENTERITIS.

Symptoms.—We will now pass the pylorus; and consider, first, inflammation of the intestines. In simple enteritis,—supposing it to be active and violent,—we have acute deep-seated pain; and this may occur in various parts of the intestinal region. Although the pain is constant, yet it is aggravated at intervals; and it is increased on pressure. It differs from "a fit of the gripes", as it is called,—"pinching and purging",—in this;—that, in common "pinching", there are intervals of ease, and when the "pinching" is over, the person is comfortable; whereas, in enteritis, although the pain comes on at intervals, yet it is constant;—although it is not of uniform intensity, yet it is always present. This is an important thing to observe; for I have seen persons seized with tormina, which required brandy, or at least laudanum, to assuage it; and then, gradually, the tormina became constant; and there was pain increased on pressure; whereas, before, it was rather relieved by it. When this change takes place, laudanum and brandy would not only be useless, but would increase the pain;—so that bleeding would be required. I recollect one case, where I was with the individual the whole time; and the series of changes was quite manifest.

In this disease, where there is this sharp fixed pain, there is usually great costiveness. The abdomen, after a time, becomes tense; and, from the severity of the pain, there is anxiety of countenance. The tongue grows white, and the breathing is quickened. Nausea and vomiting soon occur; and if complete obstruction take place, we may have vomiting of fæces. This occasionally happens; and, formerly, a particular name was given to it;—"the ileac passion"—"passio ileaca." The patient lies on his back,—just as in peritonitis; with his body drawn forwards, and his limbs drawn up.[a] The patient lies quiet; for if he move about, he increases the pain. A patient is often disposed to be restless throughout; but, for some reason, he cannot. In these cases the patient keeps his body still; but tosses his arms about. The pulse becomes quick; and it is generally small, and sometimes hard. It is generally in cases of this kind, that we have what is termed a *wiry* pulse;—that is to say, the pulse is as small and as hard as a wire. A thready pulse is one which is as small and as soft as thread. The tongue at last grows brown; and ultimately (provided things go on from bad to worse) the pain ceases; the patient will often bear pressure; the abdomen swells, and becomes very large; and if we place our fingers across it, and strike it, the sound is as hollow as that of a drum. The patient then becomes exceedingly restless, and delirious;

[a] See Page 998.

the pulse becomes irregular, and very rapid; the respiration is also quickened; and death ensues.

Morbid Appearances.—After death, very likely we may find no effusion whatever; but mere redness. Sometimes, however, there is an effusion of lymph upon the surface, and more or less serum;—from the peritonæal coat having suffered with the rest. Owing to the great congestion, a portion of the intestines will sometimes be almost black;—as black as any blood can be. This has continually been mistaken for gangrene, as Dr. Baillie mentions [a]; and as I stated when speaking of inflammation in general [b]; but we find that it resists the fingers in a way that gangrene would not. We know how mere congestion will make a person black in the face. But there *may* be gangrene; though it is a very rare thing. I do not recollect having seen it. The parts become lacerable like paper, as well as black; and they smell intolerably. Occasionally pus has been found in the substance of the intestinal coats. The mucous membrane within, and the serous membrane without, are inflamed; but the chief seat of this inflammation,—producing this obstruction and this violent pain,—I believe is the cellular coat of the intestines. The muscular fibre may be in a state of *hypertrophy*; but I have never seen it *inflamed*. Acute rheumatism is, for the most part, inflammation of the aponeuroses;—even when it appears to be the muscle itself which has been affected. Rheumatism, generally speaking, affects parts which are not muscular; but if the muscle be affected by it, it is only secondarily. We never have an effusion into muscle, or suppuration there, or any thing of the sort. It appears to me that it is the *cellular membrane* of the intestines, that is chiefly the seat of this disease; although the peritonæal coat, and the mucous membrane, may also be inflamed.

Diagnosis.—Enteritis is distinguished from *peritonitis*, by the obstruction that is produced,—the constipation; and the consequent effects of it,—nausea and vomiting; and also by the circumstance of the pain being fixed about the umbilicus, which is generally the seat of it; whereas, in peritonitis, it is diffused.

Causes.—This disease is caused by any thing which will produce inflammation;—cold and wet applied externally, and cold internally; and it is induced by any thing which occasions obstruction. If there be a hernia, and the part becomes girt, then we have enteritis. If the fæces become black and indurated, and will not pass, then we may have this disease. Whatever causes an obstruction, is sure to produce this affection; provided it continue sufficiently long for the disease to be set up.

Treatment.—When called to a patient in this disease, we must first ascertain the cause of it. Examine every part of the abdomen, and see whether there is not an umbilical, or a ventral hernia; for patients continually have symptoms of this description, because there is a hernia; and the hernia may be so small as to escape attention. A small portion of the intestines may slip down, without the patient knowing it. Great mistakes will occur, if persons do not remember that this disease may be the result of hernia; and that a patient may have hernia without knowing it. If there be a hernia, that will be treated in the way which the surgeon thinks best; but if there be not, the first thing which we have to do, is to bleed the patient well. We should set him as upright as he can be; and bleed from a large orifice without any mercy. We must of course consider the

[a] In his "Morbid Anatomy"; Chapter 8; Section 1.

[b] See Page 113.

patient's strength; but we should bleed on till we make a decided impression;—till we knock down the pulse, and make him faint. After this has been done, a very large dose of calomel should be exhibited. A large dose will clear the stomach, as well as a small one; and it will be more effectual in purging. After it has been taken some time, other purgatives should be given; but immediately after it is administered, an active injection should be given; so that, if possible, they may meet half-way, and combine; and then the disease goes away. First bleed very freely, because purgatives will not operate till we have done that; then give a large dose of calomel (such as a scruple) by the mouth; and then administer a strong purgative injection;—containing plenty of salts (combined with senna, if preferred), or extract of colocynth, or oil of turpentine. I would repeat the calomel, in doses of about ten grains, every four or six hours;—giving purgatives, in addition, from time to time, till the mouth is sore; and when this effect is produced, and the bowels are freely open, the inflammatory symptoms generally go away; and as the obstruction frequently arises from mere inflammation, if we remove the latter by bleeding, and produce a mercurial affection on the patient, the former will subside.

It is also well to cover the whole abdomen with leeches. Twenty, thirty, or forty should be applied; and we should then give mercury till the mouth is sore, and follow it up by other purgatives;—such as croton-oil, which is one of the best, and of which a drop may be given every two or three hours. Sometimes I have given a drop every hour. If these measures will not open the bowels, then we shall find it of very great use to employ the smoke of tobacco. A tobacco-clyster is sometimes a dangerous thing: and therefore we should only put a drachm to a pint of water, throw up one half of it, and watch its effects; but the smoke of tobacco is very manageable. There is a little apparatus for the purpose. We must watch the pulse at the same time; and regulate the smoke proportionately, at our discretion. Sydenham was very fond of this remedy; but not more so than it deserved. He says that the smoke of tobacco was, by far, the most efficacious of all the injections he knew. I know many practitioners who now employ this remedy, with very great success. If this fail, there is no impropriety in taking the patient out of bed, and throwing a few pails of cold water hard against the abdomen. That will sometimes open the bowels, when nothing else will. But where there is inflammation, and no mechanical cause that we can discover, the best mode is to treat it as an attack of inflammation; but in the most decided manner. Take care to give purgatives as abundantly as the stomach will bear them, till they produce their effect.

Similar Symptoms from Spasm.—This disease is called "enteritis" (from ἔντερον, *an intestine*; and "itis",—*inflammation*); because it is an inflammation of the substance of the intestines. But similar symptoms, in many respects, are produced by mere spasm;—that is to say, perfect obstruction, together with vomiting and violent pain, though pain of a different character; and then the disease is termed colic;—"enteritis" being essentially *inflammation*, but "colic" being essentially *spasm*. When the spasm ceases, however, then inflammation may come on; and we then have a case of decided enteritis.

SECTION II.—COLIC.

Having noticed that description of obstruction of the bowels which is inflammatory, I now proceed to consider that which depends simply upon spasm. This obstruction of the bowels is called "colic" (from "the *colon*").

Symptoms.—The symptoms of colic are, in the first place, constipation; with violent pain in the region of the intestines;—chiefly, as in other cases, about the umbilicus. This pain, unlike that induced by inflammation, is relieved by pressure; for there is no tenderness. The relief upon pressure is sometimes very great;—at any rate, pressure is always well borne. I have sometimes raised myself on tip-toe, and pressed on the abdomen with the whole weight of my body, and the patient has not complained at all; but, on the contrary, has felt relieved by it. The pain is, of course intermittent. It is not uniform; nor, indeed, is it constant. It will cease from time to time; the person will be perfectly easy; and then it comes again most terribly. In most cases there is vomiting; at any rate, there is nausea. The vomiting may be fæcal;—the fæces have been discharged upwards, as in cases of inflammatory constipation. In both cases, however, this circumstance is comparatively rare. The spasms, in these cases, are not confined to the intestines; for we frequently see them in the abdominal muscles; so that they are drawn into large lumps. The recti muscles become particularly contracted; and, sometimes, we may observe retraction of the navel. Sometimes there is tenesmus; and sometimes there is great contraction of the sphincter ani. There is likewise violent pain felt in the loins; there is a high degree of flatulence; and there is no feverishness. It is carefully to be remembered that this state of things, however purely spasmodic it may be, will frequently, if not relieved, run by degrees into enteritis; so that, at last, we have decided inflammation of the intestines.

Causes.—The causes of this disease are, in the first place, the application of cold when the body is over-heated. This is a very common cause. Ingesta of various kinds, which disagree with the stomach, will give rise to it. Sometimes I have seen it occur from taking bad cyder; but in other cases it will take place, not from any thing injurious in itself, but from an idiosyncracy with regard to it. Obstruction from any cause will produce it. If there be a hernia, colic may be induced, in the first instance, before inflammation comes on. Hardened fæces is another cause of the disease. It is a common occurrence from any of those causes which, after a time, produce enteritis. Sometimes we may have enteritis first, and then colic, and *vice versâ*; though the cause of both one and the other may be the same. A very frequent cause of it is a particular substance; namely, lead. In some persons, a very minute portion of it will induce this affection. A medical man told me that he had it, from a child's cot, newly painted, being placed in his bed-room. We see the affection, every day, in painters; and in persons employed in the manufacture of white lead. Individuals exposed to lead, in any way, are very subject to this disease.

Morbid Appearances.—After death, whether the disease has arisen from cold, from acrid ingesta, or from lead, we may find no morbid appearances whatever; but, on the other hand, we sometimes do. This is all a matter of chance. Sometimes the intestines are in a state of great contraction. Sometimes they are more or less inflamed; because the disease has ter-

inated in that way. Sometimes we find the cause to have been some-ing sticking in the way, or mechanical pressure of some kind; or we ay find intus-susception,—one part of the intestine running into another. ith regard to the appearance of the muscles, they are emaciated, thin, hite, and pale. I have seen the muscles so flabby and wasted, that we uld scarcely recognise their natural appearance. They have become little ore than tendons. When intus-susception has been the cause, we gene-lly find that the upper part of the tract has passed into the lower. Dr. aillie has given some good representations of intus-susception.

Treatment.—Colic may generally be treated, very successfully, by the hibition of purgatives in strong doses. If the individual be stout, and e pulse will bear it, it is a good practice to bleed him. Bleeding, within rtain limits, is an excellent anti-spasmodic;—spasms of various parts of e body will very frequently cease, on taking away blood. It is not always cessary in this affection; but it may be successfully had recourse to, if the lse will *justify* it, even though it may not *indicate* it; and it may also t beneficially in preventing inflammation. It is very useful to give a ge dose of calomel;—to administer a scruple repeatedly, after longer or orter intervals; and after we see that it will remain on the stomach, it is ght to give some other purgative;—a strong dose of castor-oil, or croton-, or sulphate of magnesia.

Croton-Oil.—One of the best purgatives is undoubtedly croton-oil; and, we choose, we may begin with it; but it will be of little use to give less an a drop. In severe cases, I would repeat it every hour or two, till it swered the purpose. Some years ago I was called to a case, where the t-bath, and every medicine in common practice, had been used, except oton-oil; and even of that a dose or two had been given. But the case as very severe, and it was necessary to overcome the disease speedily; d therefore I ordered a drop every hour, or half-hour, till it should erate. After about six doses, the bowels were freely opened; and the tient became perfectly well. An injection of oil of turpentine will also found exceedingly serviceable. About three ounces, diffused in a pint fluid, and forced into the intestines, is of great service. The warm-bath ll afford great relief; but it is rather of use as a soothing measure, than any other way. The great point is to give good purgatives, and croton- is certainly one of the best; but we may precede it, by way of laying a undation for its action, by a large dose of calomel. At the same time, hatever good may be done, we should not omit clysters; and I think the of turpentine is one of the best.

Calomel and Opium.—Some persons always combine opium with the lomel; and the opium may frequently do good by alleviating the spasm. his is a case in which opium may act as a purgative. By relaxing the asm, it may cause the bowels to open; and it is thought that it very uch reduces the pain, and makes purgatives and calomel stay better on e stomach. It is therefore said, that we ought always to give a larger or smaller dose of calomel (a scruple or five grains, whichever we may pre-) united with opium, and repeat it at certain intervals; but I have found e bowels open, just as well, without opium; and then there is no trouble terwards. If we exhibit opium, after a time the bowels are disposed to come torpid; and I am quite sure we shall succeed as well without it as th it.

Cold Affusion.—When every thing has failed, I have known this affec-on of the bowels overcome, by taking the patient out of bed, and dashing o or three pails of cold water upon the abdomen. In the particular case

to which I have just alluded,—in which the patient had taken calomel till his mouth was sore,[a]—before we began with the croton-oil, as the object was to open the bowels immediately, he was taken out of bed, and soused with cold water; and he was nothing the worse for it. He caught no cold; but it did not open his bowels. Sometimes it will effect that object immediately;—just as it will relieve spasmodic stricture. If all other things fail, it should be had recourse to.

Tobacco.—The smoke of tobacco, also, is exceedingly useful in this affection. It should be used as I have before mentioned.[b] Some have even found the inflation of common air serviceable, by producing a great distension of the intestines. A case of this kind is recorded in the "Glasgow Medical Journal", of 1831.

Clysters.—It is well also, on another account, to administer a clyster; for sometimes the symptoms arise from hardened fæces lodged in the rectum. I have known instances of that description; and as we do not always know whether such an occurrence has taken place, I would invariably, on that account alone, recommend a clyster. Occasionally, it is discovered,—especially in women,—that there is a mass of large hardened fæces there; and nothing will relieve the patient, but taking the handle of a spoon, and picking them out. Practitioners are sometimes obliged to condescend to this; and thus to clean out the rectum.

Liability of Lead-Colic to Recur.—Supposing, however, that the disease has arisen from lead, it has a great tendency to return. There is this tendency in all circumstances, but particularly in the case of lead; so that after we have once opened the bowels, it is necessary every day, for some time, to ascertain that the bowels are still regularly opened. When the disease has arisen from lead, the stomach sometimes remains in a state of spasm; so that there will be an aching pain there, and occasional vomiting; —notwithstanding that the bowels are regularly opened. This is a state which is best relieved by prussic acid or stramonium.

Alum.—Some German writers, and Dr. Percival (of Manchester), have praised alum very much. They state, that from two grains to a scruple has been given every six hours, with great relief. However, I should never think of depending upon such a remedy, in cases of colic. It may be very well after the attack is over, for the purpose of keeping the bowels open; but I should not think of placing any reliance on it during the fit. I know that it has been useful; for I recollect, perfectly well, having been consulted by a gentleman who, every six weeks or two months, had a violent fit of colic; so that it was necessary to put him in the hot-bath, and to exhibit a violent dose of purgatives. This always cured him, but left him in a state of great debility; and nothing that was done prevented the recurrence of the attacks. I gave him, three times a day, a scruple, or half a drachm of alum, mixed with ipecacuanha-powder; and it entirely cured him. He took it for a month or six weeks. I saw him, at intervals, for three or four years afterwards; and he had never had another attack. I dare say that ordinary purgatives, in the case of most people, will do very well; but I tried alum, in this instance, with great success.

Warmth.—It is useful, where there is a tendency to disease of the intestines, to put the patient on his guard with respect to cold; and to order him to wear flannel about the abdomen. A large roller, wound three or four times round the body, is exceedingly serviceable. It protects the abdomen against cold, and is always useful. In this, as in most other bowel-

[a] See Page 1051.

[b] See Page 1049.

mplaints, it is particularly necessary that the patient should avoid cold t; for some individuals, if they allow their feet to become cold, always ve an attack of colic.

SECTION III.—PARALYSIS AFTER LEAD-COLIC.

When colic has been induced by lead, we sometimes find that, after the ic is over, the wrist will drop. The muscles situated in the forearm, and onging to the hand, become paralyzed; so that the patient has very little of the hand,—perhaps none; and the muscles will, at last, waste away. is said, by some writers, that the "abductor pollicis" wastes more than other muscles; but I am not aware that it does. Sometimes this will ur from lead, without any colic at all; but generally there is colic; and s is followed by paralysis of the wrists.

General Treatment.—This is a state that may easily be remedied. In first place, withdraw the person from the poison, and prevent him, for ime, from following his occupation. If he be a painter, withdraw him m the lead, or the lead from him. It is also of great importance that should not wear the clothes which he uses in business. A quantity of d is still remaining upon them; and that may, of course, keep up the ease. I have no doubt that many painters might avoid the complaint, if y were more cleanly;—if they wore sleeves over their coat; and, as soon they had done work, regularly put off their working clothes. We can-, however, persuade men to do this. They will not give themselves the uble, till they have once suffered for their negligence; and even then, as n as they recover, they become careless. If painters would adopt the ecautions I have just given, no doubt many of them would escape.

Local Treatment.—In the way of local application, electricity is one of best remedies. It should be applied not only to the hand, but to the earm; because the muscles in both parts are paralyzed. I think I have n sparks answer better than shocks; and the electricity should be ap-ed, if possible, every day. It has also been recommended that the ient's hand should be supported by splints; and that these should be d night and day, so as to keep the hands in a state of constant extension. is has been recommended by Dr. Pemberton. Blisters are also said to useful. I have found stimulating applications, of all kinds, serviceable; particularly electricity. When we apply stimulating applications to the n, they only act on *internal* parts by sympathy. Friction may make the ts worse; but electricity will go to every spot which is really the seat of disease. As to internal medicines, I have never seen them do good. cept it has been stramonium, or strychnine, or (which is the same thing) nux vomica." This is a species of paralysis, in which I have exhibited ychnine with decided advantage.

SECTION IV.—INTUS-SUSCEPTION.

Most Frequent in the Small Intestine.—Intus-susception,—the affection which I spoke as sometimes giving rise to colic [a],—generally occurs in the *all* intestines; or else the small intestines slip down into the large,—into colon. However, intus-susception of the *large* intestines has been n; for the cæcum and a part of the colon have been found in the sigmoid xure. Cases have been seen, in which the small intestines (beginning th the duodenum) have all slipped into the large intestines, and the

[a] See Page 1051.

cæcum has protruded from the anus. These are rare cases; but not impossible because they are rare.

Causes.—This disease may occur from any irritation whatever; and it has sometimes, no doubt, been temporary; and has passed away. On opening animals, we may sometimes see intus-susception take place before our eyes; and then the parts will slip out again.

Cohesion may Occur.—However, when intus-susception has occurred, the parts may remain in the situation into which they have been forced; and at last cohesion takes place between the descending portion, and that into which it has slipped; and the mucous membranes may then cohere; so that complete obstruction takes place, and the person dies. Sometimes the part which has slipped in, has only adhered at the upper portion; sloughing has then taken place; and a part of the intestine has been discharged.

Quantity of Intestine Discharged.—The quantity of intestine which, beyond all doubt, has been expelled in some of these cases is surprising; and yet the patient has done well. Dr. Baillie mentions having seen, or known, a yard of the colon discharged from a woman before death. He mentions another person, who lived two years after losing six inches of her colon. It is easy to see how this happens, without any great mischief taking place. Adhesion takes place at the upper portion of that which has slipped down; sloughing afterwards occurs; but the part remains continuous as before,—only shorter. Whether the person has more frequent evacuations after the intestines have been shortened, I do not know; but it is an undoubted fact, that a large portion has been expelled; and yet the person has done perfectly well. Another case is recorded, in which twenty-three inches of the colon were discharged; and in another, twenty-eight inches of the small intestines; and yet recovery took place. Cruveilhier mentions a case, in which eighteen inches, together with the mesentery, were discharged; but the person entirely recovered, after having exhibited signs of strangulated hernia.

It may appear wonderful that so large a portion of intestine should be discharged; but the occurrence is not only mentioned by Dr. Baillie,—who, I suppose, was a man who never told an untruth in his life,—but Andral cites a case, where thirty inches of the ileum were discharged, and death did not take place for three months; and then it arose from peritonitis. He suspected that death took place in consequence of the cicatrix being lacerated by an accidental circumstance; and that, but for that occurrence, the individual would have done well. In the ninth volume of the "Edinburgh Medical and Surgical Journal", a surgeon mentions a case where the colon, the cæcum, and the meso-colon, were all discharged; but, of course, death took place.

Gives Rise to no Peculiar Symptoms.—There is no proof of the existence of this condition during life. We cannot tell, in a case of colic, that the patient has intus-susception. I recollect being called to a case of violent colic, which appeared to arise from a man drinking sour cyder, and rum, and a number of other things;—having, in a thirsty fit, drunk every thing he could reach. Violent colic suddenly took place; and his bowels from that moment, were confined. He had castor-oil, croton-oil, olive-oil, hot baths, cold baths, and every thing that could be devised; but no evacuation was produced. He survived a fortnight; and, at the post-mortem examination, intus-susception was found. Portions of the intestines were perfectly coherent together;—forming a solid mass; so that there was no continuation between the upper portion of the intestines and the lower; but the circumstance was not known before death. There was no particular tumour to

discovered. From what I have read, and occasionally seen in dead dies, I do not think that, in a great number of cases, there can be any n whatever. The disease has occasionally been suspected, however; d, indeed, I suspected it in the case to which I have just referred.

Treatment.—Some persons say, that we ought to cut down upon the rt;—that we are not bound to wait for the person's dying. Now the se ought to be very clear indeed, before a man's abdomen should be ened, and an attempt made to untwist his intestines directly. It has en proposed by some to cut down upon the part, wherever the seat of e pain is; but this is a very fallacious guide. We sometimes have pain *one* part of the abdomen; and, after death, the obstruction is found to be *another*. But if, after symptoms of colic, a tumour be produced, the rgeon might then take into consideration whether he would cut down or t.

SECTION V.—DYSENTERY.

I now proceed to the consideration of another disease, in which there is asm and inflammation together; and in which there is both obstruction d purging. This disease is called "dysentery."[a]

Symptoms.—The symptoms of this complaint, are a mixture of those of lic and enteritis; so that we have violent pains of the abdomen, called tormina"; we have also a forcing down backwards,—a forcing of the ctum, which is called "tenesmus"; and frequently small mucous or ody stools, together with more or less retention of the fæces; so that ere is an obstruction to the course of the fæces, but a great discharge of cretion from the inner surface of the intestines. The stools are scanty d irregular. The discharges are very frequent, but each particular dis-arge itself is scanty; and when the fæces do come away at all, they are nd in hard lumps. Sydenham defines dysentery to be—"frequent mu-us stools, with griping." Dr. Akenside, the poet, wrote on this disease[b]; d he gives the same definition as Sydenham; but he adds to it—"fre-ent desire";—in fact, *tenesmus*. The blood which is discharged in this ection, may be either in clots, or merely in streaks; and sometimes it is scharged in very considerable quantity, and quite liquid. Very frequently ere are shreds of fibrin expelled; and Sir John Pringle says, that he has n fatty matters discharged. That I can believe; for I could mention e same with respect to diarrhœa.

Acute or Chronic.—This disease may be either acute or chronic. In the *ute* affection, there is violent inflammation as well as spasm; so that there considerable feverishness, quickness of pulse, heat, thirst, pain in the ab-men, not only coming on in fits, like tenesmus (griping), but pain that is nstant, and increased on pressure; together with dryness of the skin. is state may go off in a few days, or it may last for a month; after which ne, perhaps, we may call it "*chronic* dysentery."

Nature of the Evacuations.—The liver very frequently ceases to secrete, that no bile at all passes away; and sometimes it is in a state of great itation; so that it secretes *green* bile, and the *motions* are therefore een. Sometimes, however, the motions appear to be of a pitch-like bstance. Sometimes, instead of thick mucus, there is thin serum; and, m there being a little hæmorrhage, this serum is rather red; so that the scharge from the alimentary canal has, very aptly, been compared to the

[a] From δυς, *with difficulty*; and ἐντερον, *intestine*.

[b] "De Dysenteriâ Commentarius. London, 1764."

washings of meat. The discharge may be of all colours, and of all qualities; but the fæces are usually retained. If we procure an evacuation of fæces, they come away in hard lumps; which are called "scybala", and are like forced-meat balls, only hard. Nature gets rid of these balls from time to time. The tongue is foul, and very frequently aphthæ appear;—from the mucous membrane suffering.

Frequently Conjoined with Fever.—This disease is very common in hot climates; and most common in this country[a] in hot weather. It is frequently united with the fevers of hot countries, and of our hot seasons; and frequently it is conjoined with intermittent and remittent fevers. Sometimes it precedes, and sometimes it follows these. Sir John Pringle and Sir Gilbert Blane both say, that it arises in camps at the same seasons, and in the same circumstances, as bilious fevers. It has now and then, curiously enough, been observed to be vicarious with fever. It will cease in the army and navy, in different parts of the globe, when fevers begin; and will re-appear when they cease; but, very frequently, it is united with them. It has been known to co-exist with typhus-fever; and likewise to alternate with it. When typhus-fever prevailed (a few years ago) in Ireland, dysentery prevailed at the same time, and occasionally alternated with it. Very frequently it occurs with disease of the liver; and occasionally it has been united with measles. The causes of hepatic disease, and the causes of fever, affect all parts of the abdomen.

Chronic Form less Violent.—The *chronic* form of the disease, is much less violent than the *acute*; and is attended with much less pyrexia. Indeed, the pyrexia, in the chronic form, may at last become hectic. The intestines become diseased; suppuration and ulceration occur; and we have hectic fever. Sometimes, in the chronic form, there is no fever at all; for it degenerates into diarrhœa: so that, at last, the patient complains only of mucous stools and tenesmus. The fæces not being retained, it may degenerate into diarrhœa; so that we have dysenteric diarrhœa;—that is, diarrhœa characterized by great griping, and a discharge of mucus. It has been observed, in hot countries, that more stools take place at night, than during the day; and at new and full moons, than at other times. When speaking of remittent fever, I mentioned, that at new and full moon that fever undoubtedly prevails most, and the symptoms are more intense than at other periods.[b] The same has been observed with regard to dysentery. More stools take place at that time;—not from the direct influence of the moon; but, from the high tides that then take place, there is more vegetable decomposition.

Morbid Appearances.—After death from the *acute* form of the disease, we see great inflammation of the intestines,—chiefly of the large ones, and particularly of the colon. This disease so particularly affects this part, that some have proposed to call it *colitis*,—"inflammation of the *colon*"; but that would not be quite correct; for it also affects the rectum, and likewise the small intestines. The great seat of the disease, however, is the colon and the rectum. Besides marks of redness and congestion, there is occasionally superficial abrasion of the mucous membrane; and somtimes deep-seated ulceration, and great distension. After the *chronic* form of the disease in the same situations,—namely, the colon and the rectum,—we find great redness and ulceration; but we also find that effect so peculiar to chronic inflammation,—great hypertrophy;—such thickness as acute inflammation will not induce. There is great thickness of all the coats. The

[a] England. [b] See Page 381.

rugæ are all greatly enlarged; so that the inner surface is exceedingly rugged, and we see shreds of lymph (sometimes of great length) hanging upon it. Occasionally these changes are seen only in patches; and occasionally they are seen over a very great extent; and, at the same time, red patches are frequently seen in the small intestines. The colon has been found, after this chronic form of the disease, as much as a quarter of an inch in thickness. Minute abscesses, too, are seen in the substance of the intestines. On opening the glands, we find them so much hypertrophied, as to look like so many warts. Besides the morbid appearances just mentioned, it is not uncommon to find the *liver* in a state of disease. It is frequently in a state of chronic inflammation; and, occasionally, in a state of abscess. The *spleen*, sometimes, is in the same predicament. The liver, however, is much more frequently affected than the spleen.

Causes.—As to the *causes* of dysentery, all agree that it is very often produced by changes from heat to cold, and from cold to heat. The tendency to it is greatly increased by long-continued heat, and by fatigue; therefore in those countries where it is continually seen, it frequently breaks out when the army has suffered to a great degree, or there has been a sudden vicissitude of temperature. A cold wet night, after an intensely hot day, will occasionally produce this affection, in a vast number of persons. It is a disease particularly common on board ships, and in camps. Some consider that one cause of it is malaria; and certainly it is a fact, that where malaria prevails to a great extent, dysentery is very common; but as these are wet situations, one hardly knows whether it is the malaria itself which gives rise to it. I mentioned that, with the remittent fevers of hot countries, there are bilious fevers of all kinds.[a] It is also undoubtedly produced, sometimes, by bad food; and likewise by bad water. This disease, for example, prevailed in the Penitentiary at Millbank; where there is a combination of unfavourable circumstances. The prison itself is situated in the most unwholesome place imaginable;—as if it were intended to carry off quickly the people who have been placed there; and I believe the allowance of food was not such as medical men considered to be proper. It co-existed there with scurvy, and various other diseases.

Formerly Prevalent in London.—Formerly dysentery was very common in London; but at present we seldom see it. I scarcely ever meet with a case, except in those who have been in hot climates; whereas, formerly, it was one of the greatest scourges in the metropolis. We find it treated of by Sydenham, as one of the diseases that came daily under his observation. It was one of the great causes of mortality in the city;—just as was the case with ague, plague, and scurvy. I presume it arose, then, from the bad quality of the food upon which people lived, and the bad drainage of the city. As to the ill effect of bad water, it is said that when the disease prevails in ships, those suffer most who are nearest the pump.

Fruit.—It has been supposed that fruit produces the disease; but unless the fruit be bad, there is no reason to suppose that this is the case. Of course bad fruit, coming under the head of bad *food*, might produce it; but the mere circumstance of eating fruit at the time when nature provides it for us, does not give rise to the disease. On the contrary, there are on record many cases of fruit having proved exceedingly beneficial. It is mentioned by Zimmerman, in his work on Experience, that in 1751 a whole regiment, in the south of France, was nearly destroyed by dysentery. The officers purchased the entire crop of several acres of vineyard for the regiment; and not one man died from that time, nor was one more attacked.

[a] See Page 377.

The work is well worth reading; for it is as amusing as a novel, and full of instruction. Tissot, a French writer, also mentions that eleven persons in one house were attacked with dysentery. Nine of them ate fruit and recovered; but the grandmother, and one darling little grandchild, had wine and spices instead,—as being more comfortable; and both died. It was observed in Holland, that the worst flux which was ever known in the army, occurred at the end of July, when there is no fruit there but strawberries, of which the men never partook; and that the disease ceased entirely when October arrived, and brought the grapes, of which the men ate very heartily.

Bad Water.—Any cause of intestinal irritation may produce dysentery; more particularly when a predisposition has been given by long-continued heat, and by bad food; under which term, of course, *drink* is included. It is said, that at the old barracks at Cork the troops had water contaminated by the common sewers, and made brackish by the tide; and dysentery prevailed. This was remedied; and the disease almost entirely ceased. Linnæus's friend, Rolander, had dysentery from drinking standing water out of a cistern of juniper wood. He ascribed the disease to animalcules; but the mere circumstance of its being stagnated water, was sufficient to account for the disease.

Is it Contagious?—It was formerly supposed that this disease was decidedly contagious, and that it spread most from the stools; so that if any individual followed another labouring under dysentery, for the purposes of relieving nature, it was conceived that he was more liable to catch it, than by simply being with him. Whether it is contagious or not, it is impossible for me to say; but the sporadic cases of chronic dysentery, which we occasionally meet with in those who have come from hot climates, are certainly not contagious. I never saw any thing that could lead to the supposition of the disease being so. I will not presume to deny, that sometimes it may be contagious abroad; but many diseases are supposed to be contagious that are not. I think it may reasonably be doubted whether it is contagious. Some imagine that almost any particular disease, in particular circumstances, may become contagious; and therefore I do not say that it *never* is contagious; but as the disease is seen in England, it certainly is not.

Mortality in the Peninsular War.—I mentioned that this was a disease which prevailed particularly in camps, and in the fleets abroad.[a] In the Peninsular war, our army lost no fewer than four thousand seven hundred and seventeen men by this disease exclusively. In 1812, two thousand three hundred and forty died; in 1813, one thousand six hundred and twenty-nine; and in 1814, seven hundred and forty-eight. The disease is very manageable, if taken in the first instance; but extreme mortality arises from the unfavourable circumstances in which men are placed. From the want of all comfort, and the excessive fatigue, medical men have little chance of doing good.

Pathology.—With regard to the *nature* of the disease, it appears to be inflammation of the mucous membrane, together with spasm of the muscular fibres, *chiefly* affecting the large intestines. One ought not to say "*altogether* affecting the large intestines"; but it affects them much more frequently than it does the *small* intestines. The inflammation gives rise to constant pain, to sickness, pyrexia, and to a great discharge of mucus and blood. The spasm gives rise to occasional severe pain; and to the retention of the fæces.

Prognosis.—As to the *prognosis* of the disease, that must depend upon

[a] See Page 1057.

the violence of the symptoms; but we always find it mentioned by authors, that one of the worst symptoms that can occur, is the discharge of worms;—as though the worms instinctively knew that the habitation was about to be dissolved; and that therefore the sooner they quitted it the better;—just as rats are said to quit an old barn, and to look out for a new habitation, before they are turned loose by the destruction of the present.

Treatment.—With regard to the *cure* of the affection, the first thing is to remove, if possible, the cause of the disease. If there be a bad quality of the ingesta (whether liquid or solid), or any dampness in the situation, or any contamination of the atmosphere, all this should be obviated;—either by removing the patient from it, or by removing it from the patient; otherwise we are fighting against a double enemy;—both the disease and its cause.

Antiphlogistics.—In *acute* dysentery, we have to treat the affection upon a decidedly antiphlogistic plan. It may be necessary to bleed vigorously in the arm; to apply leeches freely and repeatedly to the abdomen; to give mercury, and get the mouth sore; to apply cataplasms of hot moist bran to the abdomen; or, if preferable, to apply them cold; but, in general, the moisture answers much better if it be warm. We must treat it as a violent active inflammation of the intestines. With regard to calomel, we shall find that, although all agree upon its importance in this disease, yet that some recommend *large* doses at intervals, and others *small* ones. Those who recommend the latter, would give other purgatives (such as castor-oil) at intervals, for the purpose of emptying the intestines; whereas those that give large doses, trust more to the calomel itself. It is highly necessary, in this disease, to open the bowels well. Notwithstanding the number of evacuations, the fæces are altogether or greatly retained; and therefore it is necessary, not merely to employ the remedies for inflammation, but to empty the intestines thoroughly. Some people would give a scruple of calomel at intervals;—so as to get the mouth sore as quickly as possible, and at the same time to empty the alimentary canal. Those who give small doses, would give other purgatives in great abundance; but it is necessary to get the bowels open, as speedily and as effectually as possible. It is useful to employ opium at the same time;—on account of the great tendency which there is to severe spasmodic pain. The opium may be united with the calomel; and if we take care to make the calomel operate by means of other purgatives, no harm can arise from it. If castor-oil will stay on the stomach, I should prefer that medicine to salts; because there is, perhaps, a great discharge of mucus; and perhaps there are watery stools rather than fæces; and castor-oil has the property of thoroughly emptying the alimentary canal. Emollient clysters are also of the very highest importance; but nothing acrid should be put into them. Clysters of gruel, containing a certain portion of laudanum and castor-oil, will be much better than clysters containing salts. The patient should be kept without food;—his stomach should be allowed as much repose as possible;—he should be kept very low.

Ipecacuanha; Antimony.—Many persons, formerly at least, had a very high opinion of ipecacuanha in this disease. Dr. Akenside, the poet, in his elegant Latin treatise on this disease[a], recommends about three or five grains of ipecacuanha every six hours; and many persons still give it, and also antimony, so as to create sickness. I have no experience of any such plan. I do not see the utility of causing the patient to vomit in this disease; neither have I ever been able to discover the soothing effects of ipe-

[a] See Page 1055.

cacuanha. Some persons, when they give purgatives, give ipecacuanha; and say that it has the property of emptying the alimentary canal; but, after repeated trials, I cannot say that I have found that it has any peculiar properties, except that it makes the patient sick. I have been as successful in this disease as in any other, by treating it on antiphlogistic principles;—without exhibiting any thing with the view of producing sickness, or any specific operation. Formerly, various preparations of antimony were given; but I have not found them at all necessary.

Treatment of Chronic Dysentery.—With regard to the *chronic* form of the disease, we have to consider whether there is any inflammation still existing. There very frequently is. The abdomen is still tender; and it would be absurd to think of giving astringents, and blocking up the intestines, while that inflammation exists. The readiest way of lessening the disease is, in the first instance, to apply leeches freely over the abdomen, and to throw up a clyster;—taking care that the bowels shall be opened freely and regularly; and when we have done all this, then astringents will be very proper.

Astringents.—In chronic dysentery there frequently is no inflammation at all. The time arrives when there is a mere gleet of the surface, or the surface is merely in a state of irritation; and in that condition, opium and astringents of all kinds are exceedingly serviceable. But we may do infinite mischief unless we ascertain, before giving astringents, that there is no inflammation. If there be inflammation, we must treat it accordingly;—by leeches, blisters, fomentations, and things of that description; and we must take care to see that the bowels are regularly opened, and the fæces discharged; because if the fæces are not discharged, and we exhibit astringents, we may produce inflammation, though there was none at first. But in the chronic form of the disease, the fæces, at last, are discharged pretty well; and no purgatives are required. Still, however, the character of the acute disease so far remains, that there are bloody and mucous stools, a desire to go to stool, and tenesmus. In this form of the disease, astringents may be given safely, and may be either vegetable or mineral; and it is best to combine them with opium. By far the best astringents that I know, are kino and catechu. It may be right not to give the tinctures; as they may excite the pulse, and irritate the patient. It is best to give the infusions. Opium is very much required in this disease, to prevent griping. As I before said [a], opium is often very safe and very useful in the *acute* form of the disease;—provided we take care to subdue inflammation, and to keep the bowels open; but in the *chronic* form, it may be given with very great safety;—provided the bowels be regularly open,—as is usually the case. A good mode of exhibiting the opium, is to give the Pulvis Catechu Compositus. It will not irritate so much as opium alone.

Sulphate of Copper.—When the ordinary astringents (catechu and kino) fail, mineral astringents will frequently cure the disease; and that which I have been most in the habit of employing, and with very great success, is the sulphate of copper. The way in which I became acquainted with its use, was from hearing a gentlman state that, at the Medical Society at Guy's Hospital, a case had been read of violent chronic diarrhœa; which yielded to nothing but copper. Dr. Sutton, of Greenwich, at a consultation, informed me that he had a very obstinate case; and that, all the other astringents having failed, it occurred to him to try this; and he did so with very great success. I have consequently used it; and it certainly is one of the best, where mineral astringents are required; but it is necessary to re-

[a] At Page 1059.

member that we should not give it on an empty stomach; because, if it come in contact with the organ, it will excite vomiting. It should not be given till after breakfast; and that is the case with most acrid substances. If they be not given till the patient has had a meal, they will produce less irritation of the stomach, than if they come in direct contact with it;—which they must do when the stomach is empty. It is right to give this medicine in the form of a pill; because all acrid substances act more powerfully in a state of solution. If it be given in a pill, it comes in contact with a smaller surface; and will therefore produce less irritation than if it were diffused. It is generally right, also, to give it with opium; because, although it is an astringent, yet it is an acrid substance. It has two properties;—the one astringent, the other acrimonious; and therefore it is best united with opium; but I have frequently omitted the latter, and continued the former, with perfect safety. The smallest dose which it is worth while to exhibit, is a quarter of a grain; and we may gradually increase this to three grains; which is the largest dose that patients will ordinarily bear. In fact, many will not bear more than a grain and a half. It produces no constitutional effect. I have known a patient take it for three years, for a peculiar kind of diarrhœa, without any such result. I never saw such a constitutional effect arise from it, as occurs from lead or arsenic, or any other mineral substance. If it produce sickness, we shall find it of great use to give hydrocyanic acid with it. By giving from one to four drops of the acid, according to the necessity of the case, when the copper is taken, we shall find that patients will bear it without sickness or nausea; though without it, perhaps, there would be both. By a steady perseverance with this medicine, or with vegetable astringents and opium,—taking care, at the same time, to have the abdomen well covered with flannel; making the patient avoid cold, and every kind of ingesta likely to irritate the alimentary canal; and, at the same time, supporting his strength,—we may effect a cure in the greater number of cases. It is a rare thing for me to lose a case of dysentery. I do not know how long it is since I lost one; but certainly it is not a very common complaint.

Treatment of Ulcerated Intestine.—In the chronic form, if the intestines be ulcerated, we may still cure the disease; for it is only when there is a very great degree of ulceration, that patients die from it. Ulceration of the intestines will heal,—just like ulceration of any other part; but of course we may meet with cases, where medicine can do no good;—where the intestines are in a state of hypertrophy,—look as if they were worm-eaten;—where the mesenteric glands are diseased; and frequently perforation takes place, and the patient is destroyed by peritonitis. A representation of such a case as this, is presented in Dr. Baillie's plates; and nothing can be expected to do any good in it. A surgeon would not be expected to cure a leg or an arm, in such a state as that. If the patient may sink from the disease of a part so unessential to life as an extremity, much more may he do so in the case of the intestines. Some persons recommend other substances in this affection;—such as nitric acid and muriatic acid, united with opium and astringents. One would expect, *à priori*, that such medicines would only cause irritation; but there is testimony in favour of muriatic acid combined with opium; and some say the same of nitrous acid. I have never given acids in the disease. I have known them, when taken in other diseases, produce a pinching in the bowels; and therefore I have never ventured to give them to a patient labouring under this affection.

Treatment of Tenesmus.—We shall find it very necessary to alleviate

one symptom; and that is the tenesmus. If there be any tenderness about the abdomen at large, leeches should be applied to the anus, as well as to the front of the abdomen; because tenesmus may arise from an inflammatory state. When, however, it does not arise from an inflammatory state, but rather from irritation than anything else, opium is very useful. It is best to give it in the form of tincture, in a very small quantity of fluid. About four ounces of fluid is the utmost that can be given; because we wish it to be retained, and not to be rejected. Bulk will irritate as well as acrimony; and, therefore, when we are giving it to lessen the pain and tenesmus, as small a quantity as possible should be employed. About forty or fifty drops of laudanum, given in a little starch, will be one of the best injections of the kind. Sir James M'Gregor says that, in the Peninsula, he found great relief from injections of acetate of lead; so that we might put laudanum into a solution of the acetate of lead. I presume one or two grains of the latter would be enough. We know that lead has a soothing effect on a raw surface, or on mucous surfaces in general; and therefore we can conceive that this would be a proper medicine.

Mercury in Chronic Dysentery.—I have never given mercury in the chronic form of the disease. I have always been able to cure the affection, as we see it in this country, without it; and Sir James M'Gregor says, that in the Peninsula it was worse than useless;—it was absolutely injurious, unless the liver was diseased at the same time. I have repeatedly watched the motions in this disease. In very many cases, they were quite white; and white for a month or two;—more like paste than any thing else; and, without giving any mercury, I have suddenly seen bile in them. The intestines are restored to their function; the health is improved; the liver begins to do its duty properly; and, without exhibiting mercury, the bile will return,—sometimes gradually, and sometimes suddenly. When we consider that mercury renders the body more susceptible of cold, and that our object is to soothe the patient, I would not recommend it to be given in the chronic form of the disease.

Bandage the Abdomen.—I mentioned the necessity, in the chronic form of the disease, of well bandaging the patient's abdomen[a]; and some persons, instead of employing flannel, prefer straps of adhesive plaster all over the loins. This might be applied first, and bandages over it.

SECTION VI.—DIARRHŒA.

I now proceed to the consideration of that disease into which chronic dysentery degenerates; but which happens every day (indeed I may say every hour) without dysentery;—namely, "diarrhœa."

Definition.—By "diarrhœa" (from διαῤῥεω, *to flow through*), is meant frequent liquid, and rather copious, feculent stools;—not dependent upon debility of the sphincter ani. In dysentery the stools are not feculent. When a person is weak in the sphincter ani, he may have stools every ten minutes; but he would not, on that account, labour under diarrhœa. In this disease there is pain only at the time of the evacuation. It is pinching enough, and pretty sharp then; but it ceases as soon as the evacuation is effected; whereas, in dysentery, the griping is horrid; and is not lessened by the discharge of mucus and blood which characterizes the disease. Cullen, in his definition, says there is no preliminary fever; and that the

[a] See Page 1061. See, also, Page 1052.

disease is not contagious[a]; but there may be preliminary fever in diarrhœa, inasmuch as it is frequently inflammatory. I should be content with the definition I have given.

Character of the Dejection.—The discharge, in this disease, is of all colours;—white, green, black, yellow, and clay-coloured; and of various colours at various times. It is also of all kinds of disagreeable odours;—sour, fetid, and every other variety of unpleasant smell. It may likewise be bloody, watery, mucous, or purulent. Occasionally, the motions can hardly be called *liquid*;—they are only very *soft*. Sometimes they are uniform in their tenacity or softness; and sometimes they differ in different portions. It appears that the discharge is chiefly an increased secretion of the intestines, and sometimes of the liver. Sometimes the nature of the discharge is dependent upon some other organ. The discharge may be purulent;—from an abscess in the liver, or perhaps an abscess in the ovaria. There are all degrees of the disease, and all durations of it.

Morbid Appearances.—After death we may sometimes find nothing unusual;—it has been merely an excessive secretion; and, on the other hand, we frequently find all degrees of redness and congestion. Frequently the mucous membrane is found softened; and then it may be either red or white. Sometimes it is *inflammatory* softening, and then it is *red*; and sometimes it is without any mark of inflammation, and is quite *white*. Occasionally the mucous membrane is found very much thickened; and it is also ulcerated. Sometimes the ulceration is a mere superficial abrasion; and sometimes it is very deep;—appearing to have begun in the mucous follicles. The mucous follicles may contain (as in chronic dysentery) curdy stuff, and sometimes pus. The follicles are frequently in a state of hypertrophy; and sometimes, without being ulcerated, they contain pus. In fact, we may have all the various states of the intestines which I mentioned, as being seen after fever, and in chronic dysentery.[b] These may occur in the large intestines, or in the small intestines, or in both;—sometimes very extensively, and sometimes partially.

Causes.—The *causes* of the disease are, in the first place, too much food. If a person eats a great deal, it must find its way out; and it does. There must be more *exportation* in proportion to the *importation*; so that diarrhœa is very frequently an effort of nature; and the person would be badly off if he had not diarrhœa. An alderman, I should think, would suffer severely, if he had not many attacks of diarrhœa, in the course of a season. Improper articles of food will give rise to diarrhœa. Every body knows, that if he take something which disagrees with him, he will suffer from it;—nature makes a proper effort to get rid of it. Frequently *new* articles will occasion diarrhœa. If a person eat something to which he is not accustomed, although it may be excellent in its kind, it will frequently give rise to the disease. Children suffer exceedingly, if they are weaned too early, or too suddenly. There is a peculiar kind of diarrhœa in infants, called "weaning-thrush." If children be weaned before nature is ready for the change, or if the change be made too rapidly, diarrhœa takes place. Children cannot bear the sudden change from milk to common food; whereas, if they be strong, and be weaned gradually, they bear the alteration of diet very well. This is precisely analogous to what is observed with regard to fish. There are *salt*-water and *fresh*-water molluscæ; and if we put the *salt*-water molluscæ into *fresh* water, and *vice versâ*, they will die; but if we mix the water gradually, so as to lessen the saline quality of the water by

[a] "Dejectio frequens; morbus non contagiosus; pyrexia nulla primaria."

[b] See Pages 334, 335, and 1056.

degrees, they will live in it as well as if they had been always accustomed to it; and the same with regard to the *fresh*-water molluscæ living in *salt* water. A new article of food is a common cause of diarrhœa, both in children and adults; but especially in the former.

Cold, especially after heat, is another common cause of this complaint. The mind, too, has a very great effect. Fear is generally considered to operate very strongly on the intestines. Malaria is enumerated among the causes of this disease. The suppression of other discharges will sometimes produce it. If a person have been accustomed to a running of the leg, and it is suddenly stopped, he may think himself well off if he have diarrhœa; because, if he had not, he might have apoplexy. Metastases are causes of it. If another disease cease, it is common to see diarrhœa begin. If inflammation suddenly cease, diarrhœa may occur. Dysentery is mentioned as one cause of it. This is an affection which is very commonly produced by other diseases; or it becomes a part or consequence of other diseases. In fever, for instance, diarrhœa is very common;—it becomes a part of the fever. It is very common after measles. Measles affect the intestines almost as much, I was going to say, as the skin; but, at any rate, they affect them in a very remarkable degree. So, again, in phthisis;—the same state of the body that gives rise to that affection, causes at last a great irritation of the alimentary canal.

Causes of the Paroxysms.—Besides the exciting causes of the disease itself, there are exciting causes of *paroxysms*,—if I may so call them. For instance: when a person is labouring under diarrhœa, if he move about much, he will very likely be obliged to go to stool; and again, on taking food, many persons immediately have a desire for a motion. Sometimes it is *warm* food, and sometimes it is *cold*, which has this effect. Frequently persons can take nothing warm, without having a desire to go to stool; and the application of cold to the surface, will bring on the desire in a moment. The best plan is to sit quietly by the fire without moving.

Treatment.—As to the *treatment* of this disease, if it be slight, it is best to do nothing at all. It is generally a mere effort of nature, to relieve herself from something improper, which has been taken inwardly; or from the depressive action of an agent applied to some other part of the body. When cold has been applied to the surface, nature relieves herself in this way; and if the individual do not make it worse, he is sure to get better.

Diluents.—But if it be necessary to adopt any measures, mild diluents, in the first instance, are the best things. Every old woman knows that barley-water, chicken-broth, and so on, help to sooth the intestines. To these some persons add mild purgatives; and some are in the habit of giving the patient a dose of physic, whenever he has diarrhœa; and, in general, there is no harm in it. If any thing acrid have been taken, it may aid nature, and the disease may cease so much the sooner; but if there be merely an excessive action going on,—from a depressed circulation of the surface, or the passions of the mind,—it is difficult to see what good can be done by a purgative. As the disease, however, in most instances, if left to itself, would cease without any remedy, a purgative has frequently the credit of curing it, when it deserves no credit at all.

Opiates and Astringents.—If, however, the disease run on, it may be necessary to stop it; and, for this purpose, various opiates and astringents are given. It would be well, in these cases, to avoid giving tinctures; because there is frequently an inflammatory state; and an astringent is just as good *without* the alcohol, as *with* it. I need not enumerate chalk-mixture, catechu, kino, and all the various modes in which opium is given. In very

severe cases, the same treatment should be adopted as in chronic dysentery;—the exhibition of sulphate of copper, and other astringents.[a] For what I know to the contrary, we might give these astringents with safety at the beginning. I have done so; but it is too powerful an astringent to be frequently required. The sulphuric, nitric, and muriatic acids, united with opium, have been given in these cases, as well as in dysentery. Dr. Moses Griffiths, who invented a mixture of iron called "Mistura Ferri Composita", recommended in diarrhœa a mixture, consisting of two drachms and a half of tincture of rhubarb, and six drachms of linseed-oil;—a portion of which was to be given two or three times a-day. I have known this administered with good effect. The rhubarb, besides being a moderate purgative, is an astringent; and the oil is a demulcent. The one soothes, the other astringes; and it is thus that it has a good effect in chronic diarrhœa. It is also given in chronic dysentery. This remedy is contained in some of the Hospital-Pharmacopœias. It is a very disagreeable remedy;—as vile as can be well conceived; and I myself never found it necessary to give it; but it is sometimes a good medicine in this disease.

Leeches and Blisters.—It is always necessary to ascertain carefully, whether the disease is inflammatory; as it generally is, to a certain degree, after measles; and we should always press the abdomen, and see whether there is tenderness; because we may in vain give diluents, opiates, and astringents; and may even make the patient worse by them than if we did not give them at all, if there be a degree of inflammation which we do not take means to remedy. I have seen many cases of diarrhœa, which have resisted all the means that could be adopted; but which ceased presently on applying leeches to the part, or on the application of a blister. In fact, this disease is frequently nothing but an inflammation of the mucous membrane; and it will cease on applying blisters. It is frequently necessary, while doing this, to give opium and astringents; and we may do so with perfect safety, if we attend to the inflammation. Indeed, if we attend to the latter, there is frequently no occasion to give the former at all; and if we do *not* attend to it, we make the patient worse by their exhibition. The first thing to be done, therefore, in cases of this disease, is to inquire into the cause. If the patient have been eating improper articles of food, we must change his diet; if there be any inflammation, we must treat it accordingly; if there be no inflammation, or not much, then we must exhibit opiates and astringents; and in this way the disease may be cured. The mildest of all astringents, is chalk-mixture and a little laudanum; but if that will not answer the purpose, we must go on to catechu, kino, and sulphate of copper;—taking care that the patient be well purged in this disease,—just as I mentioned in chronic dysentery.[a]

Diarrhœa with White Evacuations.—This is the common form of diarrhœa. Occasionally, however, we meet with some singularities in this disease. I mentioned[b] that Dr. Baillie described a particular kind of jaundice;—remarkable for its being green, and for its ending unfavourably.[c] He has also described a kind of diarrhœa, remarkable for the fæces being white, and likewise terminating for the most part fatally. It is described by him in the "Transactions of the College of Physicians."[d] He says that, in this particular kind of diarrhœa, the stools are white,—like a mixture of lime and water;—that is to say, like thin mortar, or mortar spoiled. They are also frothy, of a sour smell, very copious, very numerous,

[a] See Pages 1059 and 1060
[b] See Pages 1022 and 1023.
[c] See the "Transactions of the College of Physicians"; Volume 5; Page 143.
[d] Volume 5; Page 166.

and unattended with pain. The disease is so chronic, that it may last for years. It most commonly occurs, he says, in men,—not in women; and more particularly in men who have been in warm climates, and suffered from disease of the liver. He says that the affection may occasionally be suspended, and that the fæces will sometimes become brown; but the disease returns; and the motions become white again, and also fluid. The affection is very rarely removed. The patient wastes away under it, and dies.

Treatment.—This is a disease which I have occasionally seen; and though Dr. Baillie could not cure it, I have been successful, in two cases which I have had of it, by treating it in the same way as ordinary diarrhœa;—persevering steadily in the exhibition of sulphate of copper combined with opium; and giving wine at the same time. Sulphate of copper alone might have done. Without giving mercury, the motions of these persons became bilious;—they ceased to be white; and at last they became firm, as well as of a proper colour. One man was a patient in the hospital.[a] He got stout, regained his looks, and would not stay any longer. His disease might return a year or two afterwards; but I kept him there a considerable time, and he remained perfectly well. He had been in hot climates; and, in all respects, corresponded with Dr. Baillie's observations.[b] The other case occurred in a gentleman who had long been in India; and, after persevering with medicine for nearly two years, the disease (I understand) has entirely ceased. He is an old man, whose constitution has given way to the warmth of the climate; and he has had attacks first of one thing, and then of another. Dr. Baillie mentions, that he has tried the ordinary remedies of kino, catechu, and chalk-mixture; but that they have all been unsatisfactory, and have all failed.

Discharge of Lymph.—Occasionally, in diarrhœa, very considerable shreds of lymph are discharged. Patients say, that they have discharged great pieces of skin;—that they are sure the coats of their bowels are coming off; and medical men have thought the same thing. Dr. Baillie once believed, that he saw a portion of mucous membrane come away. But he afterwards detected his error; and said that it was nothing more than an effusion of lymph, corresponding with the effusions sometimes found on a serous membrane; and exactly like those tubercular substances, which sometimes come away from the air-passages. Occasionally a large quantity of fibrin is secreted on the inner surface of the mucous membrane, in chronic dysentery; and it will come away in the form of large shreds, or even tubes. I have always seen this form of the disease marked by great pain; and have found it exceedingly obstinate. I have not seen more than three or four cases; but, by the most persevering treatment, I have not done any good. I have merely afforded temporary relief.

SECTION VII.—DISCHARGE OF FATTY MATTERS.

There is another discharge from the alimentary canal, more curious than that last described, and that is a discharge of fat,—both in a liquid and a solid state. Sometimes it is discharged with diarrhœa; and sometimes without it. Occasionally the lumps come away with great pain. In other cases, it is oil that comes away,—just of the colour of melted butter. My attention has been attracted to it, from having had some cases of this description under my own care. My curiosity was excited; and I was led to read upon the subject.

[a] St. Thomas's. [b] See the previous Paragraph.

Sauvage's Account of it.—I find that Sauvages, whom I mentioned as having been the first framer of a system of Nosology [a], has mentioned a "diarrhœa *adiposa*"; and he says that he has known the bowels, after hard riding, pour forth adipose matter. He says that, apparently, this adipose matter had been absorbed by the blood-vessels; where, being mixed with the blood, it rendered the latter viscid. It then partly flowed into the intestinal canal; and there, as it were, covered the fæces with butter.

Cases.—I found several very satisfactory cases of this disease. There is one of a woman who discharged every day, for fourteen months, a large quantity of yellow fat; which lay on the fæces, like melted butter. Sufficient was collected to fill a number of vessels; and, when thrown into the fire, it burned with a bright flame. After the fæces had cooled, it concreted; and became of the consistence of absolute fat. But (what was singular) there was neither tenesmus, emaciation, nor colliquative fever; and sixteen years afterwards she was in excellent health. This case is related by Tulpius; but he says—"What is this to an old woman who, in her seventieth year, voided precisely similar fat from the intestines and bladder?" These are singular cases; but I believe them. Tulpius adds that, towards the close of the disease in the last case, the patient became feverish, and in consequence emaciated; and that death found her little else than a parched and juiceless corpse. I find another case, where a patient, for some years, had suffered pain in the stomach. Nothing relieved her, and she became worse; when she one day discharged about three pounds of fat; and from that moment speedily recovered. I find another case, where a patient discharged from his bowels, for two years, a large quantity of fatty substance. He grew thin and weak, and then died.

In the "Edinburgh Medical Essays" [b], is described a case which occurred to a weaver, forty years of age; who, in attempting to take up a very heavy vessel, felt his back-bone crack; which crack was attended with violent pain. Being unable to stand, he fell to the ground. The pain long continued very severe. He fancied that the bone was dislocated inwards; and, in order to reduce it, made one of his neighbours pull his abdomen backwards; while another, getting on his shoulders, pressed them downwards and forwards; by which he thought his loins were made much straighter than formerly; and he had less pain. Some days after this, a country bone-setter undertook to put all the bones right;—making one man pull at his shoulders, and the other at his legs, in a contrary direction. By this extension, he was put to most exquisite torture; and all his complaints were increased. Three months afterwards, he could just manage to crawl out of doors; and then observed among his excrements a whitish substance, about the bulk of a large walnut. It was like tallow, or hardened marrow; —being composed of small globules. It melted on the application of heat. During several days after this, he observed several pieces of the same sort of substance (of the size of kidney-beans or peas) come away among his fæces. He thought all those lesser pieces, if they had been put together, would have been equal to the large piece he passed first.

I had, in St. Thomas's Hospital, a patient with diabetes, who had wasted away. For some reason or other, I happened to see his motions; and there was lying upon the fæces a large quantity of fatty matter,—soft fat; which, he said, was quite fluid when discharged. I looked at the fæces regularly every day; and there was always one or two table spoonfuls of this fatty matter. I took a part of it to Dr. Prout, and some to Mr.

[a] See Page 61.

[b] Volume 5; Page 145.

Faraday. It was also seen by some of the first chemists in London; and they found it to be similar to fat. The question asked was—"whether the patient had taken castor-oil?" But he had taken nothing of the kind,—nothing oleaginous. The fat ran away, in this liquid form, with his motions, or after them; and when he had diarrhœa, it came at the top. It was voided like oil; but presently concreted. His wife told me, that this was the first symptom of his complaint. He had formerly discharged an immense quantity of it; so that full one-half his motions were fat. What was curious,—the disease ceased while he was under my care. He died of diabetes and phthisis. I opened him; but there was nothing particular to be found. The diabetes had arisen from organic disease of the kidneys; but there was nothing else to be found there. The intestines looked greasy enough;—they were like paper steeped in oil; but that was all. No oil was found in the alimentary canal. Dr. Prout tells me that, in cases of this kind which have come to his knowledge, there was considerable disease of the kidney.

Mr. Pearson's Case.—Mr. Pearson, of Clapham, shewed me a quantity of fat which came from an old woman; and said he could furnish me with any quantity. He understood from her, that it was discharged with the urine; but he mentioned the case of a lady, whom he knew very well, who discharged fat both with the urine and with the fæces. He did not attend her; but had been in her company. He had been particular to have the urine by itself; and also to ascertain whether the fat came from the bowels or not; and he clearly ascertained that it came from both. In this case of his, and in my case too, I think the motions were very white. They seemed to be of a viscid nature. It is a curious disease.

Treatment.—Mr. Howship, in his book on Morbid Anatomy, mentions the case of a lady, who discharged a great quantity of this fatty matter; and she was cured by giving her a pint of olive-oil. That was an odd remedy. He says she was well from that day, though she had been long ill previously. As "facts are stubborn things", I gave the man under my care[a] four ounces of olive-oil; and the voiding of fat greatly diminished from that time, and soon ceased. Whether the circumstance was accidental or not, I cannot tell. In "Hufeland's Journal", for 1826, is mentioned a case where a quantity of thick oily matter was vomited. There was extreme emaciation; together with a rapid discharge of thick oily matter from the stomach.

Source of Ambergris.—The spermaceti-whale is liable to this disease;—what is called "ambergris", being fat collected in the intestines of spermaceti-whales. As much as one hundred and eighty-two pounds have been found in, or discharged from, the intestines of that animal; and it is said that it has never been found higher than six or seven feet above the anus. This fat is very often discharged, and found upon the shore; but occasionally it accumulates, and the animal dies;—either from the accumulation, or from disease forming in the intestine.[b]

SECTION VIII.—GASTRO-INTESTINAL CONCRETIONS.

Concretions of the alimentary canal are sometimes discharged, and sometimes collected within; and as they are sometimes found in the stomach, as

[a] See Page 1067.

[b] A Paper by Dr. Elliotson on the Discharge of Fatty Matters from the Intestines, will be found in the "Medico-Chirurgical Transactions"; Volume 18; Page 67.

vell as in the intestines, we may speak of them together; under the head of "gastro-intestinal concretions."

Biliary and Urinary Calculi.—In the first place, these concretions may occur without any fault in the gastro-intestinal canal;—they may arise from the gall-passages. Of course if a gall-stone escapes from the ducts, but is not voided, it will be found in the stomach or intestines. Dr. Marcet says, that he once found in the alimentary canal a stone, which came from the *urinary* passages. Ulceration had taken place; and a communication had been formed between the urinary and the fæcal passages. The rectum, in this case, was imperforate.

Foreign Bodies.—Occasionally very hard concretions are found. They are often nothing more than hardened fæces; and then they are called "scybala"[a]; but occasionally they consist of articles which have been swallowed. I saw a man who had swallowed nineteen clasped knives. He was not believed for some time, but he assured me that he had swallowed them; and, to convince me, he took out of his pocket one of the same size as those he had already swallowed, and put it down his throat. I was frightened, and begged he would bring it up; but it was too far gone. Some persons believed him, and others did not; but at last we could feel them sticking in the abdomen; and ultimately they could be felt, I understand, in the rectum. He discharged fæces containing a large quantity of iron,—blackened; and at last he died in the most horrid torments;—the knives cutting his intestines to pieces. The fastenings of the knives, as solution went on, became less and less secure; the handles separated; and the blades were let loose. After death, a great quantity of knives were found in his abdomen;—some having run through two or three folds of the intestines. It was a frightful sight. Considerable portions of the knives were discharged during life; and these, together with what were found after death, are preserved at Guy's Hospital. The case is described by Dr. Marcet, in the twelfth volume of the "Medico-Chirurgical Transactions."[b]

Various Medicines.—When a person has taken a great quantity of chalk-mixture, and even magnesia, concretions have sometimes been formed. In the Museum at St. Thomas's Hospital, there is a preparation where the intestines of a child are completely blocked up with magnesia. It has the appearance of hard mortar, regularly cemented; and is said to be magnesia. It is necessary, therefore, to be on our guard (when exhibiting chalk, or magnesia) not to give it too long without ordering a purgative,—so as to carry it away. There is on record the case of a person who had taken magnesia for a long time, and suffered a great deal; and who then suddenly discharged, from the intestines, a large quantity of powder of magnesia. It is a fact that, from magnesia or chalk, the intestines sometimes become completely blocked up.

The sesquioxide of iron will have the same effect. When giving that medicine in any quantity, it is necessary to see that the bowels are regularly opened. We may give an immense quantity, if we attend to that point. I related a case where a man took nearly two pounds of it, every day, for some days, when labouring under tetanus (of which he got well[c]); and he regularly discharged large lumps of the sesquioxide. They came away as they would from a horse, covered with mucus, and giving him no pain whatever; but then he had a clyster to prevent any mischief. If a person do not attend to his bowels, a great accumulation may take place in the

[a] See Page 1056. [b] See Page 52. [c] See Page 708.

rectum, and the individual may be obliged to pick it out; but this must be from bad management. I have known cases of this sort occur, two or three times. I had another patient labouring under tetanus, to whom I gave this remedy, and he also got well; but if the nurses did not give him purgatives properly, he suffered pain in the rectum;—the rectum was distended and became dry; and he was obliged to pick the iron out. In his bed was found a shovelful; which he had amused himself, day and night, in removing. I recollect an obstinate hysterical girl, and also the case of a lady, in whom a similar accumulation took place; but, in these cases, it arose from the patients' refusing to let us know the state of their bowels. It is right to know that, if we do not pay proper attention, such things may occur.

Dr. Barlow (of Bath) mentions a case, where pills of sulphate of iron were discharged, nine months after they had been taken.[a] This is another general fact, shewing that articles may remain in the alimentary canal for a long period before they are voided. Substances which are liable to concrete should not be given, unless we attend to the bowels.

Larks' Bones.—Dr. Prout told me, that he was sent for to see a lady from whom some odd things had come away. She had suffered excruciating pain: and it turned out to be from larks' bones. This lady had been in the habit of eating larks, of which some ladies are fond; and she munched the bones. She was a lady of title; but, in consequence of this lark-eating, she suffered great pain. The substances discharged were sent to a celebrated chemist;—in order that he might ascertain what they were. He first discovered them to be bones; and afterwards, from their figure, they were ascertained to be the bones of larks.

Mustard-Seeds.—It was the fashion, a few years ago, (and I believe it has not yet quite gone out,) for people to stuff themselves with whole mustard-seeds. They were thought to keep the bowels very open. Some said it was a good practice; and others distributed pamphlets and tracts recommending it. A gentleman came to me with various odd affections of the alimentary canal, which I could not well understand. Two days afterwards, he brought me a quantity of seeds that had come away; and I could not imagine what they were, till at last he told me he had been eating mustard-seeds, but had not taken any for six weeks. Though he had given up the practice before he came to me, they had already accumulated in him; and his danger arose from that accumulation. We know that they generally come away whole. One gentleman told me that he sowed some of these mustard-seeds, after they had been passed through him; and they produced just as good salad as if he had not used them. Fashionable people have always some whim about them;—they are always taking something; but I believe the day of mustard-seed has pretty well passed by. Mustard-seeds will accumulate;—just like other things.

Hair-Balls.—In cows, we very frequently find, in the alimentary canal, concretions consisting of hairs. They lick their skin; some of the hairs go down the throat with the saliva; and concrete together into a hard ball. They are found, not only in cows, but in many other animals. Millers' horses are said to be subject to these concretions, from the grit of the stone-dust in the mills; and particularly, it is said, when they are fed upon bran. The poor people in Scotland, who eat oaten bread, sometimes have concre-

[a] They were "Hooper's Pills", taken for amenorrhœa by a young woman; who has since married, and is now (1842) the mother of healthy offspring. From sixty to seventy were collected from the stools. —*Dr. Barlow.*

tions of this description,—formed of the beard of the oat. The outside of such concretions as these, is like velvet.

Earthy Phosphates.—It is found that the earthy phosphates are frequently mixed with hair, the beards of oats, or whatever else may have been swallowed; and become cemented together by the phosphates and the mucus. Sometimes, instead of the phosphates being mixed up with the other ingredients, they form into a concretion around a nucleus;—just the same as takes place in urinary calculi. The ammoniacal magnesian phosphates, particularly, will form around a nucleus of any sort. Sometimes the nucleus has been stale fruit; sometimes a piece of bone; sometimes a pin that has been swallowed; and sometimes a gall-stone. We shall see that it is the phosphates, in particular, that are formed around a layer in the urinary organs. In some of these concretions, oxide of iron, oxalate of lime, muriate of ammonia, and muriate of lime have been found. There was a lady who was said to discharge a large quantity of stones, from the urinary organs; but whether she told the truth, I do not know. A medical gentleman was attending her; and he wrote to his friends in London, to know whether they had seen similar wonders. It was very singular that two ladies, in different parts of the country, discharged similar stones; and both cases happened to come within my knowledge. Whether there was any deception or not, we could not tell; but Dr. Prout considered that, if there was not, the stones must have come from the intestines. There was said to be excruciating pain attending their discharge. The stones have the same appearances, and the same chemical qualities; they contain oxide of iron, and phosphate of lime. Dr. Prout considered, that many of these were too large to have passed from the urinary passages; and that the number the patient stated she had voided, must be incorrect. It is true that very large stones will pass through the female urethra; but they would have caused more suffering in the bladder than she complained of.

Size of Concretions.—These gastro-intestinal concretions are sometimes very large. I recollect having read of a woman, in whose stomach they were found nearly as large as a hen's egg. The same writer mentions finding some, which weighed four ounces, in a soldier's stomach. In the colon of a young child, one was found which weighed two ounces and a half, and was six inches long. The child died in consequence of it. In the "Philosophical Transactions", for 1686, there is an account of a woman who discharged many, varying in size from a pea to a filbert; and the weight of which amounted, in two years, to five pounds. In the thirty-second volume of the "Philosophical Transactions", there is an account of a pregnant woman, who discharged some concretions that were very large. One of them weighed above two ounces. It is a fact, therefore, that such concretions do occasionally occur. Sir H. Sloane mentions a case, where two hundred were said to be discharged.

These concretions are much larger in brutes, than in the human subject; and also more common. In a brute, one has been found weighing fifteen pounds twelve ounces. They chiefly occur in ruminant animals, and in horses of slow draught; and in millers' horses, which are fed on bran.[a] Both in the brute and the human subject, these concretions are spheroidal or oblong. They take an imperfect polish, are more or less porous, and either are radiated, or have layers. Biliary concretions of both kinds occur;—some disposed in radii, and others in laminæ.

[a] See Page 1070.

Bezoars.—Those which are taken in small ruminant animals,—such as the antelope or the goat,—are called "bezoars." The word is said to be derived from a Persian compound,—"pa-zahar";—meaning "alexipharmic" (from αλεξεω, *to repel*; and Φαρμακον, *a poison*). Bezoars were once so valued, on account of their supposed anti-poisonous properties, that one in the East, when very fine, has been sold for six thousand livres [a]; and has been hired, in Holland and Portugal, at the rate of a ducat [b] per day. I have some specimens; but some of them are probably artificial; for, being sold at a great price, they were imitated. They are said to have concentric layers; and sometimes to be crystallized. They will take a polish, and even have a metallic lustre. Mine have evidently been stained. Sometimes there is an accidental nucleus within; and they will rattle. They are found to consist chiefly of vegetable matter; and some have an aromatic smell;—from the circumstance of the animal having eaten aromatic herbs. It is said that it is only those which come from the west, that take a polish; and that the eastern have often a gloss of white. The mode of distinguishing the genuine from the spurious, is said to be this:—if we take a piece of paper rubbed over with chalk or lime, and draw a genuine bezoar across it, it turns it green, or of an olive-colour; whereas, if it be spurious, the colour of the paper remains unchanged. However, the matter now possesses very little interest; since a belief in their virtue is no longer entertained.

Symptoms which they Produce.—Concretions in the alimentary canal, if retained, give rise to urgent vomiting; and to violent gastrodynia, dyspepsia, colic, constipation, and death. From the obstruction which they produce, we have all the symptoms of enteritis, or of colic, or of strangulated hernia. The treatment, whether the nature of the concretion be known or not, is the same as for colic or enteritis: but, as I said before [c], it is well to ascertain the state of the rectum. By passing a clyster up the rectum, we have the means of learning whether the obstruction is situated there. Sometimes these concretions have reached the rectum, before they have been stopped.

[a] About two hundred and sixty pounds sterling.

[b] A coin so called from being struck by dukes; and (when in silver) worth about four shillings and sixpence.

[c] See Page 1052.

CHAPTER VIII.

CHOLERA.

SECTION I.—ENGLISH CHOLERA.

Symptoms.—Having described gastro-intestinal concretions[a], the diseases which I shall now proceed to consider, will all be affections both of the stomach and intestines; and the first which I shall mention is "cholera."[b] This disease is characterized by a sudden attack of bilious vomiting and purging. At first the discharge is sometimes thin and watery; and has been called "*white* vomit"; but very soon pure bile comes away;—in fact, unless there be a discharge of bile, it is not cholera. Besides this discharge of bile upwards and downwards, the disease is marked by severe pain in the abdomen; with very severe spasms of the abdominal muscles, of the calves of the legs, and (in very bad cases) even of the neck and back. There is no rigidity (constant spasm), as in tetanus[c]; but violent contraction alternating with relaxation, and drawing the muscles up in lumps. There is great anxiety and great debility; burning heat, generally at the pit of the stomach; and—as may easily be supposed, from such a quantity of bile being poured forth—there is thirst and headach. These are the symptoms which we see, every autumn, in this country.[d] At last, however, from this violent pain, and from this profuse discharge, the body becomes cold; great faintness is felt; perhaps there is actual syncope; the patient sinks; loses his power; becomes excessively weak; and then every thing occurs exactly as if hæmorrhage had taken place. General convulsions come on; the spasm ceases; and the patient dies, as if he had lost an immense quantity of blood.

Duration.—This affection may last only a few hours, or it may last many days. Every body must have seen it seize persons early in the morning; and the persons so seized be dead in the middle of the day. If it subside, it may possibly be followed by inflammation. I have frequently seen gastro-enteritis take place, after the discharge had entirely ceased.

Nature of the Dejections.—The bile is generally found to be very acrid; and the vomiting and purging sometimes alternate; so that the more the patient vomits, the less he is purged; and *vice versâ*. Besides the bile discharged, there is usually a great secretion of another fluid;—no doubt, from the stomach and intestines. The same state may arise, occasionally, from an overflow of the secretion of the mucous membrane of the stomach and intestines.

Causes.—Intermittent and remittent fevers[e], and dysentery[f], in hot climates, very frequently begin as cholera;—I might say, perhaps, *with*

[a] See Page 1068.
[b] From χολη, *bile*; and ῥεω, *to flow*.
[c] See Page 700.
[d] England.
[e] See Page 376.
[f] See Page 1055.

cholera. The disease is common in hot climates; and in mild climates in hot weather. Cholera is particularly induced by sudden cold, after long-continued heat;—just the same as inflammation.[a] It is observed, that occasional falls of rain are particularly followed by cholera, in hot seasons, and in hot climates. Dr. Macculloch ascribes this disease to malaria[b]; and probably that is one of the causes; but various things will excite it. Violent passion,—violent emotion of the mind, will cause it. From the latter circumstance, people often vomit or are purged, and sometimes both; and the discharge will be green;—so that cholera is one effect of violent grief. Some persons have this from certain ingesta. Any acrid substance may induce vomiting, or purging, or both; and in this case the discharge may be green; and therefore the affection may be cholera.

Treatment.—The mode of treating this affection is, in the first place, to give plenty of chicken-broth, or any other diluent; so as to dilute the acrid bile, which produces such unpleasant effects on the stomach and intestines. We should also exhibit large doses of opium; either in the tincture, or in a solid form. Perhaps the latter would stay best on the stomach. It may be necessary, from the extreme weakness, to give brandy and other stimuli; and to have recourse to the hot-bath. The greater number of cases of cholera that we see, will do well if we give the patient warm diluents;—so as to dilute the bile, and assist nature to discharge it with as little irritation as possible to the stomach and intestines. But it is nevertheless advisable to lessen the disease, at the same time, by exhibiting full doses of laudanum. When the patient is weak, it may be necessary to have recourse to stimuli;—just as in the case of hæmorrhage.[c] Should the disease chiefly consist of vomiting, it may be desirable to send the bile downwards; and calomel will then be the best medicine. It stays better on the stomach than any thing else. An injection may be found very useful. If the case be taken in time, and this mode of treatment adopted, it is very rare for patients to die. We have carefully to examine whether there is any congestion in the head, or any inflammation. After a time, these are very likely to occur; and it is necessary to treat them as we should in any other circumstances. After the disease, it may be necessary to give tonics, and to support the strength; or inflammation may come on; and then it may be necessary to bleed. Sometimes, after the affection has declined, the diarrhœa continues; and it may be necessary to check it in the usual way. But it is requisite to ascertain whether it is accompanied by inflammation or not; for it very frequently is.

This is cholera,—properly so called. That disease which has so unfortunately received the same name, and respecting which so much has lately been said, comes next under our consideration.

SECTION II.—EPIDEMIC CHOLERA.

In 1817 a disease appeared in India, in some respects like English cholera;—so far as there is a discharge upwards and downwards, severe pain in the abdomen, cramps of the extremities, and at length of the whole body, with great exhaustion.

Impropriety of the Term "Cholera."—From its resemblance, in the particulars just mentioned, to the disease last described[d], it was unfortunately called "cholera morbus"; but there is this decided difference in the

[a] See Page 119.
[b] See Note (a) to Page 301.
[c] See Page 151.
[d] See Page 1073.

wo affections;—that in what we understand (or did understand) by "cho-era", the motions are all bilious; but in this the motions have no bile in hem whatever, but are perfectly white and watery. On this account, if were necessary to give this disease a name borrowed from another, it ould be better to call it "leucorrhœa"[a] than "cholera."

Symptoms, as they appeared in India.—In the disease which broke out n India, the first symptoms were languor, uneasiness at the stomach, ausea, and common diarrhœa; and then, all at once,—about three or four clock in the morning,—violent vomiting and purging occurred; though, casionally, these took place without any premonitory symptoms. At the me time, or very soon afterwards, excessively severe spasms were felt in e extremities, and in the abdominal muscles; so as not only to make the atient exclaim with agony, but sometimes to make it necessary to call in e aid of several persons to hold him. The countenance, in a short time, came ghastly; the skin shrivelled; the features contracted and elongated; e eyes a little suffused, slightly tinged with red, and sunk in the sockets; e lips purple, or of a black cast; the base of the eyelids likewise purple; e skin and the nails blue; and the fingers not only shrunk, but shrivelled; —exactly like the hands of an old washerwoman. At the same time, there as extreme thirst; with a great sensation of heat in the throat. The mperature of the whole body was excessively low; the tongue and the eath were cold; sometimes the tongue was quite clean, and of the colour lead; but occasionally it was white, and had a tough, or (as it has been scribed) a leathery coat; and occasionally it was covered with sordes, t by no means always. The pulse became exceedingly weak, and ex-edingly quick; and at last it could not be felt at all in the wrists, though might still be perceived at the heart. Extreme restlessness took place; that the patient could scarcely bear the bed-clothes, and endeavoured toss them off. The breathing, like the pulse, became more rapid than health. It was found that, in the expirations, only one-third of the ual quantity of carbonic acid was given off. The blood that was taken as found to be thick;—some say pitchy and uncoagulable. The venous d arterial blood were equally black; and, in the worst cases, the blood uld not flow at all. It was likewise observed that no urine was dis-arged. Deafness was noticed as a frequent symptom; and also tenes-is.

Occasionally, however, there was scarcely any vomiting, but extreme de-ity; together with extreme loss of bulk, shrinking of the body, the cor-gated state of the fingers, and the violent spasms. These cases were con-ered to be worse than those in which vomiting and purging took place. is disease differs from our cholera, in there being danger where there scarcely any evacuations;—the danger of the disease not depending on, and not being in proportion to, the loss of the substance of the body. metimes it is said that, in addition to there being neither vomiting nor rging, no spasm was felt; and this was considered still worse. The pa-nt was said to be "struck with death"; his pulse became imperceptible; and death very soon closed the scene.

Irregularity in the Occurrence of the Symptoms.—There was great irregu-ity as to the occurrence of these things. Patients sometimes vomited d were purged, before they experienced spasms; and sometimes spasms curred at the onset of the disease. Occasionally, blueness of the nose

[a] From λευκος, *white*; and ῥεω, *to flow*.

and about the eye-lids was not observed; and sometimes there was no corrugation. There was by no means uniformity in the symptoms.

Precursors of Death.—Before death, it was very usual to find the spasms, the vomiting, and the purging cease; and for the patient to lie perfectly still, with the loss of the vigour of his mind, but with a perfect preservation of his reason. He would be conscious of all around him, but wish not to be disturbed; and he would take no nourishment. He would remain tranquil, as if waiting for the moment of death; not only would the pulse at the wrist be still, but sometimes (it is said) the action of the heart could not be felt. Whether the ear was employed to ascertain whether the heart acted or not, I do not know. I presume it is common enough, in different diseases, for the pulse not to be felt, when the heart still continues to beat. Before death, it was occasionally noticed that the temperature would return; and hopes of recovery were sometimes entertained; but these were, for the most part, unfounded; for the patient presently sunk. It was likewise observed that, after this extreme exhaustion, the face would sometimes become flushed, the temporal arteries become distended and throb, and the patient lie in a somewhat delirious or comatose state;—much in the condition of a person in typhus-fever. The voice was weak and very peculiar. The duration of the disease was sometimes only a couple of hours; and sometimes it would not destroy life for the greater part of a day.

Morbid Appearances.—After death, an immense quantity of white turbid fluid, with flakes of a very white substance, were found in the stomach and in the intestines; while no fluid whatever was found in the urinary bladder, and that organ was contracted to the smallest possible size. These were general occurrences. It was usual for neither fæces nor bile to be found in the alimentary canal; but the gall-bladder generally (not always) was found full, and sometimes it was remarkably distended;—so that there was no want of bile, but none passed into the alimentary canal. The veins were usually found greatly distended with blood; so that the hepatic, intestinal, and mesenteric veins, were remarkably distended; but those of the spleen were not quite so full. Congestion also occurred very frequently in the lungs and in the head. Sometimes there was a rosiness of the external surface of the alimentary canal; and sometimes of the *internal* surface. There was usually, too, a great congestion of blood in the heart itself. The abdominal muscles were found, by Dr. Davy, to be flabby and red; but, of course, not inflamed. The urinary bladder—although containing no urine, and being so greatly contracted—had generally a sort of whitish mucus, with flakes, upon the inner surface. After death, one very remarkable phenomenon presented itself;—the temperature of the body was higher than during life; so that a very high degree of heat was found, on plunging the hand into the body. Another very remarkable circumstance is mentioned:—the occurrence of a twitching of the different muscles of the body, after the person was completely dead. The fingers, the toes, and every part of the face, were seen to move. Observations of this description were made on two subjects;—the one a Caffre, and the other a Malay. The former died twenty hours after the first seizure;—the complaint baffling the most powerful remedies. In fifteen minutes after he expired, the fingers of the left hand were observed to move; then the muscles of the inside of the left arm were contracted in a convulsive manner; and the like motions were slowly propagated upwards to the pectoral muscles. The muscles of the calves of the legs contracted in like

manner;—bundles of their fibres being drawn together, in a tremulous knot. The muscles of the inside of the leg and thigh were forcibly contracted, in a vermicular manner. The muscles of the face and lower jaw were similarly affected; and, finally, those of the right arm and right pectoral muscle. These motions increased, in extent and activity, for ten minutes; after which they gradually declined, and ceased twenty minutes after they began. With regard to the Malay, about fifteen minutes after he expired, the toes began to move in various directions; and the feet were made to approach each other. Muscular contractions were speedily propagated upwards, along the inside of the legs and thighs. The thighs were turned slowly inwards, so as to approach each other, and again outwards;—the whole of the lower extremities moving on the heels, as on pivots. These motions proceeded upwards;—producing a quivering in the muscles. In five minutes, the upper extremities began to be similarly affected. The fingers were extended, and often rigidly bent inwards; and pronation and supination of the hand were steadily, though slowly, performed. The same quiverings were observable as in the lower extremities; and extended to the "pectoralis major" muscles, and the superior margin of the "latissimus dorsi." The muscles of the face moved; and the head was observed to shake. The total duration of these appearances, was half an hour. By moving or pricking the arms or limbs, these contractions were rendered stronger, and were again renewed where they had ceased.

This is the account which has been given by various writers, who witnessed the disease in India. I will now describe the disease which prevailed in London.

Symptoms, as they appeared in London.—Among the patients whom I saw, there was great variety as to the mode of attack; and as to the order of the symptoms after the disease had begun. With regard to the first point, some persons were attacked suddenly; while others had diarrhœa for some time previously. Those who were suddenly attacked, were generally seized early in the morning, after going to bed perfectly well; and discharged, by vomiting and purging, a turbid whitish fluid, containing white flakes. There was violent pain in the abdomen; violent pain in the extremities; and dreadful cramps in the fingers, toes, arms, and legs. In two or three hours from the moment of the attack, I have seen the eyes sunk in the sockets; blueness round the base of the eyes; blueness of the nails; in some cases, blueness somewhere upon the extremities; in one case, blueness of the whole body; no discharge of urine; intense thirst; a great sensation of heat within; extreme restlessness; the tongue of a colour like lead; and (in the case in which the body was blue all over) covered with a white and leathery crust; a very feeble pulse; and, at last, no pulse whatever in the extremities, although it could be felt at the heart. The pulse and the respiration were very rapid. I have counted the respirations at thirty-six in a minute. There has been a great fall of temperature; so that the hands, the tongue, and the breath (as it came from the body) were cold. On passing a thermometer into the mouth, I have found it as low as *eighty-four* degrees;—ranging only, at any rate, between *eighty* and *ninety* degrees. There has been a cold sweat on the extremities; and then, at last, the patient would remain free from restlessness, pain, or vomiting; and would lie perfectly still, conscious of every thing, but with a desire not to make the least exertion,—apparently tranquil, and waiting for his dissolution. Then, before death, I have noticed the temperature rise,—the coldness cease; and after death, the tempera-

ture has risen still more. In the case where there was such great blueness [a], no sooner had the patient expired, than the blueness was diminished. I did not observe whether it diminished before death, but I noticed it immediately afterwards; and, in an hour, there was nothing of the colour to be seen. There was a twitching of the muscles; so that one finger, after death, would be drawn in, and then another; and the lower jaw would move up and down; and we might see a quivering of the muscles inside the thighs. The voice was weak; and there was a great peculiarity in it.

Morbid Appearances.—After death, the stomach and intestines were usually found filled with a white fluid, containing white flakes. There were various appearances of the alimentary canal, both internally and externally. Sometimes it was rosy, and sometimes pale. The urinary bladder was empty, and exceedingly contracted. The congestion in the venous system was very great. The mesenteric veins were full; and the "venæ cavæ" appeared distended to the utmost. They looked like a bell-rope in a drawing-room. The heart was observed to be full; and the blood, both in the ventricles and auricles, was grumous,—half coagulated. There was sometimes congestion in the head; and sometimes in the lungs.

Identity of the Disease in India and London.—No one possessed of common sense can doubt, for a moment, that the disease which occurred in India, and that which we have seen here in England, are precisely the same. I should think no one can doubt, that it is different from the disease commonly called "cholera" [b]; which is marked by a discharge of bile, and in which the danger is in proportion to the extent of the evacuations. It cannot be said that this disease is only a severe form of common cholera; because the mildest cases are not at all like common cholera; they are not characterized by a discharge of bile. If it were cholera, only very severe, the mild cases ought to be equal to the very severe ones of the common cholera of this country.

Is it a New Disease?—Again: it has been said that this disease is not only essentially common cholera, but that it is a disease we had all seen before. If it had previously occurred in London, I think that, from being connected with a large institution [c], I should have seen it; but I certainly never saw any affection that bore the least analogy to it. It would not be more absurd to say, that measles and common bronchitis are the same, because in both there are certain morbid appearances in the air-passages; than it is to say that, because there is vomiting and purging in this disease as well as in common cholera, they are the same. A variety of diseases of the skin, which are distinct from each other, have an appearance in common; and measles, scarlet-fever, and other affections, were formerly all jumbled together.[d] No diagnosis was made between them;—simply because there was redness of skin.

The cholera which Celsus and Sydenham described, is very different from this affection. Sydenham says it prevails at the end of summer and during the autumn, as regularly as vegetation comes in spring; whereas this disease occurs at all seasons, and has no connexion whatever with heat. Sydenham describes it as a discharge of *bile*; and not of the peculiar fluid which we see in this affection. I have conversed with practitioners older than myself,—with men of the greatest experience; and they declare that they have never met with such a disease before.

History of the Disease.—It was thought, in India, that the natives suf-

[a] See Page 1077.
[b] See Page 1073.
[c] St. Thomas's Hospital.
[d] See Page 412.

fered from it more than the Europeans. Thousands of natives perished near Bombay; while of the Europeans, who had good food and good clothing, six only were affected. It was found to attack those who had the worst diet, who were the worst clothed, and were worst off in all respects. It was found to prevail at all temperatures, and all seasons;—in *healthy* and in *unhealthy* situations; both in *dry* and in *moist* places. It prevailed in spite of the monsoons; and not only in every direction of the wind, but in all hydrometric states of the atmosphere. There was great doubt whether it was contagious or not. Some thought it proceeded where there was no communication, just as well as when there was. It was found suddenly to stop without any apparent reason, and then to go on again;—to pass from one district to another, as regularly as any other disease would; and then, as soon as it ceased in one place, it would begin in another. It was said that it broke out in the Mauritius, three thousand miles from the place where it had prevailed; but it was after a vessel had arrived from that spot. On reading the accounts of the disease as it appeared in different countries, we find a mass of evidence tending to prove that it is contagious; and then we find a mass of doubtful circumstances, which unsettle our minds again.

I need not say that it turned, at last, towards Europe; and proceeded, pursuing a north-westerly direction, till at last it reached this country; and, with all the observations that could be made, it is still a matter of doubt whether it is contagious or not. The particulars observed here and on the continent, however, perfectly agreed with what I have stated; namely, that the poor were affected much more than the rich; and that those who were the worst fed, clothed, and lodged, all suffered in the greatest degree. We had a striking example of this, in contrasting its ravages in London, with those it made in Paris. Here the greater part of the people are well fed;—better fed than in any other part of the world. They eat more flesh; and that flesh is of such a quality, as is scarcely to be found in any other country. Besides this, they are better clothed, and more comfortable; and, instead of trashy wines, they have good sound ale and porter, and malt-liquor of all kinds. But in Paris the air is bad; the people have very little water; and the water, for the purposes of consumption, is very bad. The inhabitants are crowded together,—I know not how many families in a house,—with little ventilation. The streets are narrow; and, together with this, the houses are dirty. The population live upon what we Englishmen consider trash;—not roast beef and mutton; but all sorts of dishes made up of bread and vegetables, with a little meat boiled in water to colour it, or to give it a flavour; and they drink, not good beer, but thin wine; and we all know that this disease has committed infinitely more ravages,—done infinitely more mischief there, than it has here. This completely accords with what was observed in India.

Is it Contagious?—With regard to contagion, we have in this country many observations, which tend to shew that the disease is contagious; and then, again, we have cases occurring, where we cannot imagine communication could have taken place. In the "Medical Gazette" (Volume 10, Page 31[a]), reference is made to a work by Dr. Haslewood; in which several facts are mentioned, which go to shew the contagiousness of the disease; and these, together with facts which I have noticed myself, have created a strong suspicion in my mind, that it is contagious. But while I am inclined to believe that to be the case, yet I am also satisfied that it will spread without contagion at all. It may spread independently of con-

[a] No. 227; April 7, 1832.

tagion; but if the disease do occur in an individual, I cannot but think that that individual may communicate it to another. Of course we shall find a large number of exceptions to its spreading, where we might, *à priori*, expect that it *would* spread. The disease has great difficulty in attacking those who are in good health, and well off; and in this respect it differs from syphilis, itch, and small-pox; and therefore, though thousands may be exposed to the contagion of the disease (if contagion really exist), yet they will be almost sure to escape. This must be taken into consideration, when we consider whether the disease is contagious or not. If a number of persons be exposed to it, and escape, yet that is nothing more than we should expect.

Mortality.—It was observed, in India, that much good was done by medical treatment. It is said that, at Bombay,—where there were from two hundred thousand to two hundred and twenty thousand inhabitants,—there were fifteen thousand nine hundred and forty-five cases. Of these, one thousand two hundred and ninety-four took no medicine, and all died; but where medicine was employed, the deaths were much reduced. It was supposed there,—at least, it was so stated in books at the time,—that by the administration of large doses of calomel and opium, occasional bleeding, and the hot-bath, great good was effected; and that many lives were saved. Some persons gave calomel in *small* doses; and some gave scruples, with a drachm of laudanum;—altering this according to circumstances. Others bled their patients, when they could get blood to come; and it was said that that treatment, also, was very successful. Some practitioners adopted both plans. Some strongly recommended the use of magnesia, and other absorbents. Indeed, one celebrated writer says, that magnesia and absorbent specifics have saved thousands of lives. Such was the treatment there; and the success, as I have stated, was considered to be very great.

Liability of Spirit-Drinkers.—It was well ascertained in London, that not only those who were badly off, and in bad health from some other disease, but those who were in the habit of drinking spirits, were very liable to the disease. I do not know that such an observation was made in India; but I presume that drunkards there suffered,—the same as here. In Europe, however, it is an undoubted fact, that that portion of the lower orders who had every thing calculated to keep them in good health, but who indulged in spirit-drinking, were sure to suffer; and this has been observed with regard to other diseases. However well persons may be off, yet if their body be enfeebled, they are rendered increasingly liable to the disease.

Treatment.—As respects this country, I cannot but think that if all the patients had been left alone, the mortality would have been much the same as it has been. If all the persons attacked with cholera had been put into warm beds, made comfortable, and left alone,—although many would have died who have been saved,—yet, on the whole, I think the mortality would not have been greater than after all that has been done; for we are not in the least more informed as to the proper remedies, than we were when the first case of cholera occurred;—we have not been instructed, in the least, by those who have had the disease to treat. Some say that they have cured the disease by bleeding; others by calomel; others by opium; and others, again, say that opium does harm. No doubt many poor creatures died uncomfortably, who would have died tranquilly if nothing had been done to them. Some were placed in hot water, or in hot air, and had opium and calomel, and other stimulants; which, altogether, were more than their system would bear, and more than would have been borne if they had been so treated even in perfect health.

I am sorry to say that, of the cases I had to treat, the patients nearly all died. I tried two or three sorts of treatment. Some had opium and calomel, in large and full doses; but they died. Hot air was applied externally; and I got two to *breathe* hot air. I had a tube passed through boiling water; so that they might inhale hot air. It was found vain to attempt to warm people by hot air applied *externally*. They were nearly as cold as before;—we could not raise their temperature; and therefore I thought of making them breathe hot air; but both patients died, about the period that death usually takes place. It was said that saline treatment was likely to be of use; and I accordingly tried it in some patients. At first I exhibited half a drachm of sesquicarbonate of soda, every hour; and, thinking that might not be quite enough, I exhibited a drachm: in one patient at St. Thomas's Hospital, I ordered an injection containing an ounce of the same remedy; but the greater part of it came away, and the patient died. Hot air was used in this case, as well as in the others.

Condition of the Blood.—This leads me to speak of the chemical qualities of the blood, and of the discharge from the alimentary canal. It has been said that the contents of the latter were *alkaline*; but I examined that point, in several cases where no alkali had been taken: and so far from the observation being correct, I found them exceedingly *acid*. In the case of a man who was blue from head to foot, and who had twitches after death [a], the contents of the stomach were exceedingly acid; but the intestinal matters were less and less so, as we went downwards, till we got to the large intestines; and there they were natural. In the patient who took large doses of the carbonate of soda, and had an ounce thrown up [b], the contents of the stomach were then only neutral, while those of the intestines were acid. When we came to the rectum, where some of the carbonate of soda that had been injected still remained, they were alkaline. The cases that I have examined, have not been numerous; but in all of them the contents have been principally acid; and in no case were they alkaline, except in the one I have just mentioned.

Dr. O'Shaughnessy has published some observations and experiments on this subject. He says:—"The summary of my experiments may be described as denoting a great, but variable deficiency of water in the blood, in four malignant cholera cases; a total absence of carbonate of soda in two of them; its occurrence in an almost infinitesimally small proportion in one; and a remarkable diminution of the other saline ingredients in all." It would appear, from these four cases, that there is less serum in the blood; and therefore we see why it is thicker in this disease than in health; and that there are also less saline ingredients in it. He also says:—"In the dejections passed by one of the patients whose blood was analyzed, we found a preponderance of alkali; and we recovered the other saline matters deficient in the blood." Thus he supposes that the blood loses its saline particles; that they are discharged into the intestines; and that we find them there, in the same proportion as the blood has lost them. But although that may be the case, it is not clear that the dejections are of an alkaline quality;—that is to say, that there is an excess of alkali in them.

I really can say nothing satisfactory with regard to the treatment; but I know that patients feel intense heat within, and intense thirst; and that they find great comfort from cold drinks. I understand that, in Vienna, the custom was to allow ice; which the patients took with great avidity, and derived great comfort from it.

[a] See Pages 1077 and 1078.

[b] See the previous Paragraph.

CHAPTER IX.

DISORDER OF THE DIGESTIVE ORGANS.

The disease which I shall now describe, is commonly called "indigestion"; but I would rather speak of it under the denomination of "disorder of the digestive organs at large"; because "indigestion" applies to affections simply of the stomach; whereas this affection implicates the intestines as well as the stomach; and, indeed, all the organs concerned, not only in chylification, but also in excretion.

Definition.—"Indigestion" is usually termed in medicine "dyspepsia"; and is sometimes mentioned under the name of "*apepsia*";—the one meaning "*difficult* digestion" (from δυς, with *difficulty*; and πεπτω, *to concoct*); and the other "*no* digestion" at all (from α, *privative*; and πεπτω, *to concoct*). However, these all mean precisely the same thing. We are now, therefore, to consider that derangement of the digestive organs, which is generally attended with indigestion; but many of the symptoms of which take place *without* indigestion. Many persons will digest very well; and yet, when they have no food in the stomach, they are filled with wind. But this ceases on food being taken.

Sympathetic Derangement.—If any organ in the body suffer severely, the stomach is very much disposed to sympathize with it. The stomach, the heart, and the head, are particularly affected when any material derangement occurs in the frame,—the stomach more particularly, perhaps, than either of the others; and the intestines generally become more or less affected at the same time. We know that, in all acute diseases,—in all violent accidents, the stomach feels the shock. There is anorexia (loss of appetite), frequently nausea and vomiting, and either costiveness or purging. The fæces generally become depraved in their quality; uneasiness is usually felt in the stomach or intestines; and there is, perhaps, even pain and tenderness. Very frequently, the patient is rendered more uncomfortable by the sympathetic disturbance of the stomach and bowels, than by the original affection itself. In chronic diseases of the heart, liver, and lungs, for instance, the stomach and intestines are most materially affected. But besides these effects, mere *sympathetic* occurrences, from the derangement of other organs,—we have these parts deranged *originally*.

SECTION I.—SYMPTOMS.

I will now proceed to consider all the symptoms, which characterize those affections which pass, every day, under the name of "derangement of the digestive organs."

Anorexia.—In the first place, loss of appetite is a very common symptom; and this is called, in medical language, "anorexia." Sometimes, however, the appetite is not *lost*; it is only *irregular*;—the patient being able to eat well one day, though he cannot eat another. Sometimes the

anorexia amounts to loathing;—the patient not only cannot eat, but the idea of it disgusts him.

Pica.—Sometimes the appetite is not simply *deficient*, but is *depraved.*[a] This is particularly seen in females; and is called "pica" (*a magpie*;—an animal said to be subject to this complaint). Sometimes young ladies long for chalk, cinders, or sand; and they will bite glass,—munch it; and, when it is small enough, they will swallow some of it. I saw a lady, who ate *brown* paper; she longed for something to eat,—for something that she had never eaten before; but she could not tell what;—nor could I. I have heard of cases where the patient longed for raw flesh, and even for *live* flesh; so that some have eaten live kittens and rats. This is an absolute fact. In the same way, some have been known to long for the contents of snuffers; and even for manure. A case is described of a man who ate a live pig,—leaving the intestines; but, after a little while, he ate them also. There is a case described, at full length, in a German work, of a boy who had such a longing for lime, that he ate all the mortar he could pick out of the wall; and, being well horsewhipped for it, he then commenced on a *neighbour's* wall. In order to prevent this, however, the neighbour smeared the wall with a decoction of wormwood, and the boy could no longer relish it; but he then went to the kennel in the street, and sucked up the sand. He had a desire for something dirty. After this he got to some quick lime; and was forced to drink a large quantity of water, to extinguish his thirst. The mucous membrane within, had a distaste for what is called "*good* food"; but, in other respects, he was quite well. I recollect having read of a girl, and also of a student at Leyden, who always ate spiders when they could get them; and no harm arose from it. I have read of a man who disliked bread, and never ate it; but he was seized with a quartan ague, and then ate a large quantity. He recovered from the ague; and the disgust towards bread returned. This disease occurs in young women (even moral ones) who do not menstruate well;—as I mentioned when speaking of chlorosis[b]; and many pregnant women have some strange longing of this description. Every one must have met with instances of women longing for what it was difficult to get;—longing for things out of season. There was one who longed for a bit of the priest's sleeve, and contrived to get at it and bite it;—not caring for his excommunication. I could relate cases, almost without end, of this description. One dipped her bread in a tar-tub. I never met with these extreme cases; but every one must have read of instances of this nature.

Bulimia.—Sometimes, however, the appetite is *excessive*; so that people will eat an immense quantity. This is called "bulimia."[c] I mentioned, when speaking of fever, that this has sometimes occurred as a temporary symptom of another disease.[d] People will eat many pounds of meat and bread in the course of a day.

Thirst and Foul Tongue.—Persons labouring under this affection, frequently complain of intense thirst; and their tongue is foul, and covered with a yellow or a creamy mucus. Sometimes it is white, dry, and brown; but, whatever appearance it has, it is worst in the morning. It is frequently red at the same time,—either at the tip or at the edges. Sometimes it is the papillæ only that are red. They appear separate;—like granules of cayenne-pepper. Sometimes the tongue is red all over; and it may be moist, dry, glazed, or cracked.

[a] See Page 246.
[b] See Pages 245 and 248.
[c] From βου, *excessive*, and λιμος, *food.*
[d] See Page 326.

Fetid Breath.—There is frequently fœtor of the breath. Sometimes the smell is sour;—sometimes it gives one the idea of sour flesh; sometimes it is like cabbage-water; and occasionally it is absolutely fæcal;—so that it is impossible to stand near the patient. I mentioned that the most horrid kind of fetid breath, frequently arises from a depraved secretion within the tonsils.[a] Of course we may have a diseased odour of the breath, from other circumstances than any of these. It will arise from a diseased bone; and sometimes even from carious teeth. This is not so disagreeable to others; but it is very unpleasant to the patient himself,—from there being a bad taste in his mouth. Sometimes the taste is bitter; and sometimes, they say, it is particularly offensive.

Eructations.—Eructations are very common in this affection; and these may be either simple or fetid. Those which are inodorous, are generally experienced when the stomach is empty; and probably arise from a secretion of air by the surface of the stomach; but those which are fetid arise, I presume, from the contents of the stomach undergoing a certain degree of fermentation, or sometimes from the patient being costive. It appears that a portion of the fæcal odour, if not of the fæces, is absorbed; for some persons who are exceedingly costive, have very fetid eructations; which are removed by regulating their bowels. In some persons, it is only when certain articles are taken, that the breath becomes offensive. Sulphuretted hydrogen appears to be given off from the substances in question.

Nausea and Vomiting.—Besides these affections, the stomach sometimes experiences attacks of nausea and vomiting. Some vomit only the food they take; others vomit a viscid secretion. Some vomit more or less constantly; and some vomit only in the morning;—and, in the latter case, it usually arises from drinking. When the disease has become very severe, some will vomit on the slightest motion.

It is very common for the mouth to become filled with watery fluid; and often very suddenly. Sometimes the patient's mouth is constantly open. I have seen patients spit a pint a day. Occasionally the fluid is tasteless; but more frequently it is salt, or sour; and occasionally it is very acrid indeed;—containing a large quantity of muriatic acid. I believe it is often felt to be very cold. Patients complain of its coming up, as if it proceeded immediately from a spring.

Independently of this fluid, there is frequently an excessive quantity of viscid mucus; chiefly hanging from the pharynx; and causing a constant desire, on the part of the patient, to hawk it up. Many cases of this description, are mistaken for affections of the air-passages. I was myself, for some time, completely in the dark respecting it;—conceiving that persons had a constant discharge from the air-passages, when they had nothing more than indigestion. The vomiting may either be of simple food which has become exceedingly sour and acrid, or fetid; or it may be of bile; so that we have every variety of vomiting;—just as we have every variety with regard to the appetite, with regard to the appearance of the tongue, and with regard to the eructations.

Gastrodynia and Pyrosis.—To descend lower, there is tightness and fulness of the abdomen;—chiefly at the epigastrium, and chiefly after meals. Frequently there is an aching there; and sometimes excessive pain. Occasionally this is experienced only after meals; and occasionally only when the stomach is empty. This pain, if it be unaccompanied with inflammation, passes under the name of "gastrodynia"; and if, with this, there is a flow

[a] See Page 791.

of fluid into the mouth, the two circumstances together are called "water-brash", or "pyrosis" (from πυρόω, *to burn*). The pain is sometimes sudden,—comes on instantly, or at least very rapidly; and is excruciating. It darts back, perhaps, to the spine; and causes the extremities and face to become cold, the pulse to be small, and the surface pale. It passes under the name of "spasm of the stomach." Very frequently, at the same time, there is a large discharge of flatus through the œsophagus;—flatus which is usually inodorous. This pain frequently runs to the left shoulder, and down the left arm;—like the pain experienced in "angina pectoris."[a] I have known it run down both arms, up the jaws, and along the teeth. Sudden attacks of this affection, are seen more commonly in women than in men. The pain is not always felt precisely in the situation of the stomach itself; but occasionally in the shoulder-blades, and occasionally in the ribs;—even in those which are not over the stomach; though the pain is dependent on that organ. In my own case, I have occasionally laboured under this pain severely; and I have been able to get rid of it by putting my fingers into my throat, and discharging a quantity of sour stuff. When the pain in the ribs returned again, by making so slight an effort as hardly to be called "vomiting", but sufficient to discharge a quantity of stuff like bird-lime, I have invariably found the pain go away. If I had not paid attention to the stomach, I could not have believed that the pain arose from that organ. The pain is sometimes felt even at a distance;—in the calves of the legs, for instance. Frequently, when there is much disturbance of the stomach, the legs fall into a state of violent cramp; the most common cause of which, is the presence of acid in the stomach.

Cardialgia.—Besides this *spasmodic* pain,—which, for the most part comes on suddenly; or, if it exist constantly, is attended with exacerbations; and is not increased by pressure, there is frequently *inflammatory* pain;—not *gastrodynia*, but *gastritic* pain; so that the stomach is tender on pressure, and all ingesta produce great agony. A sensation of heat is induced in the stomach, and up the throat. In some cases, there is a throbbing of the epigastrium,—a violent pulsation; which no doubt has been mistaken, over and over again, for aneurism; and which patients themselves are inclined to believe is aneurism; because, in this state of things, they are much disposed to despond. This has been called "cardialgia"[b]; and has been referred, by Sauvages, to a morbid sensibility of the part. Dr. Baillie wrote a paper on this subject, in the fourth volume of the "Transactions of the College of Physicians"[c]; in which he stated that he had been consulted, several times, on this affection; which had been supposed to be aneurism; but which he had not found to be so. He opened persons who died from some other disease, while labouring under this; and found nothing morbid. It is a common symptom;—one which I have frequently been consulted upon; but we find no tumour. On pressing the part, we feel the shape as usual; and we find, at the same time, a great depression of spirits; and, more frequently than not, various symptoms of disorder of the digestive organs. On looking over Sauvages, I find he has described it as a dyspeptic symptom; and has referred it to a morbid sensibility of the arterial system of the part He says it is certain that the gastric arteries and the aorta, although not affected with aneurism, yet, in those who are constantly hypochondriacal and hysterical, acquire an exquisite sensibility, and produce this state. Occasionally the heat is far beyond what I have

[a] See Pages 990 and 991.

[b] From καρδια, *the heart*; and αλγος, *pain*.

[c] Page 271.

just mentioned. It is a *burning* pain; and patients usually speak of it as a "*burning* sensation." It arises, in most instances, from the quantity of acid produced in the stomach; and if there be any inflammation of the mucous membrane, the pain will be proportionately severe.

State of the Bowels.—The bowels are generally irregular; and, for the most part, they are torpid; but sometimes they are relaxed. In other cases we find an alternation of costiveness and relaxation; so that they are never right. The fæces, too, are frequently unhealthy. Frequently they are lumpy; but they are of various morbid degrees of consistence, and of various morbid colours; and frequently they are not of their usual smell. Sometimes there is a great want of bile; and sometimes there is even a degree of icterus. From the irritation of the stomach, the urine usually becomes high-coloured; but at other times,—especially when there is a great quantity of wind generated in the stomach itself,—the urine becomes excessive in quantity, and pale;—just as in asthma.[a]

Headach.—Other parts of the body, however, suffer as well as the gastro-intestinal, or (as it is used to be called) the alimentary canal. There is frequently headach,—either general, or particularly in the forehead; and very frequently it is confined to one part of the forehead,—to one brow. Sometimes it is intermittent; and sometimes absolutely periodical. I have no doubt, however, that occasionally this headach does not arise from the state of the stomach; for disturbance of that organ may be produced by cold, or vexation of mind; and then, when it comes to be very severe, it will make a person sick. On the other hand, it frequently arises from taking into the stomach things which disagree with it. I formerly mentioned how hereditary this description of headach is[b];—how frequently we see it in fathers and in children;—how frequently it occurs in many members of the same family. Sometimes it will come on at *regular*, and sometimes at *irregular* intervals;—disappearing, perhaps, after a certain number of years. It is so obstinate, that I do not recollect curing a case of it; though I have tried every thing that could be devised.

Disturbance of the Nervous System.—Frequently, in this disease, there is confusion of mind. Patients cannot employ themselves as they did before. They cannot read long; and I have known some obliged to give up study altogether. Frequently there is vertigo, heaviness of the head, and sleepiness; but, on the other hand, when the stomach is much deranged, it is common for persons to lie awake;—they find it impossible to go to sleep. There is frequently, too, a ringing in the ears,—"tinnitus aurium"; and specks appearing before the eyes,—"muscæ volitantes." There is frequently great sadness,—great depression of spirits. Patients are very restless and fidgetty; and sometimes their temper is very irregular; so that we must take care not to say many things which, at other times, we might say with impunity. Voltaire gives special directions to those going to ask a favour of the Prime Minister. He tells us to ascertain (from his *valet de chambre*) whether he has had his bowels opened in the morning;—so much does temper depend upon the alimentary canal.

The heart also sympathizes with the stomach. There is frequently palpitation in these cases; and sometimes an intermittent pulse. Frequently there is night-mare, or terrific dreams. A partial consciousness, and yet an inability to make a voluntary exertion, come on during sleep; but when patients can make an effort, they imagine they get out of this condition. Incubus is a very common symptom. There is frequently, too, a sense of

[a] See Page 872.

[b] See Page 528.

great debility; which is felt particularly at the pit of the stomach. Patients complain of this every day;—they say they feel as if their inside were all gone to decay. Sometimes there is a tremor of the whole body. The skin likewise suffers. It is generally dry and cold; but sometimes it is hot.

Persons sometimes have merely an inability to digest food; and are very well so long as there is no food in the stomach. But true dyspepsia (that is to say, that affection which depends upon the stomach performing its functions improperly; and which is worse after eating, or indeed is only experienced then) is attended with other symptoms. There is loss of appetite, vomiting, distant pain, and the other symptoms which I have mentioned[a]; but we frequently have these without much indigestion. Persons complain of a great sinking at the pit of the stomach; they will also have gastrodynia and pyrosis; and yet they will digest their food well,—have no dyspepsia; although there is derangement of the stomach. They are very well when they take food; and only suffer when the stomach is empty. Some of these things are merely called "indigestion." Some patients have none of these symptoms; and some may have one or other, or both together. Persons who suffer in this way, frequently become pale and emaciated. They live many years; but are never well. They are not ill enough to die; but their complexion becomes altered.

SECTION II.—CAUSES.

The cause of all these symptoms, and of all this derangement, may be *beyond* the stomach or intestines;—they themselves being disposed to be perfectly healthy; or, again, the causes may be in those very organs.

Hernia.—In the first place, the cause may be in the groin. A hernia will produce all these symptoms. If a person have a rupture, he is sure to be troubled with irregularity of bowels, costiveness, extreme flatulence, and perhaps gastrodynia and indigestion. If the hernia return into the abdomen, these symptoms may all vanish. Any sort of pressure may have the same effect.

Constipation.—Obstruction or costiveness, without any fault in the bowels themselves,—costiveness from persons neglecting to relieve their bowels, or any accidental obstruction whatever,—may produce these symptoms. The presence of worms, or any injurious substances which the patient has taken, may give rise to them;—the stomach and bowels themselves being disposed to perform their functions properly, if these mechanical or accidental circumstances were not forced upon them.

Improper Food.—Occasionally, these symptoms entirely arise from the individual having taken articles, of which the stomach can make nothing,—which it cannot manage. These ingesta may be altogether improper for any one to take; or the individual may have some particular idiosyncrasy,—peculiarity of constitution. Some persons have a stomach, which can digest things in general very well; but there may be one or two things, which their stomach cannot digest; and if these be taken there is dyspepsia, and some intestinal derangement. We can hardly say that such a person is ill; because the circumstance only occurs when he has taken some particular article of food. I once saw a maid-servant who, whenever she took any kind of fruit, experienced dreadful gastrodynia;—the pain running into the

[a] See Pages 1082 to 1087.

back, and causing a rapid pulse, extreme agony, and cold sweats. She could digest hard salt beef, and her general food; but if she took a strawberry or a gooseberry, she was thrown into the state I have described.

Excess of Food.—Of course, an *excessive quantity* of food, will have the same effect as improper ingesta. Nature not only intends us to eat certain things, and not others, but she also intends us to eat a certain quantity;—and therefore, just as a person may have "*diarrhœa* crapulosa", so they may have "*dyspepsia* crapulosa" (from κραιπυλα, *a surfeit*);—the stomach not being in fault, but having more given to it than it ought to have. The author of "Ecclesiasticus" says, that "excess of meats bringeth sickness."[a]

Imperfect Mastication.—Nature does not intend lumps of food to go into the stomach. On the contrary, she intends it to be prepared,—to pass through a certain process before it enters the great organ of digestion; and therefore imperfect mastication will produce dyspepsia, without any fault in the part itself. Old people, when they lose their teeth, or young ones when they cannot chew as before, and cannot live on spoon-victuals, are very subject to indigestion. But—independently of a particular *quality* of food, or a great *quantity*—variety, or a great discordancy of meats, will occasionally produce dyspepsia.

Sympathy.—Still speaking of causes unconnected with a fault in the stomach and intestines, we may mention "sympathy." These parts are frequently deranged through the state of other organs. In the first place, we may refer to the uterus. When the uterus is pregnant, the alimentary canal is often thrown into disorder. Nausea, vomiting, and strange longings of appetite, will sometimes occur in females, the very next morning after they are impregnated; and sometimes these will occur at the time they quicken. There is every degree of intensity of these affections. They occur continually in diseases of the kidney; and frequently in mesenteric disease. The passions of the mind have great effect. If a person have eaten a good dinner, and has a violent emotion of mind,—whether joy or grief, or any other,—he will most probably have a fit of indigestion.

[a] "Be not unsatiable in any dainty thing; nor too greedy upon meats. For excess of meats bringeth sickness; and surfeiting will turn into choler. By surfeiting have many perished; but he that taketh heed prolongeth his life."—*Ecclesiasticus; Chapter* 37; *Verses* 29 *to* 31. "Ecclesiasticus" is an apocryphal book, generally attributed to "Jesus, the son of Sirach." The first fifteen verses of the thirty-eighth chapter relate to sickness; and though it has no claims to inspiration, yet (from its undoubted antiquity) it is very curious; on account of the notices which it gives of "the physician", and the "apothecary." Express mention is made of "medicines"; and infusions of wood are plainly pointed out. We subjoin the passage:—"Honour the physician with the honour due unto him; for the uses which you may have of him; for the Lord hath created him. For of the Most High cometh healing; and he shall receive honour of the king. The skill of the physician shall lift up his head; and in the sight of great men he shall be in great admiration. The Lord hath created medicines out of the earth; and he that is wise will not abhor them. Was not the water made sweet with wood; that the virtue thereof might be known? And he hath given men skill; that he might be honoured in his marvellous works. With such doth he heal men; and taketh away their pains. Of such doth the apothecary make a confection; and of his works there is no end; and from him is a sweet odour diffused around. My son, in thy sickness be not negligent; but pray unto the Lord, and he will make thee whole. Give a sweet savour; and a memorial of fine flour; and make a fat offering. Then give place to the physician; for the Lord hath created him. Let him not go from thee; for thou hast need of him. There is a time when, in their hands, there is great success. For they shall also pray unto the Lord;—that He would prosper that which they give for ease and remedy,—to prolong life. He that sinneth before his Maker, let him fall into the hands of the physician."

Continued depressing passions have the same effect. Many cases of indigestion that I have seen, have been referrible to an uneven state of mind. They have not depended on the stomach; but some external circumstance has weighed down the spirits; and the stomach has suffered in consequence of it.

The cause, however, may reside in the alimentary canal itself. In the first place, there may be a real debility of the part; in the next place, there may be an inflammatory state; and, thirdly, there may be organic disease.

Debility.—As to *debility*, that is sometimes induced by long continued excess in diet and regimen. Persons who have indulged excessively, all their lives, in eating and drinking, may expect to be subject to dyspepsia,—to have their stomach worn out; but this state frequently arises from original debility of the stomach. There can be no doubt that the stomach may be in fault;—like all other parts of the body. This affection will run in families, where there has been no excess whatever. We may see the father or the mother and the children labouring under this disease in various degrees;—none having committed any fault calculated to produce it. Certain portions of the stomach may be feeble; or the muscular fibres may become weak;—like muscles in other parts of the body. Some persons will have *one* muscle weak, and some *another*.

Inflammation.—There may, however, be an *inflammatory* state; and this may be either primary or secondary. It may be induced like any other inflammation; but, in most instances, it is chronic; and is induced by constant irritation of the stomach. Sometimes it is a mere secondary effect. The stomach has been affected with weakness; till it has fallen into a state of morbid irritability, and ultimately into a state of inflammation.

Organic Disease.—Sometimes, however, we have what is far worse;—*organic* disease of the stomach; and then the indigestion, and all the other symptoms which I mentioned [a], are irremediable. Generally it is the cardia or the pylorus which is affected; but sometimes (as I before stated [b]) there may be an ulcer in the body of the stomach; and this ulcer may be either simple or scirrhous. Sometimes there is no ulcer; but the coats of the stomach become thickened or softened. All those circumstances that I spoke of, when treating of organic diseases of the stomach [c], may occur. I mentioned, that the softening of the stomach has sometimes come on suddenly;—has appeared not to have existed about a few weeks, and sometimes not more than a day or two.[d] I also mentioned that this softening was sometimes decidedly inflammatory [e]; and that sometimes there was no mark of inflammation at all;—the parts being perfectly white.[f]

Prognosis.—From a consideration of all the causes producing disorder of the digestive organs, we see that occasionally it is quite independent of the stomach and alimentary canal; and we have only to remove the unfavourable external circumstance, and all goes on right again. Sometimes the causes are of a nature independent of external circumstances, and are removable; or, if not removable, are in some measure controllable. In other instances, it is impossible to cure the affection, or even to control it much. The prognosis, therefore, must altogether depend upon what we ascertain to be the cause of the disturbance.

[a] See Pages 1082 to 1087.
[b] See Page 1041.
[c] See Pages 1042 to 1044.
[d] See Pages 1029 and 1032.
[e] See Page 1033.
[f] See Page 1032.

SECTION III.—TREATMENT.

Removal of Urgent Symptoms.—The first thing to be done, is to alleviate urgent symptoms. Suppose that any thing injurious in its quality or in its quantity is the cause. The shortest way then will be to give an emetic, and empty the stomach; and it is much the best to give one that does not produce nausea, but an evacuation. The sulphate of zinc is as safe as any thing that can be exhibited. The flour of mustard has also been exhibited, for the same purpose. But should the patient be of an exceedingly full habit,—for instance, a fat, short-necked, puffy, asthmatic alderman, fifty or sixty years of age,—it may be necessary to take away blood, before giving an emetic; otherwise the exhibition of the latter may cause apoplexy. In some cases, it might be proper to premise bleeding; but in every case it is right to follow up the emetic by purging. Nothing is better than eight or ten grains of calomel, followed up by senna and salts. We thus empty the patient above and below; and he is soon relieved.

If the symptom be gastrodynia, and we cannot find any thing in the stomach that has occasioned it, then tincture of opium is an excellent remedy. In the continued form of the disease, prussic acid will answer better; but I never saw it succeed when it was given for immediate effect. When we wish that, I think a full dose of opium is best; and laudanum will act rather more quickly than solid opium. Sometimes it is necessary to give a large dose in this state. Twenty drops have no effect; and we may have to give forty, fifty, or sixty, and to repeat the dose every half or three-quarters of an hour; for it produces none of the specific effects of opium. Occasionally, it is better to give the opium in plain, hot water, than in a tincture or brandy; because, after a violent spasm, there is sometimes inflammation. Occasionally, I have seen people labour under inflammation, after spasm has been removed;—not because they took opium, but because they took a quantity of brandy. Sometimes we must repeat a dose of laudanum, containing forty or sixty drops, two or three times, before the good effect is produced.

If the patient labouring under this disease, however, is of full habit, it is useful to bleed. Sometimes I have seen gastrodynia cease when the bleeding was over. Venesection is often among the best antispasmodics. After a spasm, tenderness may come on; and then bleeding at the arm, or the application of leeches, may be necessary. But the affection frequently occurs without any marks of an inflammatory state; and then laudanum is sufficient to remove it. Hot external applications are exceedingly useful. The temperature falls in this state; and it is exceedingly pleasant to the patient to have a hot fomentation, or hot substances of various kinds applied,—not merely upon the stomach, but also to the back. I need not say that a hot-bath, if it can be procured, would be useful. This state is often called "the passage of a gall-stone";—for no reason whatever, but that it comes on suddenly. We are never justified in saying, that an individual is passing gall-stones, unless he has passed them before, and they have been really found; because a pain of this description may come on in a moment, from eating an article which does not suit that particular individual; or an external circumstance may occasion it; and there is no difference, as regards pain, between it and the passage of a gall-stone.

If the urgent symptoms that require to be removed are heartburn, acidity, and a scalding-sensation in the stomach, rising to the throat, magnesia, the

carbonate of soda, and things of that description, are the best. They will remedy this state chemically in a moment, without reference to the disease itself. In the healthy stomach, there is muriatic acid. As soon as food is taken, muriatic acid is formed; and, in some persons, it is generated in such great abundance, that it produces this affection. If there be very fetid eructations, from something putrefying in the stomach, and if the latter be overloaded,—distended with them, it is best to give an emetic. If there be no reason for giving an emetic, two or three drachms of the common solution of the chlorurets might be given; and common acids, also, will answer very well. These, however, are means to be resorted to only when there are symptoms particularly urgent that require removal. We have more to do in order to cure the disease; and we must lay down for the patient a system, for the regulation of his habits and employments.

Cure of the Disease.—Having spoken of what ought to be done, in the way of lessening any very urgent symptoms that may arise in disorders of the digestive organs,—particularly in a violent attack of gastrodynia,—we will now consider what is to be done for the cure of the disease;—what is to be done in the way of a regular plan for the termination, or alleviation, of the complaint. In the first place, we must ascertain the cause of the disease; and if it be external to the stomach, we must proceed accordingly.

During Pregnancy.—In females, this disorder very frequently arises from the state of the uterus. In pregnancy, it is very common for the stomach to fall into such a state of disorder, that the patient's life, for a time, is rendered miserable; and occasionally, from the constant vomiting,—from the inability to retain any food whatever on the stomach, life has really been brought into danger. In very extreme cases, it has been judged right even to induce premature labour, for the purpose of putting a stop to this great disorder. In ordinary cases, however, although we cannot cure the nausea and vomiting, much may generally be done to alleviate them;—not by removing the pregnancy of the womb, but by lessening the irritability of the stomach, so as to make it sympathize with the uterus as little as possible. Simple bleeding at the arm, has frequently been sufficient for this purpose; and so has the frequent application of leeches to the epigastrium. All those medicines which I shall hereafter mention, (when speaking of another head of treatment,) as calculated to lessen the morbid irritability of the stomach, will here be proper;—such as strychnine, conium, and prussic acid.[a] It is also proper that the patient should take but a small quantity of food at a time. But I will speak more particularly of this presently.[b]

If we can ascertain that the disease (as is not uncommon) proceeds from a hernia, the application of the taxis may be the only means of curing the dyspepsia. If we discover that there are worms, the remedies necessary to destroy them will be proper. These remedies I will consider hereafter.

Sluggishness of the Intestines.—Very frequently, the stomach is not in fault; but there is a sluggishness of the intestines; and, as the cause is situated there, a regular course of purgative medicine will be found absolutely necessary. It is wrong to give *strong* purgatives. Those which open the bowels regularly, are best adapted for the purpose. It is astonishing how long things taken into the stomach and intestines, will remain quiet; and then give rise to various symptoms. I alluded to the circumstance before.[c] In the "Philadelphia Journal", for 1822, there is an account of a coagulum of milk, which was vomited two months after it had been taken.

[a] See Pages 1097 and 1098. [b] See Page 1095. [c] See Page 1070.

I have myself seen a coagulum of milk, like bird-lime; which had remained some days (even a week) in the patient's stomach, and produced the greatest uneasiness;—the stomach not being in fault, but being oppressed by this particular substance. I have seen a piece of salmon vomited by an infant, a month after the nurse had been so foolish as to give the child that food. I mentioned, that Dr. Barlow (of Bath) published a case, in which pills of sulphate of iron were discharged *per anum*, nine months after they had been taken.[a] In a foreign journal, a case is mentioned, similar to that of Dr. Barlow's;—a case in which pills were vomited, a year after they were taken. An instance is recorded, in which a blacksmith's son bolted thirty grapes. He did not *masticate*, but swallowed them *whole*; and, after three months' frequent vomiting and extreme suffering, he was cured by an active purgative medicine. Ten of the grapes came away whole, even then. A case is mentioned by Bartholini, where a coagulum of milk, as large as a man's tongue, was discharged after the patient had taken muriatic acid. The same author also mentions a case, where a patient had swallowed a swine's tooth. He suffered under hypochondriasis and extreme emaciation, for two years; the tooth was then discharged *per anum*; and the individual perfectly recovered. Occasionally, then, we may have disorder of the digestive organs from articles which have been taken, and have remained in the stomach and intestines a much longer time than we could imagine. If, in a case of disorder of the digestive organs, we suspect any thing of this kind, we ought to employ strong remedies. Purgatives and injections, of course, are very important.

But whether this be the cause of the disease or not, it is of the highest importance to keep the bowels regular. Nothing can be worse than to give strong purgatives for this purpose; except where there is something considerable to be brought away. In a case of habitual costiveness, strong purgatives are decidedly bad; because, when we have once acted violently on the intestines, the latter, according to the laws of nature, must fall into a torpid state,—go to sleep. During this condition of repose, the fæces accumulate again; so that we have to give another strong dose, in order to remedy the mischief of the first. Thus the person is always costive or taking strong medicines; the consequence of which is, that he is at last obliged to take them, or he will fall into a state of dyspepsia.

Croton-Oil.—One of the best remedies for this state, is a very minute quantity of croton-oil (about the twelfth, the sixth, the fourth, or the third of a drop) given regularly with rhubarb or colocynth; and if it should gripe, a small quantity of some aromatic oil may be added to it. We may order one, two, or three drops to be made up into pills; and make the patient take one every night. We shall soon find that it will produce one copious stool in the morning; and also that the medicine may be taken for two or three years, perhaps for ever, without losing its effect. The patient will not be under the necessity of increasing the dose. If, however, we give it violently, the patient will be in the same condition as if he had taken other purgatives;—he will be costive afterwards.

Impropriety of Blue-Pill.—Nothing can be more absurd than to give blue-pill, calomel, and other mercurial medicines; because they have a twofold operation. They not merely act as cathartics, but they also pervade the whole system; and thus make the patient weak and nervous. These medicines do more than we want. We merely require the intestines to be acted upon; and not the intestines at large to be put under the specific ac-

[a] See Page 1070.

tion of mercury. If Mr. Abernethy had lived a hundred years, and done good all the time, he would not have atoned for the mischief he has done, by making people take blue-pill. Half the people in England have been led to fancy, that they cannot live without blue-pill; which not only does no more good than any other purgative, but likewise renders those who take it constantly susceptible to cold; and must altogether be very injurious.

Excessive Torpidity of the Bowels in Some Persons.—I may here mention, that there are some persons who have naturally very torpid bowels;—to whom it is not natural to have a motion every day. I presume that, in ninety-nine cases out of a hundred, it is natural for the bowels to be emptied once in the twenty-four hours; but there are some who do not have a motion oftener than once in three or four days; and they are ill if they do. I have met with such cases. Dr. Heberden knew a person who, all his life, had but one motion a month.[a] As a contrast to this, Dr. Heberden mentions another individual, who had twelve motions a day, for thirty years.[a] That must have been a very troublesome state of things;—a kind of "perpetual motion." This same individual had, after this period, a motion seven times a day, for seven years. Women are much more costive, and suffer this with more impunity, than men; on account of the pelvis being large, and the rectum distending. Nothing is more common than for women to say, that they have been a week, or ten days, without a motion. We must therefore take into account, that it may be natural for some individuals to have a motion only every few days.

Watch the State of other Parts of the Body.—In a case of disorder of the digestive organs, we should always examine into the state of other parts of the body; for this condition will take place, from sympathy, not only with the uterus, but with other organs. A very common cause of this disease, is disorder of the brain;—what is commonly called "disorder of the *mind*." From anxiety, grief, and distress of mind, many persons have complaints of the stomach. So far as the stomach itself is concerned, they have no reason to find fault; but, from the state of the mind, the stomach cannot do its duty. Excessive anxiety, or grief, will not only take away the appetite, but will produce constant imperfection in the functions of the stomach; together with all those symptoms of indigestion, and derangement of the digestive organs, which I formerly mentioned.[b] I have very frequently been unable to do any material good, because the complaint evidently depended upon the state of the mind; and very frequently I have gained credit where I deserved none, simply from the circumstance of the unhappy state of mind ceasing. I have very frequently attended young ladies, who could not digest;—who had flatulence of the stomach; *no* appetite or *great* appetite; every thing wrong;—simply because there was an anxiety respecting love-affairs. They were in fear of disappointment; and as soon as the affair was settled, they ate, drank, and digested like other people;—without any inconvenience; but, on the contrary, with great benefit. I have frequently been baffled in what appeared good rational treatment, because there was some grief of mind, or some constant anxiety.

Snuff-taking before Dinner.—It is always right to look out for any particular habit;—to see whether the patient is in the habit of doing any thing, to which the disease can be attributed. Dr. Cullen mentions two cases of dyspepsia, from patients taking snuff before dinner. In one of these two cases, the disorder of the stomach was gastrodynia,—aching pain

[a] "Medical Commentaries"; Chapter 5.

[b] See Pages 1082 to 1087.

of the stomach; and in the other case, there was a complete loss of appetite. Now both these individuals, on being particular not to take snuff before dinner,—taking as much as they chose when the stomach had something in it, recovered from their dyspepsia. The one lost his gastrodynia entirely; and the other recovered his appetite.

Smoking.—With regard to myself and tobacco, although I have a stomach that will digest any thing in the shape of proper, good, nourishing food, yet if I smoke three cigars in a day, or smoke three or four successive days, it invariably produces the most extreme gastrodynia and cardialgia,—so as to make me quite miserable; and therefore I am compelled to be temperate in that respect.

Protracted Abstinence.—Many persons have this disease, from going too long without food. Habit has a great deal to do here. Some persons who breakfast at nine in the morning and dine at seven in the evening,—taking nothing in the mean time, feel no inconvenience; and others suffer the *greatest* inconvenience, if they fast more than four or five hours. Habit will not operate on some people, with regard to this point;—some persons cannot be brought to fast long; and it is vain for them to attempt it. They feel a sinking in the stomach;—they have gastrodynia induced, if they do not eat frequently. Some cannot pass above four hours without food; and in proportion to the labour undergone, is the necessity of eating. In making inquiry into dyspeptic cases, therefore, we should ascertain how frequently the patients eat, and also whether they eat too much; for the stomach must not be blamed, because it does not do double or treble the duty that nature intended. It is said that, in the reign of Henry the Sixth, the people ate but twice a day; "whereas", says Hollinshed, "we have breakfast in the forenoon, beverages or nuncheons after dinner, and thereto rear suppers when it is time to go to rest. Now these additional repasts, thanked be God, are very well left out; and each one contenteth himself with dinner and supper only." Another point is to ascertain whether the patient masticates his food. Many persons gobble up their dinner, as a hog would do, instead of masticating it properly.

Change of Diet.—The patient's diet should be regulated. Some nations live on fish; others on putrid animal matter; and others on vegetables. An eagle has been brought to eat bread, and a pigeon to eat meat;—the former being a bird of *prey*, and the latter a *domestic* bird. John Hunter brought a hawk to live on bread. If these changes be accomplished slowly, they may be well borne; but many cases of indigestion arise from persons suddenly changing their diet. It is mentioned that our countrymen who were prisoners under Tippoo Saib, were fed during their confinement upon nothing but rice, water, and capsicums; and on their return, when they were liberated, they of course ate as before. The suddenness of the change, even to their former diet of meat, produced violent diarrhœa. Very frequently persons suffer, in this respect, from a change of food; and even from a change of place;—from having different bread from that to which they have been accustomed, and different water from that which they formerly had. We see the effect of habit, every day; for the lower orders, without appearing to suffer from it, will eat such butchers' meat, and such fish, as would disorder the stomach of their superiors.

Most Appropriate Food.—There can be no doubt that, generally speaking, food is best composed of a mixture of vegetable and animal substances. It appears from the teeth, and likewise from the experiments made with the solvent juice of the stomach, that digestion is most likely to take place with facility, and in perfection, if the diet consist of a portion of animal and

vegetable substances. In general, too, the food is much better digested, if a certain degree of art be applied in its preparation,—the art of cookery. Some persons, with weak stomachs, require this art in full perfection. They do not digest things, unless they are thoroughly boiled,—thoroughly pervaded by heat,—either *dry* heat, or heat and *moisture*; and even then they require the addition of good spices. With regard to patients labouring under this affection, therefore, it is necessary to ascertain whether they have made any change in diet; whether the meat they eat is good of the kind; whether they eat a proper proportion of animal and vegetable food; and that they do not eat things raw, which might be dressed. Many persons, for example, have indigestion only when they eat articles not thoroughly cooked; and some persons digest every thing, except raw vegetables, salad, and radishes.

Superiority of Some Kinds of Meat.—In general, brown and old flesh is better digested than young meat. Mutton is easier of digestion, for example, than veal; and capon than a young chicken. In general, meat that is not particularly fat, is better digested than when it is; and lean is better digested than fat itself. Fresh meat, too, is usually better digested than salt meat. Salt hardens the fibre, makes it more compact, and less easy of solution. Dr. Robinson addicted himself to taking a vomit every evening; and he found that he brought up veal undigested; but when he dined on beef, very little remained;—shewing that the latter is of more easy digestion than the former;—*old* flesh than *young*. With regard to *fat*, it is a curious circumstance that some persons who can digest but few things well, can digest a piece of broiled bacon thoroughly; and it is now the fashion to take broiled bacon, as a thing very easy of digestion. Mr. Cunningham, a surgeon, who wrote an account of New South Wales, states that he knew a person, in whom the smallest portion of the fat of beef or mutton deranged the stomach; and she was forced, before she could take gravy, to allow it to get cold, and then have it skimmed, and warmed again;—so that not a particle of fat remained in it. Yet she could eat broiled fat bacon with impunity.

Regulate the Quantity of Fluid.—Another point to be attended to is, not to take much liquid food into the stomach;—not to indulge in broths and slops; which are so much animal matter, with water into the bargain. It is better to take animal food in a compact form, than in a quantity of hot water; because, no doubt, this quantity of liquid is injurious to the stomach. It dilutes the gastric juice; and (we must suppose) relaxes the stomach. It must both sodden it, and diminish its powers. Were there no other reason than that which I have just assigned, it would be wrong to drink too much liquid of any sort,—even beer, and tea. One of the best things to drink after dinner, is a cup of very strong coffee, without any milk. Some persons, however, are so stimulated by this, that they cannot bear it. But, in general, it is a good rule for dyspeptic people to limit their quantity of drink as much as possible; to take no slops or broth; and, in preference to drinking beer or water, to take a cup of strong coffee. With regard to vegetables, waxy potatoes are seldom well digested; and it is necessary that greens should be thoroughly boiled;—that is to say, boiled vigorously in a large quantity of water.

Best Kinds of Wine.—Many persons are much better without beer or wine; but some have a stomach so languid, that it requires the stimulus of wine. We cannot prescribe any particular wine. For some persons, Port is best; for others, Sherry; and for others, again, Madeira. With some people, Port turns acid, and with others Sherry; but, in a great number of

cases, Sherry agrees best with the stomach. A mixture of wine is bad; and persons will frequently bear Port, Sherry, or Madeira alone, when they would be made ill by taking any two of them together. But some add beer to a mixture of wines; and then we may expect a treble commotion in the stomach. Some say, that if they take a glass of brandy, it settles all;—it is like oil poured on the sea in a swell. But we find that many persons have stomachs so susceptible, that no wine can be drunk; and, indeed, nothing but brandy and water can be borne. Burgundy, Champagne, home-made and all sweet wines, generally disagree with the stomach. Still we meet with exceptions; and we may find cases where vomiting is stopped by Champagne. All Rhenish wines are sour, and likewise claret; and these usually ferment in the stomach, and become acid; and therefore they are improper. Generally one wine only should be taken; and that which usually answers best is Sherry.

Impropriety of Suppers.—It is well to prevent persons labouring under this complaint from eating suppers; unless they have had an early dinner. If people dine at one or two o'clock, it is necessary for them to take something in the evening. Now and then, we may meet with persons who are not so well without a good supper. They will lie awake from irritability brought on by exhaustion, unless they eat suppers; and therefore there is no rule for these things. There are general rules,—such as I have now mentioned; but we must never stand up for them universally. We must make exceptions; and adopt what we find the patient's constitution requires.

Brown Bread.—It is very proper to advise some persons to eat brown bread, instead of white. Many persons will not be costive, if they eat brown bread; but, in others, it produces a degree of heartburn, and acidity.

Rest after Dinner.—It is almost always right to advise persons to remain quiet after dinner; for if there be much moving about, digestion does not go on so well. It is a common saying—

"After dinner sit awhile!"

and it is also said—

"After supper ride a mile!"

This is not to digest the supper; but because the person should eat so light a supper, that he may ride a mile afterwards, without doing himself any injury.

We thus perceive that much may be done, in the way of curing disease of the digestive organs, without any medicine at all;—simply by discovering the cause, and removing it; and this cause is very frequently some bad habit. It is absurd in every case of affection of the stomach, immediately to order something. We should sit down, and learn the history of the case;—ascertain if the cause is beyond the stomach; if it has its seat in any other organ; what is the state of the intestines; what is the condition of the mind; whether the patient has been fasting too long, or eating too much, or taking something that disagrees with him. If it arise from any of these causes, we may cure the disease without any medicine;—may put the patient in possession of a plan, which will put a stop to his ailments. I am quite sure that, in the greater number of cases of indigestion, the disturbance arises from things forced into the stomach, from the state of the mind, or from some injurious habit which the patient has contracted; but it is necessary to attend to all the points I have mentioned, with regard to

iet; for some persons have such weak stomachs, that they require a par-
cular line of conduct. Articles which produce indigestion in some people,
ill not give rise to it in others.

Is there Inflammation?—We may perhaps, however, have to treat dis-
ase of the stomach itself. Independently of all external circumstances,—
f things external to the stomach, the stomach itself may be in fault. Hav-
g cleared the way so far, we should look out for gastritis. If we find a
reat sensation of heat in the stomach, and up the throat, and if we find
he part tender on pressure, the case must be treated like any other in-
ammation. Leeches frequently applied to the pit of the stomach, moderate
urging, and mild diet, are the suitable means.

Prussic Acid.—If we find no such marks of inflammation;—if the
tomach suffers pain when food is taken, although there is no pain on pres-
ure; or if the stomach vomits,—discharges its contents, and yet there is
o pain or heat;—we may conclude that the case is one of morbid irrita-
ility; and, for the purpose of lessening this, prussic acid is one of the best
emedies. In gastrodynia, it answers exceedingly well. If there be in-
ammation united with this spasmodic pain, we must remedy that by
eeches; but if there be merely spasmodic pain, or a constant aching at the
tomach, prussic acid often answers very well. It is best to begin with one
inim three times a day; taking care not to give it on an empty stomach;
or a dose that will be borne very well when the stomach is *full*, cannot be
orne when it is *empty*. All agents affect the stomach most when it is
mpty;—when they come in contact with it;—when they are not mixed
with its contents, and consequently not diluted, and only applied partially
o the organ. If we give some doses before meals, and others after it, it
will not produce a uniformity of effect. It is best to equalize the dose, by
iving it after meals. We may begin with a minim; and, in a day or two,
ncrease it to two minims, then to three, and so on. The symptoms of an
npleasant kind which it produces, and which are sufficient to make us
imit the dose, are sickness, faintness, convulsions, and a little pain in the
ead. We must tell the patient of these things, and guard him against
heir occurrence;—desiring him, if they take place, to diminish his dose
f medicine immediately;—not to take so large a quantity again, but a
maller dose. Then, as to the dose, there is no rule whatever. I had a
atient, who could not bear more than the fourteenth or seventeenth of a
rop without uneasiness; and I had another who said he took seventeen
minims, three times a day; but he could not get beyond that. I have se-
veral times seen patients, who took eight or nine minims three times a day;
nd even that is a large quantity. The dose that is usually borne, varies
rom two to four minims.

Stramonium.—Hyoscyamus, conium, and strychnine, are given for the
ame purpose; but stramonium and opium, I think, are better than any
f these. I think stramonium is the best; because opium confines the
owels; and that is injurious in these cases. I have seen stramonium cure
his pain in the stomach (gastrodynia). There is no rule for the dose of
his medicine; but it is well to begin with half a grain, two or three times
day; and gradually to increase it, while there are no unpleasant effects.
These effects are pain of the head, convulsions, and giddiness; and if the
remedy be given incautiously after these begin, we may have drowsiness,
violent pain, violent throbbing of the temporal and carotid arteries, and
sometimes thirst, and great dimness of sight. If the two latter symptoms
are not considerable, the patient may bear them; but if convulsions, giddi-

ness, and pain of the head be induced, it is well to omit the remedy immediately; and then to give a smaller quantity. With regard to the feeling of morbid irritability, that is much better put a stop to by prussic acid, than by stramonium. I have frequently seen it stopped by the first or second dose; but I think that the gastrodynia,—the aching of the stomach, is best relieved by stramonium. Prussic acid answers very well; but I have seen it fail, where stramonium cured the case with facility.

Conium; Opium.—Next to stramonium, conium answers very well; but very frequently it requires to be given in increased doses,—up to ten, fifteen, or twenty grains, three times a day. Opium is also proper in these cases, if the patient's bowels are relaxed, and we are anxious for the medicine to have a double effect.

Bismuth.—The trisnitrate of bismuth has been used to lessen gastrodynia; and, no doubt, with good effect. The Unguentum Antimonii Potassio-Tartratis has also been employed. It is well, in these cases, to give but a small quantity of food at a time; for the stomach, when much distended, falls at length into a spasmodic state. The more distended the stomach is, the greater effort does it make to contract, and the greater is the spasm; and therefore a small quantity of food is proper.

The symptoms of morbid irritability of the stomach may be united with gastrodynia, and we must remember that the morbid irritability may, at different times, amount to inflammation; so that the remedies which, in the first place, were calculated to relieve it, will no longer do so; and the remedies for inflammation must be employed. We are never certain, from day to day, whether the symptoms depend upon inflammation or morbid irritability. Occasionally we have to apply leeches, and the remedies proper for inflammation; at other times, those that I have now mentioned; and frequently we have to employ both; for there may be a degree of tenderness;—but more *pain* than *tenderness*;—so as to render both plans proper. Frequently prussic acid and conium are improper; the remedies for inflammation being required. In other cases, the remedies for inflammation are improper;—the patient requiring narcotics; and, again, there are other cases, where *both* plans are proper.

Aromatics and Stimulants.—We may have another condition of the stomach;—where there is no gastritis,—no inflammation,—no morbid irritability independent of inflammation; but where the stomach is *torpid.* Some persons have what is called "a *cold* stomach." They can digest their food, if they take brandy and cayenne pepper. Now in indolence of the stomach, aromatics are generally good;—mustard and cayenne pepper; and with regard to medicines, ether, camphor, fetid substances, and ammonia, will be found useful. Dr. Baillie says that where, in disorder of the stomach, a quantity of viscid mucus is discharged, the compound tincture of benzoin is an excellent remedy; but where there is pain on pressure, I would not give such a stimulating medicine.

In disorders of the stomach, it would be absurd always to tell patients to abstain from wine, and to take nothing rich; for some persons digest better if they take a few spiced articles, and a few glasses of wine,—perhaps even a pint. Some must have wine, and even spirits. In some cases of this description, the application of galvanism to the epigastrium has been found very serviceable. In this weakness and torpidity of the bowels, tonics, of various kinds, are useful;—especially iron; and particularly Ferri Ammonio-Chloridum, which is one of the most stimulating preparations of iron. Bitters are useful; and to these, people often add soda; which is a

good stimulant. Acids, as well as tonics, have been found useful; and they are often the best remedy for acidity; for they destroy that state of the stomach which gives rise to it. Nothing can be worse, in these cases, than for people to vomit and purge themselves, as they frequently do. It must weaken the alimentary canal. It is right to enjoin plenty of fresh air. Patients ought to avoid confinement; to have exercise short of fatigue; and constant pleasurable occupation, without care.

CHAPTER X.

WORMS.

It has been said that nature has provided every animal with other animals to prey upon it;—to make a habitation of it, and derive food from it. It is even said that a flea has its flea; and if so, I suppose, the latter would have its flea's flea. How far this matter goes, it is impossible for me to say.

Divisions.—Some of these animals evidently come from without, and perhaps exist but temporarily; and these are called "*ec*tozoa"[a]; whereas those that colonize, establish themselves, breed a posterity, and become whole families at last, are termed "*en*tozoa."[b]

SECTION 1.—ECTOZOA.

As instances of *ec*tozoa (those which reside upon the skin) I may mention fleas, lice, bugs, and other delicate little animals. But we have also others which reside *within*; some getting into the anus, some into the maxillary sinuses, some into the stomach and intestines, some into the biliary ducts, and some into the cellular membrane beneath the skin. I had a patient (an infant) who discharged about a dozen larvæ (maggots) of the common fly, all alive. The child had suffered from a chronic cough; but as soon as these dozen larvæ were discharged from the intestines, it lost its cough. I saw them myself in the napkin,—moving about in the fæces;—exactly as if they had never been in the body. I understood that it had eaten part of a high pheasant, some months before. I have had two cases, in which a live caterpillar was discharged from the intestines. One of these cases occurred in a woman, who was in the habit of eating cabbage-stalks, when she washed them for dinner. The moth lays its eggs on cabbage-stalks; and no doubt this patient has swallowed some of the eggs; and it so happened that one of them was hatched.

Dr. Good, in his work on Medicine, gives an account of a flesh-fly (the "musca cibaria"), or rather the larva of it, being discharged by means of purgatives, after producing considerable derangement. The larva of the bee, and even live spiders, have been discharged downwards, from the alimentary canal, by human beings. Even the "triton palustris" and the "lacerta aquatica" (the *domestic* and the *horse*-leech) have been discharged by vomiting, and have been found in the stomach. Leeches, when they get into the stomach, will sometimes (from sucking the blood) attain so large a size, as scarcely to be recognised. When soldiers have been encamped on marshy ground, it has been found dangerous for them to go to sleep; lest leeches should get into their mouths, and destroy them. Life

[a] From ξωα, *animals*; and εκτος, *without*, or *outside*.

[b] From ξωα, *animals*; and ενδον, *within*.

as been lost from leeches crawling down the œsophagus into the stomach, ucking blood there, and producing fatal hæmorrhage. I once saw two entipedes, said to have been vomited by a girl twelve years of age. There vas no reason to suppose that any deception was practised. She vomited hem; and the vomiting was attended by a tightness in the throat. The nimals had lived three days when I saw them. The mother said that, wo months previously, the girl had vomited a black-beetle. She had palitation of the heart, pain, and heaviness of the head.

Dr. Duncan, in the ninth volume of his "Medical Commentaries"[a], mentions the case of a boy, who discharged four caterpillars after a dose of alomel. It is said that several crawled out at the anus afterwards; and, n exhibiting calomel and jalap, an incredible number came away. He kewise discharged a lumbricus. It was ascertained, that he had frequently gone into the garden, and eaten a young cabbage-leaf;—just as I scertained that the woman ate the stalks of cabbage, when preparing the atter for dinner.[b] I should not have paid much attention to these accounts, I had not myself witnessed similar effects. I have no doubt that some ersons are the sport of these insects; while in other persons they would ie. In "Hufeland's Journal", for 1822, there is an instance of live and ead slugs being discharged by vomiting and purging. In the "Medical Gazette", Dr. Alderson (of Hull) states that a centipes was discharged rom the stomach[c];—exactly as occurred in the case that I saw.[d]

Horses have what are called "bots" in the stomach, if they swallow he eggs of the common gad-fly. The gad-fly, at a certain period of the ear, lays its eggs upon their coat; they lick their coat, and swallow the ggs, which attach themselves to the splenic portion of the stomach. I uppose all this is natural; for I believe they are often found in the stomach of horses. Nature appears to have destined this place for their reception. When they are mature, they escape through the intestines, and become gad-flies.

Numerous instances of severe headachs have arisen from insects getting to the nostrils, and crawling into the frontal sinuses; and also from eir getting into the "meatus auditorius." Nothing is more tormenting, understand, than "a flea in the ear." If it get into the ear, it buzzes bout, and makes as much disturbance as a giant would; but this state ay be cured in a moment. I recollect the case of a patient of my own, ho had been in the greatest agony from this circumstance; but on pouring a tea-spoonful of oil into the ear, the flea was quiet in a moment. I uppose it was suffocated. There is a kind of gad-fly which settles in the ectum; and it is therefore called "æstrus hæmorrhoidalus." It has een found to make its way even into the womb. There is one kind lled "æstrus *ovis*";—from its always selecting sheep. The guinea-worm omes from without, perforates the skin, lies for a considerable period in e cellular membrane under the skin, and is the source of very troublesome ulcers.

SECTION II.—ENTOZOA.

Their Usual Situation.—As to those animals which settle regularly in e human body, colonize, and descend from one generation of human be-

[a] Page 223.
[b] See Page 1100.
[c] See the "London Medical Gazette"; Volume 5; Page 306. (No. 105; December 5, 1829.)
[d] See the previous Paragraph.

ings to another, they are found both in cavities and in the substance of the body; and each of these "entozoa" has its particular habitation. The one called "lumbricus", always occupies the intestines or stomach; the one called "strongyle", particularly fixes on the uterine organs; the one called "fluke", is found in the liver; and the "filaria", or "guinea-worm", is found in the cellular membrane. There are three principal forms of these animals, found in the living body. Those of one set are *round*,—in cylinders or spindles; those of another set are *flattened*, like bobbin; and those of the third set are *globular* or *vesicular*. It is the latter that are chiefly found in the substance of organs.

Classification of Entozoa.—Linnæus arranged them according to their *situation*;—accordingly as they were found in the intestines, or in other viscera. Rudolphi (the naturalist) of Berlin, names them from their form; and arranges them into five classes. The first of these he terms "nematoidea."[a] He has a second class, which he calls "acanthocephala."[b] These are animals of the hydatid-kind. They have no spinal canal; have distinct genital organs; are of two sexes; and are found only, or chiefly, in the intestines of swine. Then he has a *third* class; which is called "trematoda."[c] These are flat, with minute pores. It is said that these have no intestinal canal; but distinct genital organs. The *fourth* is "cestoidea",[d] which include the different kinds of the "tænia", or "flat worm"; and the *fifth* he calls "cystica."[e] These are "hydatids."

Cuvier makes more simple classes than these. He arranges, in separate classes, those which have a distinct digestive cavity, and those which have *no* distinct digestive cavity to be traced in the interior. Those of the first are called "cavitaires"; because they have a digestive cavity;—regular canals and an anus; and those of the other are called "parenchymateux"; because they have nothing but a uniform structure, with no regular digestive tubes. This last class embraces all the classes of Rudolphi except the first; and those which have a regular digestive apparatus comprehend the round worm, the little ascarides, the strongyle, and the guinea-worm; and therefore, instead of the *five* kinds of Rudolphi, Cuvier makes but *four*.

Ascaris Lumbricoides.—I will begin with the "cavitaires"; or, according to Rudolphi, the "nematoidea." The first of these was formerly termed "lumbricus"; but it is now termed "ascaris lumbricoides." This worm has external integuments. It has also muscles, a *digestive* apparatus, and a *genital* apparatus; and some have thought that it has a circulating and a nervous system. The muscles of this worm lie immediately under the skin. The fibres are two-fold;—both long and transverse. The digestive organs are quite straight. It has a triangular mouth, with three tubercles; the anus is at the opposite end; and the genitals fill a great part of the animal. Each sex is a different individual; and the opening of the genitals is near the anus. It is from twelve to fifteen inches in length; is of a yellow colour; and as many as eighty of them have been discharged from one individual. The celebrated professor Frank mentions a case, in which the intestines were absolutely crammed with them.

Situation.—This worm is usually found in the small intestines. Occasionally it is found in the *large* ones, in the stomach, the œsophagus, the pharynx, and the mouth;—for I have known a person vomit one; but its

[a] From νημα, *a thread*; and ειδος, *form*.
[b] From ακανθα, *a prickle*; and κεφαλη, *the head*.
[c] From τρημα, *an aperture*; and ειδος, *form*.
[d] From κεστος, *a girdle*; and ειδος, *form*.
[e] From κυστις, *a bladder*; and ειδος, *form*.

proper habitation appears to be the small intestines. Andral says that he found a lumbricus in the pharynx. It got out of the small intestines into the stomach; from the stomach into the pharynx; and then one end turned down into the larynx, and there caused sudden death by suffocating the patient. Andral also saw several in the liver;—having apparently crept up the "ductus communis choledochus", from the duodenum. Dr. Baron, of Gloucester, mentions having seen a lumbricus in the ducts of the liver; and an old physician, who wrote on Morbid Anatomy, mentions having seen several worms in that situation. Andral says that he saw a liver absolutely perforated with them; and sometimes they have perforated the intestines, and got into the peritonæum. They have sometimes been known to escape externally through the integuments; or into the urinary bladder, or into the vagina.

It Resembles the Earth-Worm.—This animal resembles the earth-worm; but the earth-worm is found to be less pointed; its mouth is only a small slit at the under part of a rounded head; and the anus is not *near* the extremity, but at the *very* extremity. The earth-worm is more fleshy, and more marked with rugæ; and it has one most distinguishing circumstance,—a quadrangular row of processes, like feet; which it can erect and move about. It has also three longitudinal lines at the upper surface; and it is an hermaphrodite. The "ascaris lumbricoides" is by far most common in children; and is rarer as people grow old.

Trichocephalus.—The next worm, in point of size, is that formerly called "trichuris"[a]; sometimes improperly termed "the *three-tailed* worm." Unluckily our predecessors mistook the *head* for the *tail*, and it is now called "trichocephalus."[b] It is a very small worm;—about one inch and a half, or two inches, in length. It is of a violet-colour; and the anterior end is much finer than the posterior;—it becomes a mere point for the mouth. The posterior end of the male is bent; and it has a straight alimentary canal, around which are placed the organs of generation. This worm is found lower down in the alimentary canal than the last; for it occurs chiefly in the cæcum. There are generally several of them. It is much more common in infants, than in others.

Oxyuris.—Another worm which has also an alimentary canal, is the "ascaris"[c]; or, properly speaking, "the "oxyuris"[d], or "drop-tail." This passes, with the common people, under the name of "thread-worm." It lives as low down as it possibly can in the rectum, and frequently makes its exit; and when it once gets out, it cannot get back, but shrinks up and perishes. It is far shorter than the others. The male is said to be about a line and a half in length; the female four lines. The organization is the same as in the other two kinds. It is not only usually found in the rectum; but it is generally surrounded by mucus. These worms will crawl out; and patients sometimes amuse themselves by seeing how many they can catch during the night;—in order that they may shew their exploits to the doctor, in the morning. I have known them to crawl out of old persons; so that they have complained that they picked them off their thighs in bed.

Parenchymateux.—Worms of the other description (called "parenchymateux" by Cuvier[e]) have no digestive or other perceptible organs, except instruments of locomotion. They have various forms; some are *spheroidal*,

[a] From θριξ, *a hair*; and ουρα, *the tail.*

[b] From θριξ, *a hair*; and κεφαλη, *the head.*

[c] From ασκεω, *to move about.*

[d] From οξυς, *sharp*; and ουρα, *tail.*

[e] See Page 1102.

some *flat*, and some *long*. They are the "acanthocephala",—with two points; the "trematoda",— with a perforation; and the "cestoidea", including those of which I am now going to speak,—"tæniæ." These are found in the substance of the body, and in various cavities. Lastly, there are those which are called "hydatids" ("cystica"), and which are very frequently found in the substance of the body, but occasionally in its cavities; and sometimes they have a particular cyst.

Tænia.—I will now proceed to that worm, which we meet with every day in the living subject; and which is called "tænia."[a] This animal is never less than several feet in length; and sometimes many yards. One author mentions a worm of this kind which measured one hundred and fifty feet; and another foreign writer saw one three hundred feet long. Though I never saw one so long as that, yet I have frequently seen seven, eight, or ten yards, come away at once. It is fine in structure, and has a series of articulations,—each with natural pores. Dr. Baillie[b] says, that the last joint has no aperture. The anterior part of the worm is very fine; the head is square; and it has little retractile hooks. There is no regular organization within;—that is to say, there is nothing leading to a digestive tube. It is almost a mere amorphous mass; yet we may feel arborescent vessels about the joints; and a serpentine canal is sometimes seen at the edges. It moves in an undulatory manner.

Varieties.—There are two kinds seen;—the one called "tænia *solium*"[c]; and the other "tænia *lata*."[d] That which is called "*tænia solium*" is, towards the head, about the third of a line broad; and has crotchets before and on each side the articulations. On this account, it is sometimes called "*armed* tænia." The other, which is called "tænia *lata*", is shorter and broader; and has no crotchets. The latter usually exists in cavities,—three or four in an individual; and from twelve to fifteen feet long.

Most Frequent in Adults.—The "tape-worm" is far more frequent in adults, than in children, and in the dog than in the human subject; but it is said that in the dog, and in other brutes, it differs somewhat from that observed in the human subject. It is more common in some countries than in others. In Switzerland, the water is very bad; and the "tænia *solium*" is very common there. The "tænia *lata*" is not so common.

Strongyle.—One kind of worm is found in the bladder; and this is called the "*strongyle*." The late Dr. D. D. Davis, of University College, London, once shewed me a phial, containing a large number of them,—all creeping about in full animation,—which came from the bladder of a female. She had discharged a large quantity of them, for a considerable time. Mr. Lawrence has described a curious case of this kind, in the second volume of the "Medico-Chirurgical Transactions."[e] In that case, from eight hundred to one thousand of these worms were discharged from the bladder in about a year. They were very hard and firm; and some were an inch in length. These worms cause great irritation, a frequent desire to make water, and sometimes bloody urine. In the fifth volume of the "Edinburgh Medical Essays"[f] (which is a very excellent work), there is an instance of one an inch in length, and as broad as the smallest part of a needle. It was discharged, after having produced bloody urine for many years. What could be done in a case of this description, I do not know. Whether turpentine given by the mouth would answer, is doubtful. It

[a] From ταινια, *a fillet.*

[b] In his "Morbid Anatomy"; Chapter 8; Section 12.

[c] From "solus," *alone*; because it usually infests the body singly.

[d] From "latus", *broad.*

[e] Page 382.

[f] Page 289.

ould find its way to the urinary organs, because it impregnates the urine; ut whether in sufficient quantity to destroy the worm, I do not know. Whether it would be right to inject the bladder, I cannot tell; but first I ould try an injection of olive-oil;—just as I should kill a flea in the ear. Whether these worms are formed in the bladder, or come from the kidneys, do not know. The point is not yet determined.

Causes.—It is probable that a great number of those worms which I have ow been speaking of as "*en*tozoa", really came originally from *without.* Many persons, on going to particular places, have presently become subject worms;—just like other people in that particular neighbourhood. Per- ons who, by accident, have drunk bad water, have frequently had worms om that time. There can be no doubt that "tæniæ" may be continually aced to external sources; and with respect to "ascarides", a remarkable se is published[a] in the Second Volume of the "Transactions of the ing's and Queen's College of Physicians in Ireland"[b];—a case in hich a whole family was infested with this worm; and every servant ho came to the house, after a certain time, had it. Although medi- nes were taken, yet nothing liberated these persons from it; and at st ascarides (very similar, but a little browner) were discovered in a well, om which the people derived all their water. The family had resided ere many years, but they now found it necessary to change their habita- on; and, from that time, nearly all of them lost their worms. The race as kept up in one individual. Dr. Darwin mentions that the fens of incolnshire are famed for tæniæ. Sir John Pringle says, that lumbrici are ery common in the remittent fevers of marshy countries; and that when ey have been once introduced, it is impossible to say how long they may main. They may continue for many years. It appears to be a fact, that ey may be transmitted from generation to generation. A German writer f authority) says, that he actually found worms in the intestines of a tus. This is not at all surprising; for the germs may be easily trans- itted from the mother to the offspring. Lamarck, the French naturalist, as found the same thing. Tæniæ have been seen in a muddy spring; only ey were rather smaller than those observed in human beings. The lower imals are easily altered by particular circumstances; and therefore it is ot surprising that ascarides should be of a different colour and size *in* the ody, and *out* of it;—in wells and in the living subject. I recollect being ld by a friend, who had travelled a great deal in Syria, that he drank some ad water, and was exceedingly ill, for a week or so. He did not know hat was the matter with him; when, all at once, after taking a good dose f calomel, he discharged little more than a heap of small maggots. What ey were, he was not naturalist enough to inform me; but he got well; nd his illness could be traced to this external circumstance. Tæniæ may ome from without; and so, it would appear, may ascarides; as well as, in ll probability, the "ascaris lumbricoides."

Debility Favourable to their Presence.—Generally speaking, these worms revail more especially in proportion as the patient is weak. We know hat persons who are exhausted from fever, will become the subjects of ermin. In extreme debility of the constitution, a patient may be leaned several times a day; and be covered with a fresh crop of vermin. o it is, in general, within. The more weakness there is of the body, the nore the entozoa thrive. Bad air, bad food, and the want of sun, will con-

[a] By Dr. John Milner Barry. [b] Page 390.

tribute to their appearance. When rabbits are kept in a bad place, they become subject to hydatids; as do also sheep in wet pastures.

Spontaneous Cessation.—There can be no doubt that children are much more disposed to ascarides and to lumbrici, than other persons are; and not only so, but, as age advances, the constitution frequently becomes so unfit for the continuance of these worms, that they are absolutely shaken off without any medicine. I feel no doubt that children cease to become the prey of worms. Thousands have ascarides when they are young, and never have them afterwards. This is not so common an occurrence with regard to lumbrici, as with regard to ascarides; but the remark is correct there, to a certain extent. The early period of life seems to favour these animals;—why, I do not know. Some of these worms occur in persons of the highest health. Persons with a good colour complain of worms; and they will be able to verify their assertion.

Symptoms.—Worms sometimes produce the most distressing effects;—so as to make life a burden. At other times, they produce no symptoms at all; and a person only knows that he has worms, because he discharges them. I have seen many individuals who, to their great astonishment, discharged several feet of tape-worm;—not having had the least idea, previously, that there was any thing the matter with them.

In enumerating the symptoms, I will begin with the head, and go downwards;—for the sake of assisting the memory. When worms exist in the alimentary canal, the symptoms usually are headach, heaviness, giddiness, depression of spirits, and even convulsions. Sometimes the headach is sharp; sometimes it is dull; and frequently there is a stabbing of the temples. Perhaps there is regular epilepsy; and some authors even mention tetanus. There is a black circle around the eyes; paleness of the face; more or less tumidness of the upper lip; great itching of the nose; foulness of the tongue; thirst; offensiveness of the breath; palpitation; dyspnœa; cough; and even hæmoptysis. Then (to go below the diaphragm) we have either anorexia, or excessive appetite; nausea; vomiting; a gnawing pain at the "scrobiculus cordis"; pain, perhaps all over the abdomen, or in various parts of it; griping; purging; itching of the fundament and genitals; a discharge of mucus from the rectum; feverishness; and emaciation. The pain of the abdomen is sometimes a *pricking* pain; and there may be tenderness of it. Of course, we do not see all these symptoms in every case; and sometimes worms will exist in the alimentary canal, without giving rise to any symptoms whatever.

Treatment.—As to getting rid of worms, in the first place, any brisk purgative may answer the purpose. A good dose of calomel and jalap is an old remedy, and a very excellent one. Sir John Pringle used to give twelve grains of calomel, and half a drachm of rhubarb. Some give gamboge; but I do not know its specific power. It produces nausea; and is not so good as calomel and jalap.

Oil of Turpentine.—But besides these remedies for the *expulsion* of worms, we employ others for the purpose of *destruction*; and one of the best is, unquestionably, oil of turpentine. In the case of ascarides,—which are easily known from their crawling out, from their appearing in the stools, and from the extreme itching which they cause in the rectum,—it is best to give the oil of turpentine by injection. We thus send it immediately on the parts where the worms reside; save the patient the unpleasantness of a filthy dose; and save the stomach from great disturbance. From a drachm to half an ounce, mixed with gruel, may be given to a

child; and it will often bring away thousands. Adults will take a larger dose in an injection;—an ounce or more; but perhaps a very large dose is not so well. It causes so much irritation, that it may produce an immediate expulsion. It may not lie long enough to kill the worms; but may be discharged from the intestines. In the case of other worms, the oil of turpentine should be given by the mouth; and the dose is then from half an ounce to three ounces. In females, half an ounce is generally a proper dose to begin with; and it is seldom right to give more than an ounce; but in men, if they be not particularly delicate, it may be right to give two ounces. It is best not to give it fasting; lest it should create sickness, and be lost. Patients had better take it a couple of hours after some meal; and they ought to remain perfectly quiet;—lest vomiting should be induced. It may be taken pure;—in the same way as a glass of spirits; or in gruel, or in any thing else which the patient chooses. The effect it generally produces, is that of making the patient sick, purging him violently, making him giddy, and causing extreme vertigo. These symptoms will all go off; but occasionally the medicine will not purge itself away; and, therefore, it is best to give a dose of castor-oil; and to repeat it every hour or two, till the medicine passes freely. It rarely affects the urinary organs; but sometimes it does. Now and then we have bloody urine, a frequent desire to make water, and great pain; but, in general, these effects do not occur; and when they do, there is usually an idiosyncracy; and they will occur from the smallest doses. Large doses usually work themselves off; but where they do not, I have seen these effects. Where the remedy does not produce irritation, it has been absorbed; and the urine has smelt strongly of it, for several days.

History of the Use of Oil of Turpentine.—The history of our knowledge of this medicine is rather curious. So far as I have read, it appears that its use, in the cure of worms, was first mentioned in 1792, by a general practitioner at Putney, named Malden.[a] A man had been long accustomed to pass tape-worm; and a friend advised him to take oil of turpentine. He took two drachms; and, to his great astonishment, discharged five yards of tape-worm, and several pieces afterwards. At the time Mr. Malden wrote, which was three years and a half afterwards, he was quite well. This fact was lost sight of,—not in the least attended to, till a paper was published, in 1811, in the "Medico-Chirurgical Transactions"[b], by a physician at Durham.[c] It gives an account[d] of a sailor, who had been in the habit of taking gin to expel a tænia; but at last it failed; and he took a glass of oil of turpentine;—thinking that that was stronger. It was quite successful. What is very curious, after this paper was written, Dr. Walker, in 1817, published a paper in the "Transactions of the London Medical Society"[e], in which Mr. Malden's account was contained[a]; and claimed the discovery of the remedy. The circumstance was forgotten; and the Society allowed the second paper to be published. Oil of turpentine is one of the best remedies that we have. It will expel all sorts of worms;—ascarides, lumbrici, tæniæ, and all the others. Occasionally it will fail; but we should give it in large doses, and take care that it finds its way out. We should follow it up with a dose of castor-oil every two hours; otherwise the patient may be brought into some danger. I have seen a degree of danger produced in a child, from inflammation of the intestines coming

[a] See "Memoirs of the Medical Society of London"; Volume 4; Page 419.
[b] Volume 2; Page 24.
[c] Dr. John Ralph Fenwick.
[d] At Page 25.
[e] See Volume 1; Part 2; Page 114.

on; but it went away in a few hours. The oil of turpentine has been particularly used in the case of tape-worm in the intestines; but it is equally good in the case of other kinds of worms.

Dolichos Pruriens.—The "dolichos pruriens" ("cowhage" or "cow-itch") has been used, particularly against the lumbrici; and the best account I can give of that remedy, is to be found in a work, written some years ago, by a general practitioner of the name of Chamberlain.[a] The pubes, or small spiculæ of the dolichos, are scraped off, and made into an electuary with treacle, or confection of senna; and the electuary may be given in almost any quantity. As good a mode of exhibiting it as can be adopted, is to thicken it to a proper consistency with treacle; and to let the patient take a tea-spoonful of it, two or three times a day. We should occasionally give a purgative. I have found the oil of turpentine so efficacious, that I have not had much recourse to "cow-itch." A woman, at St. Thomas's Hospital, took a drachm of the pubes of dolichos, twice a day, for five days; and afterwards a purgative was given to her. The only inconvenience which my patient experienced, was a tingling in the mouth; but when it had once got into the alimentary canal, no further unpleasant symptom arose.

Pomegranate-Root Bark.—The bark of pomegranate-root has also been particularly recommended. Half a drachm may be given every half hour, till vertigo is produced. A good account of this is given, in the eleventh volume of the "Medico-Chirurgical Transactions."[b] It has the effect of producing giddiness, sickness, convulsions, pain in the head, and purging. There is no rule for the quantity that will produce these effects; and therefore it is well to give half a drachm of the powdered bark, in some water, every half hour, till the patient begins to feel sickness, or is purged. It is for the tænia that this is particularly recommended; and there can be no doubt of its virtue. These are the only things with which I am practically acquainted.

Other Remedies.—Steel-filings have been mentioned; and a woman once took an ounce and a half in a day. They purged off with a cathartic; but without any sensible effect whatever. A number of medicines are recommended in books on Materia Medica. The bark and shoots of the "bastard cabbage-tree", and of the fern, have been particularly spoken of as a remedy for tænia. Indian pink (which is an acrid narcotic) has undoubtedly been useful. In the first volume of the "Transactions of the College of Physicians in London"[c], is recorded[d] the case of a man who took two pounds of common salt, in four pints of water; and, by that means, got rid of an immense number of ascarides. It is well known that salt is rather a preservative against worms. The flukes which are found in sheep come, it would appear, from stagnant water; and it is said that, by giving the sheep plenty of salt, we may prevent them from becoming the victims of fluke. Electricity has been employed,—the passing of shocks through the abdomen; and now and then a worm has come away. It has been rendered uneasy, and has endeavoured to escape.

Restore the General Health.—But besides those means which are necessary to expel the worms, it is of the highest importance to restore the health. There can be no doubt that worms derange the health; and if we

[a] "Treatise on the Efficacy of Cowhage, in Diseases occasioned by Worms, &c. By William Chamberlain."

[b] Page 301.

[c] At Page 54.

[d] By Dr. William Heberden.

an get rid of them, health will return. But they are frequently present n account of bad health; and therefore, though it is necessary to expel hem by common purgatives (which often answer very well), we must, at he same time, endeavour (by all the means in our power) to restore the ealth; to take care that the patient has wholesome food, and to put the igestive organs into the best possible order. If this be done, worms will requently disappear, without any other means being employed. Without iving any purgative medicines whatever,—without doing any thing to expel r destroy worms, in a great number of cases where children have become heir prey, they will spontaneously cease. Children are far more subject to scarides and lumbrici than adults; and a great number of children have hem at a particular time; but as puberty arrives, the constitution is less avourable as a habitation for worms; and they cease spontaneously. Most f us have been freed from worms spontaneously; although they may have een a great torment to us at the younger period of life.

Entozoa originally Ectozoa?—Before concluding the subject of these orms, I should state that we are not quite certain with regard to some of hese, whether they deserve the name of "*ec*tozoa" or "*en*tozoa." Those hat *reside* and *breed* within ("entozoa") have particular residences. Some nvade the alimentary canal generally; and others reside in particular parts f the canal. The same thing has been observed with respect to those hich reside on the surface. Whether they have an external origin or not, e are not quite certain. Then, again, there are some vermin (small lice) hich live only in the head; and it is said that they will not thrive any here else. There are others which live only on the body; and it is said, hat if we put them into the hair of the head, they die. These have been ulgarly named "crab-lice"; but scientifically they are called "pediculi ubis." They thrive only on the pubes.

Chigoes.—There is a particular kind of flea,—very large,—a sort of iant,—which passes under the name of "chigoe." This is found parti-ularly among the negroes, and is a source of great trouble to them; for it so powerful, that it gets under the skin, and there burrows, and forms a ag, in which it lays its eggs;—the result of which is a very troublesome lcer. I had a patient at St. Thomas's Hospital, who had lost the nail, and he extremity of each great toe, through chigoes. There was a cicatrix unning across the toe; which cicatrix had been occasioned by this animal. he negroes are very expert at taking them out, in whomsoever they occur. he great point is to remove the bag entirely; for if any part remain, an ozing occurs, and no good is done. There is a story told of a person, ho was anxious to have it put to the test, whether chigoes were a parti-ular sort of flea, or only a variety of the common kind; and he therefore t one which had got under the skin, go on burrowing; in order that he ight observe its increase and habits. The consequence was not only a roublesome ulcer, but mortification. A gentleman, who has been much n the West Indies, is of opinion that that kind of elephantiasis which s called "Barbadoes-Leg"[a],—in which the skin becomes exceedingly ypertrophied,—and that disease of the scrotum in which the skin and he subjacent cellular membrane are excessively hypertrophied (just such case as occurred in the Chinese at Guy's Hospital[b]), all arise from

[a] See Page 510.

[b] This refers to Hoo Loo, an unfortunate Chinese; who came over to this country, expressly to have a large tumour removed from the scrotum. The operation was performed at Guy's Hospital; but the patient did not survive. An account of this case will be found in the "Lancet", for April 16, 1831 (No. 398; Volume 2, 1830-1; Page 86). Mr. Liston has, in his Museum, an enormous tumour of this kind, which he removed successfully.

chigoes. Whether he is right in his opinion, or what grounds he has for it, I will not pretend to say; but he is a man of very careful observation.[a]

[a] The late Dr. Fletcher, of Edinburgh, with the view of assisting the memory, used to include in a table all the parasitic animals (twelve in number) to which the human body is liable. We give this table below. The nomenclature adopted is that of Rudolphi; but we have added a few synonymes.

I. Cystica (Hydatids).
   1. Cysticercus Cellulosus (Bladder-tailed Hydatid).
   2. Echinococcus Humanus (Acephalocyst).

II. Nematoidea (Cylindrical Worms).
   3. Hamularia Subcompressa.
   4. Ascaris Lumbricoides (Lumbricus).
   5. Trichocephalus Dispar (Trichuris Vulgaris; Long Thread-Worm).
   6. Oxyuris Vermicularis (Ascaris Vermicularis; Thread, or Maw-Worm).
   7. Strongylus Gigas (Urinary Worm).
   8. Filaria Medinensis (Dracunculus; Guinea-Worm, or Hair-Worm).

III. Trematoda (Intermediate Worms).
   9. Dystoma Hepaticum (Fasciola Hepatica; Fluke).
   10. Polystoma Pinguicola (Fat-Worm).

IV. Cestoidea (Tape-Worms).
   11. Bothriocephalus Latus (Tænia Osculis Superficialibus; Broad Worm).
   12. Tænia Solium (Tænia Osculis Marginalibus; Long Worm).

Succinct remarks by Dr. Fletcher on the localities inhabited by these different animals, together with various other interesting particulars respecting them, will be found in the "London Medical and Surgical Journal", for June 17, 1837. (Page 318.)

BOOK VI.

DISEASES OF THE URINARY ORGANS.

CHAPTER I.

DISEASES OF THE KIDNEY.

SECTION I.—NEPHRITIS.

According to the rule which I have hitherto observed [a], the first disease which I shall describe among those of the urinary organs, will be *inflammation*; and inflammation of the *kidney*; called "nephritis." [b]

Symptoms.—In this disease there is pain in the loins; but it is usually experienced on one side only. On account of the great sympathy that exists between the kidney and the stomach, there is very frequently nausea and vomiting. In inflammation of the *heart* and *lungs*, there is no vomiting; but in inflammation of the *kidney*, we generally have more or less disturbance of the stomach;—either nausea, or absolute vomiting. From sympathy among different parts of the urinary system, there is usually a frequent desire to make water. The pain is not confined to the loins; but runs along the ureter, towards the bladder. The testicle of that side is generally painful and drawn up; and very frequently indeed it is swelled. There is also numbness in the inner part of the thigh;—I presume from an affection of the anterior crural nerve. The pain is seldom felt at the *back* of the *thigh*. It does not run down that part of the limb, like sciatica; but is felt *anteriorly*,—along the course of the ureter, down the testis, and down the inner part of the thigh; where the anterior crural nerve is situated. The testis, indeed, is sometimes not only swelled, but sore to the touch; and sometimes it, as well as the inner part of the thigh, experiences a sensation of numbness. The urine is generally scanty and red;—following the course that is usually observed in any active inflammatory disease; and, the kidney being the part affected, it is more scanty and of a deeper red in nephritis, than in other inflammations. On the other hand, the urine is sometimes not deficient in quantity; and occasionally it is found to be very pale.

Diagnosis from Rheumatism.—In a *rheumatic* affection of the loins, the pain is usually felt on both sides; and it is felt to a great extent;—it ge-

[a] See Page 62.

[b] From νεφρος, *the kidney*; and "itis", *inflammation.*

nerally affects a large surface. It runs to the hip; and, if it extend at all, it proceeds down the outer part of the thigh;—taking the course of the sciatic nerve. There is not a frequent desire to make water; there is no pain in the course of the ureter, no enlargement of the testicle, nor any pain in the inside of the thigh. Motion, in that disease, very frequently produces pain;—perhaps extending to the thigh, and especially about the joint and the "trochanter major." The latter is not only painful, but perhaps hot and swollen. Very often there is rheumatism in other parts; and, very frequently, there is profuse sweating. The absence of all *urinary* symptoms (if I may so call them), and the situation of the pain,—in addition to the common symptoms of acute rheumatism,—enable us, in general, to distinguish the disease perfectly. I was able in one instance to make an accurate diagnosis, where some little difficulty was thrown around the case. In St. Thomas's Hospital there was a man, who had been there, six or eight months previously, for a decided affection of one kidney. There was pain in one part of the back, extending down the ureter; the testis was retracted; and there was an affection of the urine. The case was treated as *nephritis*. But he now came in with what was decided *rheumatism*. There was pain on the outer side, lower down than the kidney. It did not extend in the course of the ureter; but ran down the course of the sciatic nerve, and particularly affected the joint, which was painful on motion;—showing the effect of rheumatism. He did not make water more frequently than he ought; but there was pain in one point anteriorly. That, however, arose from an evident circumstance; it was in the situation of the glands, which were inflamed. He was treated by acupuncture, and making his mouth sore; and he speedily got rid of the disease.

Causes.—Nephritis may be produced by cold, like any other inflammation; but it is rarely an idiopathic disease. It is more frequently the result either of mechanical violence, or of some acrid matter which has been taken; such as turpentine or cantharides. Or it is the result of stones existing in the kidney, or of some disposition perhaps to gout.

Termination.—If the disease go on to great violence, suppuration may occur. There is then less pain; rigors may be experienced by the patient; and pus may appear in his urine. The discharge may take place in that direction; or it may present itself at the back;—giving the appearance of a lumbar abscess, perhaps. Sometimes, however, it has been known to open into the intestines. Various terminations have occurred; all of which we may imagine beforehand. The pus has sometimes been collected into an abscess; and sometimes it has appeared in separate portions;—forming so many minute specks, with which the organ has been studded.

Treatment.—The treatment of the disease consists in bleeding at the arm; cupping on the loins,—either alone or after general bleeding; purging, especially by calomel; putting the patient into a warm bath; and low diet. If the kidneys suppurate, it is necessary to treat it as any other suppuration. We must support the strength; tranquillize the patient by anodynes; and perhaps give "uva ursi." Some recommend this drug; but whether it has any particular virtue I do not know. The common treatment of suppuration, in any part of the body, is that which is required.

SECTION II.—HÆMATURIA.

Causes.—The kidneys are subject to hæmorrhage; and when blood appears in the urine, the disease is called "hæmaturia."[a] Blood may appear

[a] From αιμα, *blood*; and ουρον, *urine*.

in the urine from an affection of the kidneys, or of the ureters, or of the bladder, or of the urethra, or of some other part opening into the kidney. The blood is occasionally diffused through the urine;—the urine contains a sediment, which is evidently a mass of blood; and sometimes blood is discharged without any urine.

Diagnosis.—If the urine be red in consequence of the presence of blood, I think we may always distinguish it by the eye. It is not of a deep orange-colour; but is of downright red. We may always distinguish it from the most red sediment, produced by feverishness and inflammation. It is a true red;—such as no one, I think, can mistake; but if we have any doubt, we may dip a rag into it; and we shall find it stained red;—without any tinge of yellow, or any orange-tint; as is the case in the highest-coloured urine if no blood be present. Frequently blood is discharged so pure, or in such a quantity, that (independently of the colour) we ascertain its presence at once. But we have another point to ascertain. After having distinguished whether it is blood or not, we have also to find out whence it comes;—whether from the kidney, or some other part. If it be furnished by the urethra, the latter will present evident symptoms of disease. It is common in violent gonorrhœa, in stricture, and when a bougie is passed. There can be no difficulty, I think, in ascertaining whether the hæmorrhage comes from the urethra; the point most difficult to ascertain is, whether it comes from the *kidney* or from the *bladder*. It is rare for hæmorrhage to take place from the ureter.

I presume the mode of distinguishing between hæmorrhage from the kidney, and that from the bladder, would be by observing where the other symptoms reside;—whether in the loins, or down in the pelvis. Sometimes, I believe, it is impossible to make an accurate diagnosis. I recollect having a case of "fungus hæmatodes" of the bladder, which was productive of no pain, nor of any irritation whatever. The only symptom the man had, was a discharge of blood from the urinary passages. I could make out no disease at all. He died under the repeated hæmorrhages; and, at the autopsy, a fungus was found shooting from the bladder. But if there be any symptoms besides the bleeding, emaciation, and debility, we should observe whether they are situated in the *loins* or about the *bladder*. If they are in the *loins*, there will be pain there, most likely sickness, and perhaps tenderness in the region of the kidney. If the symptoms are in the *bladder*, we have pain about the pelvis, and a frequent desire to make water;—far more so than in the other case;—there will be far greater irritation. But it is to be remembered, that disease of the bladder and urethra will cause pain in the kidney; and that disease of the kidney will cause irritation about the bladder, as well as the symptoms I have mentioned about the testicle.[a] The latter show how distant the symptoms may be, when the kidney is itself affected; but, generally, the greater intensity of the symptoms at one spot rather than at another, will remove all difficulty.

General Treatment.—Hæmaturia is sometimes easily cured; or, on the other hand, it may be very dangerous;—all depends upon the cause. It is sometimes inflammatory, and is attended with a quick pulse, a dry tongue, and even retraction of the testicle. It will then give way to the common treatment for nephritis.[b] A bleeding or two, or purging, will generally get rid of it. When it is inflammatory, it is acute; and generally arises from some evident cause,—a "cold", or a blow, or some acrid substances that

[a] See Page 1111. [b] See Page 1112.

have been taken. The most common of the latter (and, indeed, the only ones that I ever saw produce it) are turpentine and cantharides. When it has arisen from these, it would be well to take plenty of diluents and demulcent substances. Water, with a quantity of gum in it, and mucilaginous matters in general, should be employed in addition to anti-inflammatory treatment.

Treatment of Passive Hæmaturia.—Sometimes, however, this hæmorrhage is entirely passive;—not accompanied by any signs of inflammation. It sometimes occurs with typhus-fever, sometimes with small-pox, and sometimes with "purpura hæmorrhagica";—both in cases where that disease arises entirely from debility, as well as when it is inflammatory. In these circumstances the treatment for passive hæmorrhage must be adopted; and turpentine will be found very useful;—not in *large*, but in *small* doses;—from twenty to twenty-five drops, every four or six hours. Of course the system requires support; and the common treatment of passive inflammation must be adopted, at the same time that we employ this specific remedy.

Arising from Chronic Disease of the Kidney.—When hæmorrhage takes place in chronic disease of the kidney; when we have seen chronic disease previously existing; when we suspect the presence of calculi in the kidney, or a cancerous affection of the organ, or any other structural disease,—the same treatment must be adopted. We cannot, in general, lower the patient. If there be symptoms of inflammation, we must act accordingly; but, in general, the administration of turpentine in small doses (carefully watching it lest it should irritate the kidneys),—together with the exhibition of opiates to relieve the pain and procure rest, and giving the patient good support,—is all that is needful. The treatment will give no difficulty at all. We have only to treat it in the same way as we should treat hæmorrhage from other parts. Consider what is the patient's strength, on the one hand, or his debility, on the other;—consider whether there are symptoms of active inflammation, or how far the hæmorrhage appears to be passive only. If the disease be not inflammatory, oil of turpentine is of as great use here, as in hæmorrhage from the alimentary canal; but it is necessary that we should carefully watch the patient; because that which is *passive* to-day, may, through sudden excitement, be *active* to-morrow.

Hæmaturia from Suppressed Discharges.—This hæmorrhage occurs, sometimes, in a curious way. Like other hæmorrhages, it has occurred where the menses have been suspended. I once saw an instance of its occurrence, after hæmoptysis had been cured. Occasionally it will take place in men, and also in women; but more frequently in men who have been subject to a discharge of blood from the hæmorrhoidal vessels. When that discharge is stopped, they are in the predicament of a woman who is in a state of amenorrhœa. Generally speaking, these cases are not dangerous; but they require antiphlogistic treatment. If the natural discharge of menstruation has ceased, and inflammatory hæmaturia has supervened, it may be right to attempt to bring it back again.

SECTION III.—ORGANIC DISEASES OF THE KIDNEY.

Hypertrophy.—The kidney is subject also to *chronic* inflammation; but we usually see the effects of chronic inflammation in the form of organic disease. Occasionally the kidney becomes *enlarged*. There is no particular alteration of structure; but the organ is evidently *hypertrophied*, and is

perhaps firmer than usual. I presume that over-nourishment is, more or less, of an inflammatory nature; and that, from the great activity of the circulation, deposition has taken place.

Turgescence.—Sometimes the kidney will become very *turgid*, and very *red*;—merely as the result of a difficulty in the circulation. Sometimes, after great dyspnœa,—after obstruction of the *heart*,—after obstruction of the *lungs*, the kidney, on being cut open, has been found full of blood;—so that we might, at first, mistake the appearance for that of active inflammation. But if there be active inflammation, the kidney is generally found *soft*; whereas the effect of chronic inflammation of this organ, is either induration or hypertrophy.

Paleness.—Frequently the kidney, instead of being red, is *pale*. After death has occurred from chronic disease, the body is generally found to be wasted; and not only are the *brain*, and the *muscles* pale, but the *kidney* likewise. The kidney, however, is sometimes pale through disease of its own; and then it is generally firmer and harder than it should be. When I mentioned induration as a common effect of inflammation, I spoke both of *red* and of *pale* induration[a]; and each of these kinds occurs in the kidney.

Mottled Kidney.—But the kidney is sometimes very red, or very pale, only in *spots*; and then we have what is called "a *mottled* kidney." Morbid paleness usually occurs in the cortical part; but sometimes the whole kidney is in this condition. Hypertrophy, attended with redness,—when it is partial, occurs in the cortical portion; and that also will give rise to a mottled appearance. We may have a mottled appearance from one part becoming morbidly pale, while the other remains natural; or it may arise from one part becoming morbidly red, while the other retains its natural paleness.

Granular Kidney.—Occasionally the kidney is *granulated*. Small grains, more or less firm, are seen in different parts. Whether this is local hypertrophy or not, I do not know; but it is found most frequently in the cortical portion. These grains are of all numbers, and of all sizes.

Softening.—Occasionally the kidney becomes excessively *soft*; so that we may break it up with our fingers; and this, I presume, may occur very rapidly. I have no cases in point to support this opinion; but, judging from what occurs in the spleen and liver, I should think that the softening may be very rapid. I know that softening of the spleen or liver, will take place in the course of a few days. A person, in perfect health, may be suddenly taken ill and die; and we shall find these parts so soft, that we can run our finger through them in every direction,—break them up in a moment; and therefore I can conceive that the kidney may become soft either in an *acute*, or in a *chronic* way. When this organ is soft, there is the usual difference;—that is to say, the softness is sometimes accompanied with redness, and sometimes with paleness. Sometimes there is *inflammatory* softening; and sometimes this change appears to take place without any connexion with inflammation.

Atrophy.—The kidney will sometimes *waste*. If one kidney waste, it is usual for the other to double its natural size;—in order to perform the duty of both. Nothing is more common, than to find one kidney enlarged, in proportion as the other is diminished. This wasting of the kidney will sometimes proceed to such an extent, that we can scarcely find any remains of the organ. I have met with cases where the kidney was discovered with the greatest difficulty; so that those who have first examined the

[a] See Page 195.

body, have said that there was but one kidney. What is termed "a *horse-shoe* kidney", is where there is only one. That, however, is a rare case; but the organ is sometimes wasted to a less size than that of a horse-bean. Atrophy of the kidney sometimes takes place, without any ascertainable cause. Sometimes it is the result of inflammation; sometimes it is the result of abscess. A great discharge will cause atrophy of part of the organ. We produce counter-irritation, for the purpose of lessening morbid growths, and morbid activity of the circulation; and if, without morbid growths and morbid activity, a discharge takes place by suppuration, the activity of the part is diminished, and wasting is a very common circumstance. An abscess, therefore, will occasion a part to waste; according to the general principles on which we employ setons and issues. But pressure will have the same effect. The pressure occasioned by a tumour in the neighbourhood of the kidney, has been seen to produce atrophy of the organ. It is stated, by authors, that atrophy of the kidney is sometimes partial; so that the medullary portion only is wasted, and the pelvis becomes a mere bag. Sometimes the *cortical* part is wasted; so that the cones within the kidney nearly touch the external fibrous membrane;—there being only a thin layer of cortical substance between. Thus, we see, there are various degrees of atrophy; and they have all been considered as a frequent result of inflammation.

Serous Cysts.—We have, however, other organic disease of the kidney. In the cortical substance, serous cysts are very common; and, by their pressure and growth, they will cause an atrophy of it. As they increase, they cause more and more atrophy; till there is little more than a bag left. Cruveilhier has given a very good representation of these cysts. They are found more commonly in the kidney and liver, than in any other parts of the body. Serous cysts are sometimes found under the external membrane of the kidney.

Fatty Degeneration.—The kidney has sometimes been seen converted to fat. A great deposition of fat, I presume, has taken place in the cellular membrane, under the external coat; and the rest has wasted. Sometimes it has been converted into *jelly*. A peculiar substance of this kind is occasionally formed in the kidney, which sometimes contains a great quantity of it;—causing atrophy of the organ itself.

Malignant Disease.—Occasionally *encephaloid* disease occurs in this part. We may have great *disorganization* of the kidney;—we may have *tubercles* of various kinds; and even *scrofulous* tubercles have been found here.

Symptoms of Organic Disease.—All these diseases may occur with very obscure symptoms; but sometimes they occasion dull pain in the region of one kidney, together with more or less disturbance of the stomach. The diagnosis is generally difficult; unless the pain be very local, and the urine very much affected. Even then,—when we have satisfactorily made out that there must be organic disease,—it must be very difficult, if not impossible, to say what that organic disease is. Scirrhus is said to occur in the kidney; but whether the affection is scirrhus, cancer, encephaloid disease, or a mixture of these, or a scrofulous suppuration, it must be difficult to determine. If organic disease occur in a young person, and there is not much pain, we may suspect that it is encephaloid. If there be strong marks of scrofula;—if the ends of the fingers be enlarged;—if there be mesenteric disease, or phthisis,—we may suspect that the affection of the kidney is of a scrofulous nature. If the person be advanced in life, we may suspect scirrhus or cancer. The particular nature of the organic alteration, however, can make no difference as to the treatment; which must be con-

ducted on general principles. Dr. Baillie states that, according to his observations, the kidneys are more frequently affected in *men* than in *women*.

Diseases of the Renal Capsules.—The renal capsules are rarely diseased, except from scrofula; but I have frequently seen them in that condition. Sometimes they are indurated; and the induration may amount to cartilage, or even to bone. As to the symptoms, nothing can be said on that subject.

CHAPTER II.

FUNCTIONAL DISORDERS OF THE KIDNEY.

HAVING spoken of those diseases which are the result of *inflammation* of the kidney[a], and of *structural* diseases[b], I will now proceed to consider *functional* disorders of that organ. The kidney is subject to an *increase* and to a *diminution* of its secretion. It is liable to secrete *morbid* urine; —to secrete a substance which it ought not to form in that particular way; or which, if it be produced, should pass off with the urine. Besides these affections, the urinary organs are sometimes infested by worms.

SECTION I.—ISCHURIA.

Varieties.—The first disease which I shall mention, is a diminution of the secretion; and this is called "ischuria." The *suppression* of urine, the *absence* of urine, or the *diminution* of urine, when it occurs in the kidney, is called "ischuria *renalis*." If urine be formed in the kidney, but cannot escape from it, owing to some obstruction in the *ureters*,—then it is called "ischuria *ureterica*." If there be some obstruction in the *bladder*, it is then termed "ischuria *vesicalis*." If there be obstruction in the *urethra*, it is denominated "ischuria *urethralis*." There is no analogy in these different words. If the urine be *suppressed*,—that is to say, if none be *formed*,—we call it "*suppression* of urine"; if, however, it be formed, but cannot *escape*, we call it "*retention* of urine"; so that "ischuria *renalis*" and "ischuria *vesicalis*" are not at all analogous; and young beginners are often laughed at in the hospital-wards, for saying "*suppression*", when they ought to say "*retention*"; and *vice versâ*.

Symptoms.—The *suppression* of urine,—a deficiency of the *secretion*,—may be entirely inflammatory; and then we have symptoms of nephritis[a], and must treat it as inflammation.[c] But sometimes this complaint is unconnected with any symptoms of inflammation of the part; and it certainly is then a curious affection; for it is usually followed by apoplexy. No urine is made, or scarcely any; and, at last, absolutely none. There is no fulness of the bladder; and when we pass an instrument,—to ascertain whether it is a case of retention or not,—we find that the organ is empty. In general, the patient very soon becomes drowsy; which drowsiness increases, till he becomes decidedly apoplectic, and perhaps dies. In the "London Medical Dictionary", Dr. Parr mentions a case, where no urine was made for six weeks; and Haller quotes an instance, in which it was said that no urine formed for twenty-two weeks. These are very chronic cases; and one cannot answer for the truth of that which Haller alludes to.

[a] See Page 1111. [b] See Page 1114. [c] See Page 1112.

I presume he mentions it on the authority of another. The disease has sometimes been ushered in with rigors, and sometimes not. Sometimes it has occurred without any particular symptom, till coma has made its appearance. Following the course of diseases of the kidney, it occurs more frequently in men than in women.[a] It usually takes place in fat people; and especially in those who are upwards of fifty years of age.

Excretion from Other Organs.—When the urine has been suppressed in this way, it has occasionally escaped from some other part of the body; and when the urine has *not* been suppressed, but (though formed) has not been able to escape,—in consequence of some obstruction,—it has been absorbed; and has passed off by some other organ. I know instances where it has been *vomited*; and I saw a case where it passed from the *skin*,—particularly the palms of the hands. Persons in these circumstances, —who have made no urine, or whose urine (when secreted) could not escape,—have occasionally vomited a fluid, which had the smell, and taste, and all the other qualities of urine. Others have passed it in the form of perspiration. There can be no doubt of the truth of these cases. I presume that, in the latter case, the fluid has been absorbed, and re-secreted; and, in the former case, it has been secreted originally, and has not been absorbed at all.

Termination in Apoplexy.—In "ischuria renalis", it is very common for the individual to become apoplectic; and it is, therefore, a very dangerous disease. I have had but one case of it, and that occurred after a person had taken (by mistake) a quantity of corrosive sublimate. Proper means had been used, and no harm was thought likely to occur; but, after a certain time, the urine became suppressed. I think the individual had hemiplegia; but I recollect perfectly, that he became drowsy; and the drowsiness increased till, at length, he became decidedly apoplectic, and died. One might imagine, in such a case, that the same occurrence must have happened as when the urine has been vomited, or has been thrown off by perspiration;—namely, that the urine was re-secreted into the ventricles of the brain; or that, if no *urine* was secreted, that an excessive quantity of *fluid* would be found within the brain. Nothing of the kind, however, was discovered in this case. There was not only no *urine* in the head; but no excess of *fluid*, either *in* or *upon* the brain. That was a result for which we were not prepared.

Treatment.—The proper mode of treating these cases is to give cantharides. I do not know whether oil of turpentine has been tried. In the case I saw[b], a blister was applied, and cantharides were given internally; but the patient died within a few hours of its exhibition. However, a friend of mine had two cases which occurred nearly together, in old people; and one of them was so bad, that Sir Astley Cooper, who was called in, had little hope of saving life; but he treated the case in a way which, he said, had been found successful; and the patient got perfectly well. In the second case, my friend adopted the same plan; and it was attended with the same success. In the latter case, it appears that the kidney had become torpid; but not through inflammation. Whether other diuretics would answer, I do not know; but it is said that cantharides should be given internally, and a large blister applied to the loins,—in order that the medicine may have more effect; because the surface has much influence over the internal parts. When it is exhibited internally, it should be in the solid form; because the tincture is a most uncertain preparation. We

[a] See Page 1117.

[b] See the previous Paragraph.

should give a grain once or twice a day, or every eight hours; whichever we choose. A grain is a pretty strong dose; but, in a case of this description, there is no time to be lost, for apoplexy may soon come on; and therefore we should repeat the dose, as long as it does no harm. I have given ten, fifteen, or twenty drops of the tincture, without any effect; and, at last, I have been obliged to give two or three drachms. The tincture, I presume, was not good; but it has been so common an occurrence, with me, to find the tincture either bad from its nature, or bad from its being so continually ill made, that I place no confidence in it, in a case of life and death, where there is no time to be lost.

SECTION II.—DIABETES.

Etymology.—The term "*diabetes*" is derived from the Greek word διαβαινω,—*to stream through*;—the disease being characterized by the "streaming away" of a considerable quantity of water. This affection, on account of the excess of fluid, has sometimes been called "hydrops ad matulam",—"chamber-pot dropsy"; but as there is no *accumulation* of fluid, it cannot, without great impropriety, be called "*dropsy*." In dropsy there is an *accumulation* of fluid;—not merely a *formation* of it. It is formed faster than it comes away, and therefore is termed "dropsy"; but as, in diabetes, the water comes away, the word *dropsy* has been applied to it with the greatest absurdity.

Definition.—The word "*diabetes*" is usually employed to signify *chronic* excess of urine. A person would not be said to have diabetes, if he merely made a large quantity of urine for a day or two. The fluid may be either of a natural quality, or it may contain sugar. As, however, there is no distinct single name for that disease in which sugar is formed in the urine, and as it is sometimes formed without the urine being at all in excess, it would be well, perhaps, to restrict the term "*diabetes*" solely to *saccharine* urine, and to give such a name as "*polyuria*"[a] to that form of the disease, in which there is merely excessive *quantity*. But we find "*diabetes*" employed to signify a chronic excess of urine, whether there be sugar in it or not:—the one being called "diabetes *insipidus*", and the other "diabetes *mellitus*",—"*honey*-like",—sweet to the taste. It was to an *excessive quantity* of urine, that the ancients applied this term; for it does not appear that they were at all aware, that the urine was ever sweet. I believe it was Dr. Willis, the English physician, who first pointed out that, in this disease, the urine is sometimes saccharine. The term is certainly employed by the ancients simply to denote a chronic *excess* of urine.

Excess of Urine in Various Diseases.—There is frequently a *temporary* excess of urine, in various diseases. In asthma, for example, a large quantity of pale urine is frequently made. So, again, in hysterical and dyspeptic people, this is often the case. Fright likewise will cause a temporary excessive quantity of urine; so that persons who have been waiting anxiously to be called into a room, have been obliged to walk out twenty times in the course of an hour. Long-continued grief and anxiety have the same effect. I have known persons, from leaving off some of their clothes, make a considerable quantity of urine; and it has been remedied by wearing their usual quantity of clothes again.

[a] From πολυς, *much*; and ουρον, *urine*.

Diabetes Insipidus.—But, independently of the circumstances I have now mentioned, there is sometimes formed an excessive quantity of urine; not at all impregnated with sugar, and occurring without any evident cause. This form of the disease,—which (as it sometimes has been) might as well be called "polyuria",—is occasionally followed by that form in which the urine contains sugar. But sometimes it exists alone; and I believe that, not unfrequently, after a length of time, it will cease. This incipient diabetes is more common in women, than in men. The urine is very pale, in general; and if it continue, thirst and dryness of skin are mechanically produced. An excessive secretion of water is going on in one part of the body; and there is therefore less water for the secretion of the mouth and skin. From the loss which the body sustains, there is also weakness and hunger. This condition may frequently be recovered from, by wearing warm clothing, employing the hot-bath, or going to a warm climate; and by the exhibition of iron. Persons who have laboured under this form of the disease have, by medical men who have not properly examined the urine, been said to be cured of diabetes; as though they had had the saccharine form of the disease.

Diabetes Mellitus.—In "diabetes mellitus", or *true* diabetes, there is sugar in the fluid; and generally there is also an excessive quantity of fluid. The general symptoms that I just now mentioned, are produced in this affection. From the loss which the body sustains, there is great debility; from the body losing its nourishment, there is hunger; and from the want of fluid, there is thirst and dryness of skin. The hunger is sometimes excessive; so that the patient not only feels very hungry at the usual time of his meals, but he feels hungry during the greater part of the day. The food which the patient takes, does him (he says) "no good"; and he is presently anxious for more. Patients generally complain of a sinking at the pit of the stomach; and the uneasiness there occasionally amounts to aching. The thirst is sometimes so great, that many quarts of fluid are drunk in the course of the day; and the skin is sometimes so dry, that the hair falls off. The feet and hands are frequently cold; there is lowness of spirits; and, in almost every case, peevishness and fretfulness. There is also one very remarkable symptom;—the loss of sexual power and desire. I have never found this symptom absent; and sometimes it has been the very first symptom noticed by the patient. I never had a patient labouring under diabetes, in whom the feeling of sexual power and desire had not ceased entirely, or become very much impaired. This symptom is not noticed by all authors; and a patient, of course, will not mention it; but, in making a point of inquiring into it, we shall (I believe) nearly always find it to be a fact. There is also frequently pain of the loins; but whether it arises from an affection of the kidney, or is merely a symptom of debility, I do not know. Although the whole body becomes emaciated, there is frequently œdema of the legs; and usually there is costiveness. From the deficiency of fluid in the alimentary canal, there is not only dryness of the skin, and thirst, but the tongue is sometimes white and clammy. Frequently, however, it is smooth and red; and the saliva and mucus are excessively tenacious;—so that the patient is very much annoyed. The gums sometimes become very red, and slightly ulcerated. The saliva is occasionally sweet; and so likewise is the breath. Dr. Latham says, that the body smells like hay. I have not observed this; but the breath frequently has sweet smells;—has something of the odour mentioned by Dr. Latham. Very often there is redness and soreness of the end of the urethra. I have

seen even phimosis[a]; which may arise, perhaps, from the irritating quality of the fluid. We usually find the pulse quick,—perhaps full; and at last it becomes weak. There is a hectic appearance in the patient's face;—we frequently find a flush upon his cheek, as well as quickness of the pulse; and, at last, we have decided hectic. In many cases there is great sweating,—I have frequently seen it. Phthisis is a very common termination of this complaint. Indeed, the majority of diabetic patients whom I have attended, have died of phthisis. The urine has a particular odour, which is not perceived by smelling the pot; but if we partly fill a phial with it, and keep it corked for a little time, on withdrawing the cork, we may perceive a peculiar smell,—something like peppermint. It has also a sweet taste; which we may ascertain by desiring the patient to taste for himself. Generally the urine is clear, and of a lemon-colour. Besides the presence of sugar, there is usually a diseased secretion altogether.

Quantity of Urine Voided.—Professor Frank, of Vienna, saw a case in which, on an average, forty pints of urine were made in a day. There were sometimes as much as fifty-two pints. He says that other authors have mentioned fifty-two pints being discharged. He also states that he saw a case, in which the quantity voided, in a few days, exceeded the whole weight of the body. Usually, however, the quantity of urine discharged, is from six to twenty pints *per diem*. On the other hand, the urine is sometimes very little increased in quantity; and sometimes not at all. Professor Frank mentions a few cases of the disease, where the quantity was not increased; but it contained so much sugar, that from two pints of fluid six ounces of saccharine matter were obtained. One patient of mine made, at last, but three pints of urine in a day;—which was less fluid than he drank. Dr. Heberden mentions a case, in which the urine made was double the quantity of the fluid drunk. Such are the varieties as to the quantity of urine.

Quantity of Sugar.—With regard to the quantity of saccharine matter, Dr. Dobson procured an ounce of saccharine extract, by evaporating a pint of urine. Cruikshank obtained three ounces and a quarter from thirty-six ounces troy; and found the specific gravity to be 1·040. From ten pints of urine, he obtained a pound and a quarter of solid extract. Dr. Prout, from a pint of urine,—the specific gravity of which was 1·050,—obtained two ounces of thick stuff; and from this he procured one ounce and a half of sugar. Frank says that, from twenty-four pints of urine, he obtained twenty-six ounces of saccharine extract. The sugar obtained from urine, is like that procured from grapes.

Fermentation of the Urine.—From the presence of sugar, the urine undergoes a vinous fermentation; so that, at a certain time, if it be thrown into the fire, it burns;—just as if it had been spirits. Still later, the urine becomes quite sour. The usual changes which sugar is capable of producing go on; that is to say, we have vinous and acid fermentation.

Deficiency of the Other Constituents.—These, however, are not the only circumstances in this disease; for there is frequently but little urea in the urine;—little lithic acid, and little of the usual salts. Not that they are *absent*; for I saw them all myself in a patient's urine, which contained a large quantity of sugar. But it is said that, in general, they are very *deficient*; and deficient in proportion to the quantity of sugar formed.

Specific Gravity of the Urine.—The weight of the urine, in this disease,

[a] From φιμω, *to tie up.*

depends upon the quantity of sugar; and the quantity of sugar is such as to augment the weight very considerably. The specific gravity of healthy urine is generally from 1·010 to 1·018; but that of *diabetic* urine is from 1·030 to 1·050; and I think I have seen it still higher. This excessive weight, as I have just said, depends on the presence of sugar.

Cause of the Presence of Sugar.—It has been supposed, that the presence of the sugar is dependent upon the deficiency of urea; and urea and sugar contain exactly the same quantity of *hydrogen*; while the quantity of *carbon* and *oxygen*, in sugar, is twice that of those substances in urea. It has therefore been supposed, that there is only a morbid change undergone in the composition of the urine;—that instead of *urea*, we have *sugar*. However, this is certainly not accurate; because I have seen a large quantity of sugar in the urine, where there was likewise a considerable quantity of urea.[a] Still, it frequently does happen that, in proportion as the one is deficient, the other is abundant. It is by no means proved, I think, that sugar is merely altered urea; and those have mistaken the matter who say, that urea is absent in diabetic urine; for sometimes a large quantity of urea is found in true diabetes; where, of course, there is a large quantity of sugar.

Reappearance of Albumen.—If the disease take a favourable course, Dupuytren and Thenard assert that, before the salts and urea appear again, albumen is found. Dr. Prout mentions, that the worst form of diabetes is where the urine is albuminous;—where, besides sugar, we find albuminous flocculi in the urine. In a fatal case of mine, not long before death, there were albuminous flocculi. These flocculi increase the fermentation, which the urine experiences from the sugar.

Condition of the Blood.—It is pretty certain that no sugar is found in the *blood* of these patients. Dr. Prout, who is very nice in his examination of these things, says that he has sometimes seen something *like* sugar; but *true* sugar has been looked for, by a large number of chemists, in vain.

In this disease, the blood is sometimes of an unnatural appearance. It is said, by Dr. Watts of Glasgow, (who, I dare say, may be depended upon,) to be a little like treacle, and of a bluish colour; but this is not an invariable circumstance; for I have not noticed it myself. The serum of the blood had a white fluid swimming upon it; and the blood was buffed. I mention this to shew, that we may have these things, at the same time that the urine contains sugar. There is no connexion between them; only the presence of one does not exclude the possibility of the other being present also. I may mention that Vauquelin found no sugar in the blood of a person, whose urine actually contained one-seventh part of sugar. He also says that he found no *urea* in the blood of this individual; though he gave him a large quantity by the mouth, for some days. He also states that an opposite occurrence takes place here, to what is observed in scurvy;—namely, that the blood will not putrefy so soon as in health. In one case of my own,—the only case (I believe) in which experiments were made,—it was found that the more sugar the urine contained, the larger was the quantity of carbon discharged from the lungs.

Duration and Termination.—This disease may last many years; and it may prove fatal by phthisis;—that is to say, it may induce phthisis, or be followed by it. The fact may be expressed in any way we choose;—diabetic patients frequently die phthisical. They sometimes die from mere

[a] See Page 1122.

exhaustion, occasioned by the disease; and sometimes they die suddenly; but the most common terminations are phthisis, and mere exhaustion. It may destroy a patient in a year or two, or it may remit; and I believe it may cease, or be cured. Dr. Gregory[a] used to say that he knew a case, where the saccharine quality of the urine ceased in two days, and did not return; but whether the observations were made with all the accuracy that we require, in modern times, I do not know. Usually the appearance of sugar, and the excessive quantity of urine, decline together;—that is to say, in proportion as the quantity of urine becomes less, so does the proportion of sugar. We may have the quantity of urine diminished, and yet the proportion of sugar to that quantity remain the same; and, on the other hand, it is asserted (though I have not seen it) that the sugar sometimes diminishes in absolute quantity, while the urine remains in the same excess as before. As, however, the sugar absolutely lessens, so do the salts, the lithic acid, and the urea, generally increase. The colouring matter of the urine is usually deficient, as well as the lithic acid and salts; and sometimes the sugar entirely disappears before death. I have seen the urine, in diabetic patients, suddenly cease to have a particle of sugar in it; and yet the patient has died in the course of three or four days.

[With respect to the *terminations* of diabetes, phthisis (as already stated) is the most frequent. Besides phthisis, however, I have seen diabetes prove fatal by disease of the liver and jaundice, by apoplexy, by a peculiar affection of the stomach, brought on by improper food, or by over-distension; by acute gastritis induced by taking cold fluids when heated; by inflammatory fever excited by exposure to cold, and rapidly assuming the typhoid character, &c. Occasionally diabetes is said to terminate in incurable dropsy, and in various other affections. In short, a great many circumstances which would not affect a sound constitution, often prove fatal in this disease. Hence a diabetic individual may be considered as existing on the brink of a precipice; and the general prognosis must be always unfavourable.[b]]

Morbid Appearances.—After death, we frequently find no morbid appearances whatever. I have several times opened diabetic patients; and, as far as I could judge, the whole of the body was sound. The kidneys have sometimes been enlarged a little;—sometimes a little redder or fuller than natural, and a little flabby; but that has been all; and sometimes I have not seen even that. The ureters are said to be sometimes florid; but Morbid Anatomy alone certainly gives us no explanation of this disease. Suppose we find the kidney fuller or larger than natural, and the vessels more distinct, that is nothing more than we should expect, from the kidney being stimulated to excessive action; and, whatever may be the cause, that appearance of the kidney certainly does not explain the saccharine quality of the urine.

Causes.—[It is a remarkable fact, that diabetes seems to be peculiar to mankind. Horses and other animals are, indeed, subject to diseases accompanied by a large flow of urine; but I am assured that in such cases the urine is never saccharine; nor am I aware that sugar has been found in the urine of any inferior animal. If such an immunity from diabetes really exists among the inferior animals, its cause is very obscure. Can the

[a] See Note to Page 270.

[b] Dr. Prout, on the Nature and Treatment of Stomach and Urinary Diseases. Third Edition; Pages 33 and 34.

exemption be referred to the absence of that fertile cause of bodily disorder in human beings, the influence of *mind*?[a]]

Predisposing Causes.—Diabetes is by no means confined to adults; for it frequently affects children also; but it is not so easily observed in them. It occurs much more frequently in men, than in women; and it occurs much more frequently in some countries, than in others. Professor Frank says, that he saw but three cases of it in Germany, for twenty years; and that when he practised in Italy, he saw but seven cases in eight years. There are far more cases of it in Edinburgh, than in London. When I was a student in Edinburgh, there were always some cases of it to be found; but I do not recollect having a case in London, for two years.

Exciting Causes.—Sometimes it is produced by grief. I have seen it produced by the long continuance of the depressing passions. It is sometimes occasioned by chills;—by the exposure of the body to heat and cold alternately;—especially when the body is in a state of perspiration. It sometimes appears to arise from strains of the loins. Whether whiskey has any particular power in producing it, I do not know; but it is far more common in Scotland, than in England. I suppose they drink as much whiskey in Ireland, as in Scotland; but whether the disease is equally prevalent there, I do not know. Dr. Latham says, that he has seen the disease come on after boils; and I have heard others, I think, confirm the observation. Excess of venery appears likewise to be a cause of it. Some authors mention this most decidedly, as the cause of the disease; and, in some instances, I have asked the question of young men; and they have replied that they had indulged to great excess. Whether they had or had not, I cannot say; because people feel differently as to what is excess. I saw it, however, in one man, who had committed no excess of this kind; for he said he had never "known a woman"; but he died of the disease; and it is very possible he had committed excess of a less creditable kind. I rather think this was the case, from the great length of the prepuce. Sometimes there is no evident exciting cause at all; and, in some cases, it is evidently constitutional and hereditary. One German writer mentions having seen seven cases of the disease in one family. Dr. Gregory[b] said that he saw three cases in one family; and Dr. Prout knew a mother, an uncle, a brother, and a sister, all affected with the disease.

Pathology.—Some declare the disease to be situated in the kidney; while others maintain that it is situated in the stomach. Many of the symptoms are as easily explained on *one* supposition, as on the *other*. The thirst and the dryness of skin are referrible to the loss of fluid. So, again, the costiveness, the emaciation, the hunger, the debility, and the sensation of sinking at the stomach, are all referrible to the mere loss of so much substance, as must be lost in the production of sugar. But the absence of sugar in the blood, and the very frequent absence of dyspepsia, or any thing connected with the stomach, except the hunger (which the excessive loss will explain), make it appear to me most probable that the disease is situated in the kidney.

[The *proximate* cause of diabetes has much puzzled physiologists; and a great deal has been said and written on the subject, which it would be useless to repeat here. According to the principles[c] advanced in this vo-

[a] Dr. Prout, on the Nature and Treatment of Stomach and Urinary Diseases. Third Edition; Page 34.

[b] See Note to Page 270.

[c] The principles alluded to, as far as they are involved in the present question, may be thus briefly recapitulated:—1. The assimilation of the saccharine principle is a distinct function. 2. The cellular tissue represents the saccharine aliment. 3. A se-

lume [a], the proximate cause of diabetes lies partly in the assimilating organs, and partly in the kidneys; and may be thus stated:—

When *crystallized* sugar is taken into the stomach by a diabetic individual, it is reduced to a *low* state, remains more or less unassimilated, and passes through the system to the kidneys; by which organs (being already crystallizable) it is separated unchanged.

When *organized* saccharine principles,—as farinaceous matters, &c.,—are taken into the diabetic stomach, they are (in the first place) reduced to the form of *low* sugar; part of which is assimilated, as in the healthy stomach; while another part is modified, or remains unassimilated. The portion that is assimilated is applied to the purposes of the economy; the portions modified and unassimilated, pass together through the system to the kidneys; by which glands the portion modified is disorganized, and finally appears in the urine as crystallizable sugar, along with the portion originally remaining unassimilated in the stomach. The same remarks are applicable to gelatinous, and in extreme cases, perhaps, to albuminous and oleaginous aliments. The *secondary* assimilating processes in diabetic individuals, participate in the derangements of the primary processes just detailed;—that is to say, the gelatinous tissues are either reduced to sugar, and thus not assimilated at all; or they are imperfectly assimilated; or they are mal-assimilated; in all which conditions, the saccharine principle derived from the gelatinous and other tissues, may be supposed to pass through the system to the kidneys; by which organs, like similar matters brought from the stomach, the various modifications of the saccharine principle are further disorganized, and converted into crystallizable sugar.[b]

Such are the modes in which the phenomena of diabetes appear explicable on our principles. I [c] shall not trouble the reader with corroborative details; but shall mention only one circumstance illustrative of the subject, on account of its practical importance. When, in diabetic individuals, the disorganizing function of the kidneys is suspended; or when these glands are partially diseased, the urine, besides albuminous matters and more or less of crystallizable sugar, often contains the saccharine principle *in imperfectly developed forms*. Hence the urine, almost without perceptibly becoming vinous, passes at once into the lactic or acetous fermentation; and acquires, from the quantity of lactic and acetic acids developed, the strong acid smell of sour milk [d,e]]

Diagnosis.—The diagnosis is sufficiently easy. It may be made by measuring the quantity of fluid, by weighing it, and by analyzing it. We obtain, in diabetes, a brown treacly extract; which, on tasting, we find to be sweet. No one can object to taste it; for it is not urine, but sugar. When the fluid is evaporated, there is nothing left but "hard-bake"; which tastes

condary assimilating process, analogous to that in the digestive organs, is constantly going on in all parts of the body. 4. An important function of the kidneys is of a disorganizing character; that is, consists in the reduction of organized into crystallizable compounds.

[a] "On the Nature and Treatment of Stomach and Urinary Diseases; being an Inquiry into the Connexion of Diabetes, Calculus, and other Affections of the Kidney and Bladder with Indigestion. By William Prout, M.D." Third Edition.

[b] These views seem to be almost demonstrated by the important observations of Mr. M'Gregor; who found, that sugar is not only developed from vegetable and animal matters in the stomach; but that it exists in the blood, saliva, &c., and even in the alvine evacuations of a diabetic patient.

[c] Dr. Prout.

[d] This phenomenon is often exhibited by the chylous urine;—a disease in which the disorganizing function of the kidneys is either destroyed, or suspended. (See Page 1132.)

[e] Dr. Prout, on the Nature and Treatment of Stomach and Urinary Diseases. Book 1; Chapter 2; Section 1; Subdivision 3. (Third Edition; Pages 36 to 38.)

just as well as any *other* "hard-bake." But although the disease is made out easily enough, when we suspect its existence, and it really does exist, yet it is a disease which is continually overlooked. It comes on so insidiously, that many persons have it for a length of time, before the medical attendant suspects its existence. The patient complains of being weak and languid; does not know what is the matter with him; and the quantity of urine may not be such as to attract his attention;—so that frequently no light is thrown on the disease. I have known so many cases of this kind passed over, that when I see a patient complaining of weakness, and can discover no evident cause, I always question him as to the quantity of urine. Not long ago, I saw a patient who must have had diabetes for some years; but that circumstance never struck my mind. He had disease of the heart, which was killing him; and it was not till I saw him three or four months afterwards, that he spoke of the quantity of his urine. The disease of the heart explained every symptom of which he complained; but, upon being told that there was something wrong in his urine, I evaporated a portion, and found it was diabetic; and he then stated that, for several years, he had made an excessive quantity of urine. No disease is more easily passed over;—unless the patient chances to mention, that he makes a larger quantity of urine than usual. When we see a patient emaciated, complaining of thirst, with a good appetite, and a dry skin; while we can see no reason for these symptoms, either in the chest or abdomen,—it is well always to inquire into the state of the urine.

Prognosis.—[The general *prognosis* in diabetes, must be considered unfavourable. Among the *favourable* symptoms in this affection, may be enumerated a moderate flow of urine, of a specific gravity not higher than 1·035; the appearance in the urine of lithic acid, either in its amorphous or crystallized form; the recent appearance of the disease, and absence of thirst; the retention or gain of flesh and strength; and (more than all) immunity from organic disease, especially of the lungs. On the contrary, when the flow of urine is permanently excessive, and of high specific gravity; or when this secretion is pale-coloured, opalescent, and serous; when the thirst, emaciation, and debility are extreme; or when organic disease, particularly of the lungs, is present, the chance of recovery is much diminished. But when (as is too frequently the case) several, or all of these unfavourable symptoms co-exist, the chance of recovery is not only diminished, but *absolutely hopeless.*[a]]

Treatment.—Perhaps this is the most singular disease in the animal economy; for the nature of it is not known; and the treatment which is found useful, is as singular as the disease itself. The remedies are directly opposite. There can be no doubt that repeated venesection has sometimes lessened the symptoms very much; and it is sometimes borne remarkably well. There are on record a sufficient number of cases to establish the fact, that bleeding is occasionally very useful in the disease; not bleeding to syncope,—not *violent* bleeding; but *repeated* bleedings,—taking from eight ounces to a pint. I have employed this method; and have seen it borne in a remarkable manner. In many cases, the urine diminished, and the quality improved, while venesection was going on. But though there can be no doubt of its utility, yet it has frequently failed. Some prefer the application of leeches to the epigastrium; and some, cupping on the loins.

[a] Dr. Prout, on the Nature and Treatment of Stomach and Urinary Diseases. Book 1; Chapter 2; Section 1; Subdivision 4. (Third Edition; Pages 38 and 39.)

Animal Diet.—Then, again, rump-steaks eaten abundantly (which is a practice directly opposite to bleeding) have also answered as good a purpose. Many persons have their urine improved, by being confined to animal diet; but, still, we should imagine that this would not go to the root of the complaint, wherever it may be. It is like giving phosphate of lime in softness of the bones, and taking carbonate of soda to remedy acidity of the stomach;—it is merely *alleviating*, not *curing* the disease. But we find it very difficult to make a person adhere to animal diet. He becomes so disgusted with it at last, that he says he would rather starve than eat meat every day. I never found a patient able to continue it for a length of time. Still, as there is great weakness, it may be well to make a patient live on meat as much as possible; and we find as strong evidence in its favour, as in that of bleeding.

[Dr. Francis Home was the first to point out the advantages of an animal diet, in the treatment of diabetes; but the dietetic treatment was not reduced to a regular system, or its effects thoroughly understood, till the publication of the interesting treatise of Dr. Rollo.[a] This author illustrated the beneficial effects of animal diet by a variety of cases, in one of which a complete and apparently permanent recovery was accomplished; and since his time, a diet more or less purely animal has constituted an essential part of every successful method of cure. Dr. Rollo dwelt strongly on the necessity of enforcing for some time a strictly animal diet, into which no article of vegetable food was to be admitted. It has been found, however, exceedingly difficult to secure the observance of an absolute animal diet even in private practice, and still more in hospitals; and in recent times it has even been maintained, that the rigorous observance of such a diet is not essential; and that some articles of vegetable food, more especially bread, may be safely allowed in moderate proportion. The difficulty of enforcing a rigorous animal diet, must be readily conceded: the craving for vegetable aliments soon becomes overpowering, particularly where the patient is tantalized by the sight of others indulging in them without control. But some doubt may be entertained whether the rigour of Rollo's dietetic system can be relaxed at all without prejudice; even although several eminent authorities, and among the rest Dr. Prout, have decided the question in the affirmative. It is at least not unworthy of remark, that those who allow a moderate proportion of vegetable aliment, admit their practice to have been unsuccessful; while others, who maintain, with Dr. Bardsley, that a fair proportion of cases may be cured, have adopted in their practice a rigorous animal diet; and insist, like Rollo, that they who deny from their own experience the curability of the disease, had forfeited all claim to do so, from having permitted a departure from his injunctions in this respect.

It is universally conceded that, if vegetable food is to be allowed at all, bread is the only admissible article; and that it should be fermented bread, and somewhat stale. Among animal articles, the flesh of adult animals is preferable to others; it ought to be cooked (in preference) by broiling or roasting, and with as little salt as possible, lest thirst be excited; it should be taken three times a day at most,—the largest meal being that of dinner; and the last meal must be taken at least two or three hours before bedtime. In the middle walks of society, a greater variety of articles and modes of cooking is advisable; otherwise an animal diet soon becomes irksome; but, in admitting variety in these respects, digestibility is always an important condition. Rollo and some of his imitators have thought, that

[a] Cases of the Diabetes Mellitus. By John Rollo, M.D.

there is advantage in the meat being as fat as possible; because it is less digestible than in its ordinary state. But the reason for this preference is far from conclusive; and experience has not confirmed the statement, that much fat tends to restore the healthy constitution of the urine. Others, again, have thought that cheese may form a moderate proportion of the food; on the ground, that in a state of health it is comparatively indigestible, superabundant in azote, and highly productive of urea and lithic acid. Here, too, ulterior experience contradicts early theory. The stomach being apt (in many cases) to be easily disordered, indigestible substances ought not to be preferred; as the urine generally abounds in urea, food producing this principle in abundance is not eligible; and in point of fact cheese, even where well digested, does not appear to possess any advantages over muscular fibre. It ought not, therefore, to constitute a large proportion of the food as some propose; but may be allowed in small quantity for variety's sake, wherever it is found easily digestible. The quantity of the food should be carefully regulated. Exaggerated notions are often entertained of the quantity of food which diabetics consume; and in general, though they have unusual appetite and craving before meals, they will be satisfied with even less than the allowances of a stout man engaged in an active employment. If bread is allowed, sixteen ounces of that article, and twenty ounces of meat (weighed raw), will generally prove sufficient; or it will become so in no long time, if the morbid condition of the urine should begin to yield to treatment.

As thirst is commonly a more urgent symptom than hunger, so is it likewise more difficult to control. The regulation of the drink is, however, one of the most essential articles of the treatment. For it must be observed, that excessive indulgence in liquids is (on the one hand) injurious by impairing digestion, or even causing some of the food to pass into the intestines undigested; and (on the other) it has a much worse effect upon the urine, than merely increasing its quantity by simple dilution; since the density is commonly found to be maintained, though the quantity be greatly increased. The patient must, accordingly, be often exhorted to curb the longing for drink as much as possible; and great care should be taken in regulating its quality. It is found that thirst is slaked with a less amount of fluids, when a considerable proportion of the drink consists of such animal infusions as weak beef-tea or mutton-tea; to which may also be added milk in moderation. Except these articles, pure spring water, and probably also such waters as contain calcareous salts in excess, no other ordinary articles of drink are allowable. The water of Bristol Hot-Well, and other calcareous springs, has been found (by Dr. Marsh, Dr. Prout, and others) to be less apt to increase the quantity of urine, than ordinary waters. Beer and other fermented liquors, much as they are longed for by the patient,—also wine and spirits, which he often asks for on account of the sense of languor and oppression that assails him,—tea as being in some measure diuretic, and all acidulous drinks, must be carefully shunned.[a] An important rule is, that he should drink little at a time. Another rule not less essential is, that little liquid should be taken at meals, and the thirst

[a] When the patient has been in the habit of taking fermented liquors, I [Dr. Prout] have been accustomed (for some years past) to recommend sound porter, in preference to wine or spirits. The *quantity* must be determined by the circumstances of the patient; but the minimum quantity should be rarely surpassed. With very few exceptions, I have seen more relief from thirst, and more support given by porter in diabetic cases, than by any other means whatever.—*Dr. Prout, on the Nature and Treatment of Stomach and Urinary Diseases. Third Edition; Page* 44.

controlled as long after meals as possible; because under these precautions digestion goes on more perfectly, and thirst subsequently is less difficult to appease. Advantage has been found by some in using all the drink warm, because less is required to slake the thirst. While it is desirable that the desire for drink should at all times be controlled as much as may be conveniently accomplished, great and sudden reductions ought never to be attempted; especially when the disease is somewhat advanced.

It is of imperative consequence, that violations of system as to diet be scrupulously avoided. The undue gratification of the thirst, the indulgence in such prohibited articles as beer, spirits, vegetables, pastry or confectioneries, is infallibly followed by an increase in the quantity and density of the urine, when it has been reduced in these respects by previous care in eating and drinking; and one stolen enjoyment is dearly purchased by many days of aggravated thirst and exasperation of every symptom.[a]]

Opium.—There can be no doubt that opium has a great power over the disease; it increases the quantity of lithic acid,—the quantity of urea; and lessens that of the sugar. I have seen this proved repeatedly;—nay, so great is its influence, that a very great quantity will diminish the *urine*, as rapidly as it will diminish the *sugar* in the urine. I once, finding a man dying of the disease, gave him opium so freely, that it induced stupor, and some degree of delirium; and, in the course of sixty hours, the quantity of urine was reduced from *eight* pints to *two*, in the twenty-four hours; and, from being very heavy, it lost the greater part of its morbid specific gravity; and absolutely lost the whole quantity of sugar. Indeed, urea was produced in excess;—the urine contained more urea than it does in health. The man died, a few days afterwards, of phthisis; but the quantity of opium produced the effect I have stated. In general, by giving opium, in increasing doses, we lessen the amount of urine, and likewise the quantity of sugar. Of course, the opium may be increased in this disease, as it may in any other; and one man, who began with half a grain, three times a day, at last took as much as two scruples, three times a day. It never confined his bowels; which it usually does where patients take a large quantity. His urine became natural; when, through a mistake on the part of those who made up the prescription, he had forty grains of blue-pill, which he took three times a day. Thus there was an *absence* of the *opium*, and the *presence* of a strong *purgative*,—a strong *mineral poison*; and instantly the sugar was brought back into the urine, in the original quantity, and the urine also was increased as before. The opium was renewed again; but I never made an impression on the disease afterwards. Whether the benefit would have continued, I do not know.[b]

It is said that other narcotics answer as well as opium; but I do not know whether that is the case. However, there was one man who, by repeated bleedings, *appeared* cured; but I did not see him afterwards. I do not know that I ever yet cured a case of this disease; and I dare not say that he was cured by opium, by animal diet, or by any other means. Of course, I am speaking of *saccharine* diabetes; for "diabetes *insipidus*", may be effectually removed.

Other Remedies.—The steam-bath and the hot-bath have been strongly recommended; but I have used them without any material benefit. Iron has also been recommended;—particularly the phosphate; but I employed

[a] "Library of Medicine"; Volume 4; Pages 258 to 260.

[b] In the "Lancet" for December 1, 1832, (No. 483, Page 319,) will be found a case illustrating the efficacy of Muriate of Morphia in this disease.

the sesquioxide, and it appeared useful; though I have never seen it cure the disease. I have not had sufficient experience of the disease in children, to say whether it may or may not be cured. I saw a child, about two years ago, making an excessive quantity of urine; and I think this urine was said to be saccharine; but this state lasted only a few days. Alum, catechu, and astringents, are said to be of service; and it is alleged that they have sometimes cured the disease. But what I would recommend, if the patient's strength would bear it, would be venesection, and a confinement as much as possible to animal diet; and there is no reason why we should not give opium, and at the same time phosphate of iron. These all act in a way that we do not understand; we are not sufficiently acquainted with the disease to say that they will not do good; and if I found a remedy serviceable, I would recommend a patient to use it. It is right always to make a patient wear plenty of clothes; to keep the surface as warm as possible. Warm clothing, and exercise to sweating, have been recommended; but I have known persons perspire profusely in the disease, without any good being done.

SECTION III.—EXCESS OF UREA IN THE URINE.

There is an affection very similar to diabetes, and sometimes mistaken for it; and that is, where the urea is in excess. I do not know that the disease has been noticed by any one except Dr. Prout; but I have seen several cases of it; all of which have done well.

Symptoms.—There is debility; lowness of spirits; pain in the loins; thirst; an excessive quantity of urine; a diminution and frequently a loss of sexual power; often irritation at the neck of the bladder; and a frequent desire of making water. The urine is pale, and likewise heavy,—perhaps the specific gravity is from 1·025 to 1·030. It is acid; but soon grows alkalescent. On evaporating the urine, we find no sweet extract; and if we add strong nitric acid to the fluid, we have a precipitation of the urea. This state of the urine is frequently seen where the phosphates are in excess. Equal quantities of nitric and muriatic acid must be added, in order to produce crystals.

Treatment.—The remedy for this state (as for diabetes) is opium [a], and likewise iron.[a] I have seen these cases yield to the exhibition of one or both these remedies. Dr. Prout has cured many cases, which were thought to be diabetes, till he examined the urine, and found no sugar in it. The patient complains of the symptoms I have narrated [b]; and if we find it to be this disease, it may yield to the remedies I have just named. If the patient's health be improved, the disease may cease spontaneously. It is by no means a formidable disease,—like the formation of sugar.[c]

Just as, with respect to the *solids*, we have an excess of developement, or an alteration of natural structure [d], so the same is observed occasionally in the *fluids*. The natural constituents become changed in their proportions; and just as, in one part of the body, we have cartilage, or bone, where it ought not to exist,—so, with regard to the fluids, we find them containing something which ought not to be there; but still something which is natural to the body; or we find them containing something in excess. Again, as, with regard to *structure*, we sometimes have a new structure altogether,—a structure that ought not to be in the body at all;—such as melanosis (if

[a] See Page 1130.
[b] See the previous Paragraph.
[c] See Page 1121.
[d] See Page 195.

we choose to call that a *structure*), and scrofulous disease, which is a foreign substance;—so occasionally, in the *fluids*, we find things that ought not to be there at all. Of these sugar in the urine is an instance. We have changes in the fluids analogous to *transformations* in the solids[a]; and we have further changes, which are analogous to *new formations*.[b]

SECTION IV.—SERUM, CHYLE, AND FAT IN THE URINE.

Before describing that disease in which there is sugar in the urine,—which is a *new formation* altogether, and not found in any part of the body,—I ought, for the sake of uniformity and consistency of plan, to have mentioned some other affections;—those in which there is merely a *transformation*, if I may so term it;—in which we find in the urine things which are natural to the *body*, although they ought not to be present in the urine.

Serous Urine.—One of these articles is serum; the presence of which is easily ascertained by the application of heat. It coagulates (as we know albumen does) at 160 degrees; or it will coagulate on adding a small portion of acetic acid, and then prussiate of potass. I spoke of this as occurring sometimes in inflammatory dropsy, sometimes where there is no inflammation to be discovered, and sometimes where there is no disease of the kidney to be ascertained.[c] When serum exists in the urine, the urine may be of its natural quantity, or it may be below it, or it may be in excess. Generally the urine when made is pale; sometimes it is, when first made, a little opaque. I need not say any thing more about this; as I described it so fully when treating of dropsy.[d]

Chylous Urine.—Fibrin sometimes exists in the urine;—not as a deposit from the ureters or bladder, but really as the product of the kidneys. At least, it was so in a case which I saw. I have seen only one case, but that I repeatedly examined; and I found it was the fibrin of chyle;—there being fibrin in *chyle*, as well as fibrin in *blood*. The case to which I have just alluded, was very remarkable. The woman was otherwise in very good health; but soon after she passed urine, a coagulation took place; and there was a quantity of something exactly like "blanc mange";—as much as would fill a tea-cup. Occasionally it coagulated; so that she could not make water. I showed the discharge to Dr. Prout; who examined it, and ascertained that it was chyle. She went on, in this state, for two or three years; and, in the midst of it all, she gave birth to a child;—it seemed to make no difference in that way. I have every reason to believe she is now alive. Dr. Prout has seen six or seven cases since that time. I wished to make some observations upon her; and begged her not to take any food for twenty-four hours;—in order that I might see if it would check the formation. There was this change produced;—the coagulum approached nearer to blood. It had a fine pink colour; and the more she fasted, the more it approached to red;—it was more and more converted into blood. There was no fresh food taken to form fresh chyle; and consequently the chyle became more like blood. Around this coagulum there was a fluid, which was very serous,—contained a good deal of albumen in solution; and, of course, there was urine; but the fluid scarcely smelt of urine, till it was concentrated. One hundred grains of the fluid, on evaporation, gave only half a grain of urea. Nothing was done in this case; but Dr. Prout told

[a] See Page 205. [b] See Page 211. [c] See Page 176. [d] See Page 174.

me that, by the long-continued exhibition of opium, two or three times a day, he had been successful in curing this disease. The quantity of substance was altogether deceptive to the eye; for, on evaporating this large coagulum and examining it, there was very little solid matter; and therefore the loss to the system was by no means so great as, at first sight, we must have imagined.

Discharge of Fat.—Fat has occasionally been found in the urine. When speaking of a discharge of fat from the intestines, I stated that, in some cases mentioned by authors, fat was found in the urine[a]; and in the case of a lady whom I know, but whom I do not attend, the gentleman under whose care she is assures me, that a large quantity of fat is discharged along with the urine.

[a] See Pages 1067 and 1068.

CHAPTER III.

CALCULOUS DISEASES.

SECTION I.—URINARY SEDIMENTS.

Concretions are of a mixed nature. They may consist merely of the natural constituents of the urine; and may therefore be analogous to those diseases of the solids called "transformations"[a];—in which things naturally found in the body are present. Or they may be new substances,—such as ought not to exist in the body at all;—being analogous to those which are termed "new formations", or "*non-analogous* changes of structure."[b] Before entering on the subject of urinary concretions, however, it is necessary to make some general remarks on the nature of urine and its constituents.

Acidity of Healthy Urine.—Healthy urine, when it is first made, is acid. It will stain litmus-paper; and, if the bladder be not very retentive, and if persons be not very particular (as is sometimes the case with old gentlemen), their dress will be stained;—it becomes red on account of the acid in the urine. Chemists say, in general, that the urine is acid when first made; but Dr. Prout contends that it is not pure uric acid, but lithate of ammonia, that stains litmus-paper red.[c]

a. Amorphous Sediments.

Lithic-Acid Deposits.—But the urine sometimes contains *nitric* acid; and we know that, if nitric acid be added to lithic acid, erythric acid is produced. It is of a very fine scarlet hue. If to this erythric acid pure ammonia be added, a purpurate of ammonia is produced; and if we treat this purpurate with potass, and then again with sulphuric acid, a new acid is formed,—called "purpuric acid"; so that erythric and purpuric acid do not exist naturally in the urine, but are the result of other changes. If nitric acid be formed (by disease) in the urinary secretion, purpuric acid may be formed; and then (as there are soda, potash, and ammonia, in the urine) we may have the purpurates of soda, potash, and ammonia; and if these are added to the lithate of ammonia, then the lithate of ammonia which may exist in the urine, becomes of a fine pink or red colour; and we have a pink or red sediment. Therefore, the pink and red sediments are essentially lithate of ammonia, which is formed in excess,—so as to be insoluble at a common temperature; and they are deposited in the urine because they are in excess, or because the *acid* is in excess;—they are super-lithates. The lithate of ammonia, and the other lithates, are *white* of themselves; but, from the presence of the purpurates, they acquire a *red* or *pink* colour; and if the

[a] See Page 205.
[b] See Page 211.
[c] "On the Nature and Treatment of Stomach and Urinary Diseases. By William Prout, M.D." Third Edition. Introduction; Section 8; Pages 74 and 75.

yellow matter of the urine be absent (as in hectic), then, instead of being *red*, they become *pink*. All this, however, is comparatively unimportant.

In pyrexia, nitric acid appears to be formed in the urine; and the lithates (particularly the lithate of ammonia) are in excess; and, in consequence of the excess of lithic acid, or of lithate of ammonia, and the formation of the purpurates by nitric acid, a copious red sediment is produced; and though it is originally owing to the nitric acid, yet it is a lithate (generally the lithate of ammonia) which has been rendered red by the presence of the purpurates.

Causes.—All this may be produced by the sympathy of the kidney with any other organ that is affected. From mere catarrh;—slight inflammation of the mucous membrane of the air-passages, we may have this effect produced. In fever, and in inflammation, the same occurrence takes place. If there be organic disease, especially of the liver, it has a tendency to produce pink sediment;—that is, it causes an absence of the yellow matter; and consequently the sediment is pink. Very trifling things will produce this state, in some people. Anxiety, strong exercise, a little pie-crust or pastry, or the slightest derangement, may cause a red or yellow sediment. Hence Dr. Prout has called this—"the sediment of health"[a]; though it is seen in disease. He means that it occurs from such slight causes, that it is hardly worth while to consider it as an indication of disease. All is not right, but still it will happen every day; and, indeed, by far the most frequently when the person is in a state which we cannot denominate "indisposition." Generally the redder or the pinker the urine is, the more scanty is its quantity.

Deposition Occurs when the Urine Cools.—The temperature of the urine, when in the body, is sufficient to keep these matters suspended; and therefore it is generally passed clear; and it is not till the fluid is cool, that the sediment appears; and even then, if the person make water a short time afterwards, the heat of the fresh quantity of urine, causes the sediment of the former to be dissolved again; though, of course, a second cooling occurs. For this reason we observe this sediment far more frequently in *cold*, than in *warm* and *hot* weather. In hot weather, though the urine perhaps contains every thing necessary for such a deposition, yet it does not produce it; but in cold weather, if it so happen that the urine is not in excess (as it so frequently is),—if we are not chilled,—if we are in a warm room,—if we do not diminish the perspiration, the quantity of urine remains the same as before; and then, on making water, in a cold room, we are almost sure to have this sediment; although in summer, in the same circumstances, we should not; for the external heat would then be quite sufficient to keep these ingredients in a state of solution.

Varieties in the Colour.—There is great variety in the colour of the sediment. Sometimes it is red; sometimes it is reddish; sometimes it is brown (the colour of a ripe hazel-nut); and so on;—fainter and fainter, till the sediment is nearly white, or perhaps quite so.

Lithic-Acid Deposit shews Acidity.—When we see *red* or *pink* sediment, the urine is generally *more* acid than in health; and when it approaches more to *yellow*, it is *less* acid. It shews that there has been less nitric acid; and that less of the purpurates have been formed. A less change, therefore, has been produced on the lithate of ammonia by the purpurates; and

[a] Dr. Prout, on Stomach and Urinary Diseases. Book 1; Chapter 3; Section 3; Subdivision 1. (Third Edition; Page 196.)

therefore we have a fainter colour. This is all very intelligible: but it is necessary to shew it, in order that it may be fully understood. In those states of the body in which there happens to be nitric acid formed in excess, we have the purpurates; and the purpurates, being present and united with lithates, produce a red or a pink colour;—just as it may be. In the case of red or pink sediment, therefore, the urine is acid; but if it so happen that nitric acid is not formed in abundance, then the purpurates are not produced in so much abundance; and therefore they cannot change the colour of the lithates (which is naturally *white*) to a *red* or *pink* hue. Hence, whenever this sediment is red and high-coloured, we generally find the urine very acid; and in proportion as it is paler,—goes through a faint brown and approaches to white,—in that proportion, generally, is the urine less acid. It may even be deficient in the *natural* quantity of acid; and be rather *alkalescent*. The urine, when there is acid, is high-coloured; but when the sediments are pale, and the urine is not acid, then the urine generally is pale also.

Oxalate of Lime.—Besides the *nitric* acid, *oxalic* acid has been found in the urine, in the form of a sediment; not a *powdery*, but a *crystallized* one; and is in union with the oxalate of lime. Once only has Dr. Prout seen a powdery sediment;—what he calls "an amorphous uncrystallized sediment of oxalate of lime"; and then it was mixed with ammonia. We shall see, with regard to oxalate of lime, that one calculus consists entirely of it; and the tendency to produce oxalic acid, it is said, has been sometimes traced to eating sorrel; which contains that particular acid. But of that I will speak presently.

Phosphatic Deposits.—If the sediments of the urine be absolutely white, then they are not the lithate of ammonia, but the phosphate of lime, the phosphate of magnesia, or the phosphate of ammonia, or more than one of these. In this state of things,—when there is this absolutely white sediment of the phosphates,—the urine is *not* acid. On the other hand it is *alkaline*; or it becomes so very soon after it is passed. It is rare, certainly, for the urine to be quite alkaline at first. Sometimes the urine is all but alkaline; and it is no sooner passed, than it emits a strong smell of ammonia. The best test for alkalies is, not *turmeric*-paper, but *litmus*-paper which has been exposed to acid. Reddened litmus-paper is the most delicate test; for the smallest quantity of alkali brings back the purple hue. When the sediments are white, and depend upon the phosphates, the urine differs, in other particulars, from the urine made when the sediment depends upon the lithate of ammonia. The urine, instead of being high-coloured, is pale,—with a faint greenish hue; and, instead of being scanty,—as is the case with *acid* urine,—it is generally abundant; and, very soon after it is made, it undergoes such a high degree of decomposition, that it becomes very offensive, and smells of ammonia. Still there is one exception to this; and that is, when lithate of soda has been deposited. I have had one case of this description; and, I suppose, others have had many. There was a white sediment in the urine; but it did not depend upon the phosphates; and therefore the quality of the urine was like that which is seen where there is *red* sediment. The lithate of soda, if not coloured by the purpurates, is perfectly white. It so happened, in this case, that the lithate of soda was deposited pure; but as it was not a phosphate, the urine was not of that quality which occurs when the phosphates are deposited. It was not abundant, but scanty; it was not alkaline soon after it was made, but acid; for it tinged litmus-paper red.

Diagnosis.—One set of sediments consists of lithates deposited in abundance; and they are generally tinged with the purpurates.[a] Another set are always white; and they are phosphates.[b] In one set we have *acid* urine[c], in the other *alkaline*[b]; namely, where there is an alkaline phosphatic disposition. In one set the urine is *scanty*[b], in the other it is *abundant*[b]; in one it is *high-coloured*[b], in the other it is *pale*, and frequently of a green hue.[b] If it so happen that the purpurates are not formed, we may have a pure lithate of ammonia; and the deposit will then be *white*[a];—just as if it were a phosphate.[b]

Cause.—This state of the urine—where the phosphates are deposited, and where the urine is abundant, and disposed to alkalescency (not staining litmus-paper)—does not shew an inflammatory state. The *other* secretion of urine[a] shews an inflammatory condition; but this is connected with an irritable state of the system,—a state of debility.

Alternation of Lithates and Phosphates.—However, these very states run into each other. We may have persons passing one description of urine, with one kind of sediment, and then the other, alternately; and we may have persons verging from one to the other;—so that there is no certainty. Persons are in a sort of mixed transition-state; where matters are much confused. Most probably, they begin with acid urine, and the lithic deposits[a]; and yet they are actually passing into the other condition[b], which is the worst state of the two. The sediments are sometimes seen to be mixed. In the sediment, we have occasionally lithic acid, the lithates, and the phosphates also at the same time;—so that the whole state of the patient may be one of transition. Sometimes these conditions alternate; so that we may be very much puzzled, perhaps, in the treatment of the case.

Excess of Urea in Phosphatic Urine.—Where the urine is abundant, pale, green, and alkalescent[b], and the phosphates are deposited, it is observed also that urea is in great abundance; but Dr. Prout considers that it is imperfectly formed;—that it is the urea which gives rise to the abundance of ammonia.[d] The way in which this operates he conceives to be the following. In these cases the urea is secreted in abundance. Urea, we know, is a compound; and, being badly formed, it undergoes some change, and affords ammonia. As there is not a correspondent quantity of phosphoric acid, this ammonia precipitates the lime; and then, by uniting with the phosphate of magnesia, a triple salt is formed; which salt is called the "ammoniaco-magnesian phosphate."[d] This is, of course, a phosphatic sediment; and we may easily know this triple sediment, by its white glistening particles. The urine, in these cases, is alkalescent; because there is such an abundance of imperfect urea,—giving rise to so much ammonia. However, though the abundance of ammonia (from the diseased urea) may be the cause of the deposition of this phosphatic sediment, yet the same effect will be produced from a deficiency of acid in the urine. If there be not sufficient phosphoric and sulphuric acid, the lime will be precipitated; and, not only the lime, but likewise the ammonia and magnesia;—so that we have the "ammoniaco-magnesian phosphate." Sometimes it is said that an excess of lime is the cause of the mischief. That, however, is rare.

Thus the urine may err through an *excess* of acid, of one kind or other (generally the nitric[a]); or from a *deficiency* of the acids.[b]

[a] See Page 1134.
[b] See Page 1136.
[c] See Page 1135.
[d] Dr. Prout, on Stomach and Urinary Diseases. Third Edition. Introduction; Section 8; Page 89.

b. Crystallized Sediments.

Lithic Acid.—The sediments are sometimes mere powders (called "amorphous"[a]); but sometimes the matters deposited are in a crystalline state. In the latter case they may, in the first place, be red. These red, granular, crystallized sediments (called "crystallized", to distinguish them from powdery ones) are spiculated crystals. We may see them in the urine. There will frequently be red crystals, with numerous spiculæ, at the bottom of the vessel. Some of them, by chance, may be swimming; and some may be sticking at the sides. These are very nearly pure lithic acid. From the great quantity of nitric acid, most probably, the lithic acid is precipitated. Sometimes the lithic acid is absolutely in excess, so that it is not held in solution; and therefore crystals are deposited. But this is not necessarily the case. The *phosphoric* acid will sometimes do this, and sometimes the *sulphuric*; but frequently it is *muriatic* acid; and sometimes it is even said to be *carbonic* acid. It must be an acid of little strength, to precipitate the lithic acid; because any *strong* acid will produce decomposition. The urine—when it deposits this spiculated, crystallized, red sediment—is usually very transparent; and of a fine, reddish colour.

Triple Phosphate.—If the crystallized sediment be *white*, it is usually the triple phosphate of magnesia and ammonia; and is called the "ammoniaco-magnesian phosphate." The urine, in this case, is just the same as if the sediment had been in powder. It is alkalescent, abundant, pale, and greenish; and soon becomes ammoniacal, and undergoes decomposition.[b]

Oxalate of Lime.—We may have crystals consisting of oxalate of lime[b]; and then the crystals are of a dark *green* colour; and the urine is found to be acid. But this is a very rare occurrence; and one which I have never seen. The *crystallized* deposits are said never to be found together; while the *powdery* concretions (the *amorphous* deposits) sometimes are.

SECTION II.—URINARY CALCULI.

If it happen that the crystals just described are larger, or that more solid matter is heaped together, we give to them the name of "concretions." It is merely the same thing on a large scale;—perhaps the union of several of these, deposit over deposit; and a great quantity of solid matter. We may be prepared to understand these concretions, from what I have now said respecting sediments;—both powdery ("amorphous") and crystalline.

Lithic Acid.—In the first place, we have a concretion which is merely *lithic acid*; and is of a brownish red or fawn-colour. Concretions of this kind are sometimes smooth; but sometimes they are tuberculated,—rather rough. On dividing them, we find that they consist of concentric laminæ within. If they are broken, instead of being divided with the saw, the fracture is imperfectly crystallized, and of a deep fawn-colour, like the rest. Sometimes they are not in concentric laminæ; but form an amorphous irregular mass, of a pale colour; but when they are pale, they are generally mixed with a little phosphate of lime, or even a little *oxalate*. If we apply heat to this calculus, it becomes white, and burns away; leaving a minute quantity of white ash, which is generally alkaline. This calculus is quite soluble in potash; and we may precipitate

[a] See Page 1134. [b] See Page 1136.

it again by any acid. It descends in the form of a white powder. If we add nitric acid as well as apply the heat, it is dissolved; and, on drying it, we have a fine carmine-colour, which is erythric acid.[a] I before stated, that when *nitric* acid is added to *lithic* acid, a fine scarlet colour is produced[a]; and therefore if we take such a calculus as this, and add strong nitric acid to it, we obtain a red colour.

Lithate of Ammonia.—The calculus just mentioned (lithic acid) is rarely found pure. It is generally mixed with the *lithate of ammonia*; and it is then clay-coloured,—rather paler than the other. It has, however, the same general character. It is sometimes smooth, and sometimes tuberculated; sometimes it has concentric plates, and sometimes it is an amorphous irregular mass; but it is more rarely found in the latter state, than the calculus of pure lithic acid. The most common calculus of this description, is not pure lithic acid, nor pure lithate of ammonia, but a mixture of both. If lithate of ammonia exist in a calculus, either in a pure or in a mixed state, it decrepitates by heat; and if we add potash with the heat, ammonia is soon given off. It is soluble in the alkaline carbonates; whereas a calculus of pure lithic acid is not; and therefore we may easily distinguish the one from the other, by chemical means. A calculus consisting of pure lithate of ammonia, occurs generally before puberty. It is small, and rather uncommon. The calculus of lithate of ammonia is not only continually found mixed with lithic acid, but often with oxalate of lime.

Oxalate of Lime.—The next calculus which is found in acid urine, is "oxalate of lime." This, for the most part, is very easily known. It is brown, rough, exceedingly hard, and generally exceedingly rugged. From the irregularity of its surface, it is called "a *mulberry*-calculus." Sometimes it is nearly black. On applying heat, a white efflorescence appears upon it. Oxalate of lime no longer remains, but *pure* lime; and this, being alkaline, will stain turmeric-paper. Occasionally this calculus has been found smooth; but in that case it must be of a very small size. Generally it is a most formidable-looking calculus;—such as would make one shudder, when we remember that it is formed in the human bladder. It is known by its ruggedness and dark colour.

Cystic Oxide.—There is another calculus which exists with acid urine; and it is called "cystic oxide." It is so very rare that, perhaps, we may never meet with it; but I will describe it. It is of a yellowish-white colour, and smooth externally. Internally, it is a confused, crystalline, glistening mass. In point of size, it is small. If heat be applied, a peculiar odour is emitted; and it is soluble both in acids and in alkalies.

Phosphate of Lime.—We now pass to the consideration of other calculi; which exist with urine generally deficient in *acidity*, and sometimes bordering very closely on *alkalescency*. These are the phosphates; and the first calculus of which I will speak, is that composed of *phosphate of lime*. The colour is of either pale brown, or white. It is very smooth and polished; and has regular laminæ, which are very separable from each other. It is rare and small; and it is thought, by Dr. Prout, not to be a true urinary calculus; but to be formed in the prostate gland.[b] It is not fusible by the heat of a blow-pipe; and, when dissolved, may be again precipitated. Although this calculus is not dissolvable by heat, yet we may dissolve it in muriatic acid.

Triple Phosphate.—There is another phosphate which, unfortunately, is very common. It may be known in a moment. It is the "triple phos-

[a] See Page 1134.

[b] Dr. Prout, on Stomach and Urinary Diseases. Third Edition. Introduction; Section 8; Pages 108 and 111.

phate";—consisting of phosphoric acid, magnesia, and ammonia. It is white; has no laminæ; and is easily pulverized or broken. This calculus consists of the same substance as the white sand I mentioned.[a] It glistens; and consists of a number of minute, white, sparkling crystals. The surface is uneven;—being covered with minute asperities. If we apply heat or potash to this calculus, ammonia escapes; and therefore our chemical knowledge will enable us to say what it is. If we apply intense heat to it, it will at last melt; but this is effected with great difficulty. It is more soluble in acids, than the phosphate of lime[b]; and may be precipitated again, in the form of minute shining crystals.

Fusible Calculus.—We have another calculus which is very common; but not quite so common as the last of which I spoke. This is a compound of the last calculus with the last but one;—consisting of phosphate of lime, united with the phosphate of magnesia and ammonia. It passes under the name of "the *fusible* calculus"; because it so easily melts under the blow-pipe. It is exceedingly white and very friable;—breaking under our fingers, like so much chalk. If we rub it on our sleeve, the coat is immediately dirtied,—as it would be by chalk. Generally, it is not laminated; but if it be separable into laminæ, we generally find between them the triple phosphate[b], in the form of shining crystals. When it is not laminated, but in a mass like chalk, it sometimes attains a very large size. It is very soluble in the acids;—particularly diluted *muriatic* acid. It is a calculus which frequently gives the surgeon a good deal of trouble,—coming to pieces when he applies the forceps. We may easily separate the lime from this calculus. By adding oxalate of ammonia, the lime goes to the bottom; and then, again, the magnesia may be separated by adding pure ammonia.

Alternating Calculus.—We do not often have calculi in forms so simple as those that I have now mentioned; but, very frequently indeed, we have what is called "an *alternating* calculus"; that is, a calculus consisting of these various substances in different layers. In by far the greater number of these cases, we shall find that the *inner* substances are those which I first mentioned;—lithic acid[c], or (more properly speaking) a compound of lithic acid and ammonia[b], or oxalate of lime[b]; and then, in the outer part, we find the phosphates.[b] The layers of these alternating calculi may be very various; but the nucleus,—the internal portion, generally consists of lithic acid, or oxalate of lime. When a patient has a "mulberry-calculus"[b], nature at last throws the phosphates around it. It becomes white externally, and loses a great portion of its roughness; so that the patient does not suffer so much as before. The external crust generally consists of a "fusible calculus." Sometimes we have laminæ of all the three ingredients; but still the external crusts generally consist of the phosphates. When calculi are thickened in this way, they are often very large. As to the *chemical* qualities, they depend upon the layer examined. If we inspect the *outer* layer, we find all the characters of the phosphates; and *within* there are all the characters of lithic acid and lithate of ammonia.

Mixed Calculus.—We have another compound calculus; in which the materials, instead of being in alternating layers, are all mixed together. A mass of this kind generally consists of lithate of ammonia[b] and the phosphates[b]; and, of course, the colour will vary with the composition. Accordingly as lithic acid predominates, or the phosphates, so will the calculus incline to a *clay*-colour, or to a *white* colour; and the proportions are quite

[a] See Page 1137. [b] See Page 1139. [c] See Page 1138.

indeterminable. A "*mixed* calculus", of this description, is generally very hard;—seldom laminated, and seldom large.

Carbonate of Lime.—There is another calculus, called "the *carbonate-of-lime* calculus"; because it consists of pure carbonate of lime. It is very rare, and very friable. It has all the characters of chalk; and effervesces with the acids.

Xanthic Oxide.—This calculus is so very rare, that it has been seen only once. It is called "xanthic oxide." The substance of this calculus is very peculiar. By the addition of nitric acid it becomes yellow.

Fibrinous Calculus.—There are some concretions of the bladder, which have turned out to be nothing more than fibrin.

Prostatic Calculus.—Besides these *vesical* calculi, we have calculi in the prostate gland. They are found in two situations;—first, in the *natural cavities* of the gland; and then they are of a yellowish brown colour, and more or less round and small. Sometimes, I believe, these come from the kidney. I have passed thousands of these at different times;—about the size of pins' heads. I have collected some, and shewn them to Dr. Prout; who says they came from the prostate. But calculi are sometimes found in an *abscess* of the prostate; and these are much larger and highly polished. They are chiefly phosphate of lime[a]; and Dr. Prout believes[b] that the "phosphate-of-lime calculus", found in the bladder, is in reality a *prostatic* calculus.[c]

SECTION III.—CALCULOUS DIATHESES.

It appears that there are four elementary kinds of calculi, and four distinct calculous dispositions; to which dispositions Dr. Prout gives the name of "diatheses." In the first place, there is the diathesis to form *lithic acid*[d], its compound (lithate of ammonia[a]), and a mixture of the two.[a] This is the most common calculus we have. Nearly all the calculi taken from children, if they have not been allowed to remain long, consist of lithic acid, or its compounds, or a mixture of the two; and in the majority of calculi taken from people, of whatever age, it forms the nucleus. Then there is a disposition to produce *oxalate of lime*[a]; and that appears to be a distinct diathesis. Then there is a disposition to form *cystic oxide*[a]; but this is very rare. Then there is a disposition to form the various *phosphates* which I have mentioned.[a] This last succeeds to the others. It is usually

[a] See Page 1139.

[b] Dr. Prout, on Stomach and Urinary Diseases. Third Edition. Introduction; Section 8; Page 111.

[c] The following is Dr. Graves's excellent Table of Calculi (slightly modified):—

I. Animal Calculi.
  1. Lithic (or Uric) Acid.
  2. Lithate (or Urate) of Ammonia.
  3. Xanthic Oxide.
  4. Cystic Oxide.
  5. Fibrin.

II. Simple Saline Calculi.
  6. Phosphate of Lime. ("Bone-Earth" Calculus.) } 8. Fusible Calculus.
  7. Phosphate of Ammonia and Magnesia. }
  9. Oxalate of Lime. ("Mulberry" Calculus.)
  10. Carbonate of Lime.

III. Compound Saline Calculi.
  11. Alternating. (Composed of Layers.)
  12. Mixed. (Substances irregularly Mingled.)

[d] See Page 1138.

after the three first diatheses have ceased, that the disposition to form the phosphates comes on.

Their Comparative Frequency.—So common is the disposition to produce the "*lithic-acid* calculus" [a], that it is said to predominate in rather more than one-third of all the calculi examined. At least two-thirds originate from it in the first instance. Those which are of a deep fawn-colour, are well laminated, and have quite a crystalline fracture, are nearly pure lithic acid; in fact, it is red crystallized gravel. If, with this diathesis, the calculus is of a pale-brown or clay-colour, with an earthy fracture, then it is a compound of lithic acid and ammonia [b]; and generally there is a little mixture of the phosphates, and even a little oxalate of lime; and the more there is of the phosphates and the lithate of ammonia, instead of lithic acid, the paler the calculus becomes. The rarest of these calculi is the pure "lithate of ammonia." [b] The "*mulberry*-calculus" [b] is found to *constitute* rather less than one-*seventh* of all the calculi which are examined; but it is *contained* in about one-*fourth* of all the calculi that occur. Of two hundred and seventy-four calculi which were examined, only one was found to be of "cystic oxide" [b]; and in three collections out of five, none were found.

The "phosphates" [b] constitute about one-fourth of the calculi; and one half of this one-fourth are the "*mixed* phosphates" [b];—that is to say, a mixture of the different phosphates. But this estimate of one-fourth is not very accurate; because it has been taken from the *external* appearance of the calculi; whereas, if these had all been sawn through, it is most likely that, *within*, a number of other ingredients would have appeared.

The "*alternating* calculi" [c] (those which consist of a layer of different substances,—the lithate of ammonia, the oxalate of lime, and the phosphates alternately) form a very large proportion. In these alternating calculi, we sometimes see lithic acid and its compounds externally; and perhaps a foreign body for a nucleus. We see, *within*, alternations of lithic acid [a] and its compounds, and a "mulberry calculus" [b] *without*;—that is very common. We see alternations of lithic acid within, and the phosphates without. We see alternations of the lithic-acid calculus within, then the "mulberry-calculus", and the phosphates without. Again: we see alternations of the "mulberry-calculus" within, and lithic acid and the phosphates without. When, however, these alternating calculi are found, the phosphates exist externally; and therefore it appears that the disposition to form phosphatic calculi, does not precede the disposition to form lithic acid calculi, or oxalate of lime. It appears that the disposition to form the phosphates, either takes place originally, or follows the disposition to form the oxalate of lime, or lithic-acid calculus; but it is not succeeded by any other diathesis. This very interesting and very remarkable fact, was noticed by Sir Gilbert Blane, in 1812; in a paper published in the "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge." [d] He states [e] that lithic acid is generally the nucleus in calculi; and that the other depositions are merely the result of irritation. I am not aware that this statement of Sir G. Blane's was attended to for some time; but it has now, by very extensive observations, been proved to be correct. Dr. Prout says, that he never met with one patient in whom the phosphatic deposition was decidedly followed by any other.[f] It usually occurs when irritation takes place.

[a] See Page 1138.
[b] See Page 1139.
[c] See Page 1140.
[d] Volume 3; Page 338.
[e] At Page 358.
[f] Dr. Prout, on Stomach and Urinary Diseases. Appendix; Observations on Table 2. (Third Edition; Page 481.)

a. Lithic-Acid Diathesis.

Depends on the Kidney.—The disposition to form lithic acid, evidently appears to reside in the *kidney*; for these calculi are seen in that organ. Indeed, there is no reason whatever for believing that this description of calculus is formed in the *bladder*. It appears to be truly a *renal* calculus. If this diathesis be not very intense, there is merely an amorphous sediment[a];—such as we all have occasionally. Some people frighten themselves about it; but, unless the quantity be very great, there is no occasion for alarm;—especially if the sediment does not appear when the urine is first made. If it be so abundant as to be deposited before the urine cools[b],—if it come from the bladder in the form of powder, then there may be danger; and if it not only occurs when the urine is first made, and is warm, but takes place constantly, then (I believe) the individual is almost sure at last to have gravel or stone;—that is to say, he will pass concretions; or have a concretion so large, that it will not pass.

Prognosis.—With respect to the lithic-acid sediment[c], there is more danger in proportion as it becomes paler. When it is of a bright *red* colour, there is not much occasion for alarm; but when it is *white*, there is some degree of danger; because it shews a disposition to deposit the phosphates. I do not say that it *always* shews danger; because occasionally, when it is white, it is merely lithate of ammonia; and it is white because it is not tinged with the colouring matter;—in the way I mentioned before.[d] Very frequently, however, the intensity of it arises from the phosphates being deposited; and when that is the case, there is considerable danger.

Symptoms.—Some people will pass crystals with very little irritation; but if irritation be produced by the sediment, then there is generally a mixture of amorphous and crystallized sediment[c]; and when the irritation is very great, it is generally because a large quantity is passed in both these forms. In these circumstances, there is generally more or less pain in the kidney; irritation about the neck of the bladder; a frequent desire to make water; and more or less feverishness. The urine is acid and scanty; it has a high specific gravity. Persons complain of these symptoms, from time to time; and then they will discharge a large quantity of red or reddish sediment. The urine is very acid; and we should always test it. This state of things frequently comes on in persons who have a calculus already in the bladder. Sometimes a calculus is formed in the kidney, and may remain there; and give the patient no trouble. A person may have a stone formed in the kidney, without being aware of it; and we may be surprised to find it there after death. Sometimes it will only cause an aching pain in the loins; and will not shorten life. But occasionally these calculi produce very great mischief. No doubt they continually pass in the form of minute concretions; and the patient is not at all aware of it; and they will lodge in the bladder, and there grow to the size of which they are found. Sometimes they pass from the kidney, after having obtained a size so large as to give great pain, as they pass through the ureter. This pain in the back, on their attempt to leave the kidney, is attended with vomiting, and perhaps with a great degree of feverishness. Inflammation may be set up, or it may not; and then, after a time, all these symptoms cease, perhaps suddenly; and, in a day or two, if the stone be very large, we have signs of a calculus in the bladder.

The infundibula of the kidney are sometimes filled with these calculi.

[a] See Page 1134.
[b] See Page 1135.
[c] See Pages 1134 and 1138.
[d] See Page 1137.

We see them sticking there; and sometimes the kidney will become blocked up with them. The pelvis is sometimes filled with them; the infundibula become greatly distended; and sometimes the ureter is blocked up with them;—so that the pelvis of the kidney is distended into a mere bag. It is said that, in the museum of the College of Surgeons, there is a calculus weighing seven ounces and a half, which was taken from a kidney, and which caused no symptoms during life. This is analogous to what I stated with regard to the gall-bladder; where a large number of stones will sometimes exist, without being productive of any symptoms.[a] These lithic-acid calculi are continually found in the kidney; and are of all sizes. It is probable that, in all the instances where they are found in the bladder, they have descended from the kidney.

Lithic-acid calculi (using the term generically) sometimes occur in great numbers. No fewer than two thousand have been voided, by one individual, in the space of two years; and one hundred and twenty have been known to come away in three days. It is the calculus which, of all, gives the least irritation.

Causes.—Children and dyspeptic individuals are most subject to that state of body, in which there is a disposition to form these calculi. The disposition appears to be less between puberty and forty years of age, than before. There is certainly sometimes an hereditary tendency to it; for it occurs in members of the same family,—descendants of each other. It is said to have occurred frequently in those who have cutaneous complaints; but cutaneous diseases are so very common, that I do not know whether the examples are sufficiently numerous, to authorize us in supposing that there is any connexion between the two. Something appears to depend upon local situation; for some places are remarkable for the abundance of persons with this sort of calculus; but it is not known in what the peculiarity consists. Undoubtedly there is some connexion with a gouty disposition. Persons disposed to gout, frequently become the subjects of this sort of calculus, and this kind of deposition in the urine. Excess in eating or drinking, is always mentioned among the causes; and so likewise is indolence.

Treatment.—As to the *treatment* of the disposition to form this calculus, and this kind of sediment, it consists in antiphlogistic measures; for this state of body is certainly, for the most part, inflammatory.

Diet.—An individual so circumstanced, should take very little animal food;—sometimes, perhaps, none at all. In many cases, the latter restriction may be necessary. At any rate, animal food should be taken in great moderation; and equal moderation is required in eating altogether. In general, it is necessary to abstain from wine, spirits, and strong malt-liquors; though *mild* malt-liquors may be admissible. It is not merely necessary to abstain from Rhenish wine and claret; but from all strong wines, and every thing that is sour. It is necessary to avoid vinegar, sorrel, oranges, and lemons;—in short, every thing that is acid. It is likewise necessary that the patient should be moderate in the exercise he takes; and that he should keep an open state of the bowels.

Remedial Agents.—With regard to *medicine*, colchicum is found to be beneficial; together with light preparations of mercury;—mercury in a moderate quantity;—so as not to debilitate the frame; but to keep down, as much as possible, an inflammatory condition. In connexion with colchicum and mercury, neutral salts (such as tartrate of potash) will be very

[a] See Page 1025.

proper. Alkalies are advisable here,—particularly magnesia;—both on account of its being an alkali, and from the tendency it has to open the bowels. A saline draught is an excellent mode of giving an alkali; because, although we thus give a neutral salt, yet it contains a vegetable acid, which is always decomposed within; so that we have the benefit of the alkali which was combined with it. For this fact we are indebted to Sir Gilbert Blane.[a] He was the first who pointed out the impropriety of giving saline draughts, where an alkali was not required; and the advantage attendant upon their exhibition when it was. Dr. Prout, and others who are best able to give an opinion upon it, declare that this is the case[b]; and they frequently give a saline draught, for the purpose of administering an alkali. It is judged advisable, in these cases, to take care that the water which the patient drinks be not hard,—does not contain salts of lime; although water, for the most part, is one of the best beverages which people, in these circumstances, can take. I stated[h] that neutral salts should be given from time to time.

Patients, in this condition, sometimes discharge a quantity of powder, like "fuller's-earth." It is certainly true that, in this state, a vast secretion of lithic acid[c], or lithate of ammonia[d], occasionally takes place in the kidney; and then the irritation is altogether relieved. It comes on in fits;—just like the gout. Some have attempted to bring on a secretion of this earth, by artificial means. For this purpose, some give turpentine and opium, in small doses; and some give onions and leeks steeped in gin, wild carrot, and other herbs. Dr. Prout says, that he has seen great benefit produced by these substances.[e] I mentioned, when speaking of diabetes, that opium has undoubtedly the power of increasing the quantity of lithic acid[f]; and therefore it has been employed where a copious discharge of lithic acid was required all at once;—a *liberation*, if I may so say, of the sediment. But a purgative should be given in conjunction with the opium; because, although the latter may do partial good by exciting a discharge of lithic acid, yet it may do harm by confining the bowels;—to which state they are much disposed. In such a case as this, if the patient be very bad indeed,—if he have violent pain in the kidney, great feverishness, pain down the ureter, and about the neck of the bladder,—we must treat it as nephritis and cystitis;—particularly by cupping him on the loins. We shall find it serviceable to put him in a hot-bath, to purge him well, and to give him colchicum, alkalies, and opium.

b. Oxalate-of-Lime Diathesis.

Symptoms.—In cases where the disposition is to form *oxalate-of-lime*, or "mulberry-calculi"[d], the urine is likewise acid. A state of the system, similar to that last described[g], takes place; and a similar mode of treatment is required.[h] The "mulberry-calculus", like the lithic acid, occurs in both sexes; and at all ages up to fifty. It is about fifty that it is most frequently seen; but it is, I believe, never formed after sixty years of age.

[a] "Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge." Volume 3; Pages 339 to 341.

[b] Dr. Prout, on Stomach and Urinary Diseases. Book 1; Chapter 3; Section 3; Subdivision 6. (Third Edition; Page 221.)

[c] See Pages 1134 and 1138.

[d] See Page 1139.

[e] Dr. Prout, on Stomach and Urinary Diseases. Book 1; Chapter 3; Section 3; Subdivision 6. (Third Edition; Page 228.)

[f] See Page 1130.

[g] See Pages 1142 to 1144.

[h] See Page 1144.

The " lithic-acid calculus " and its compounds, occur in persons who are very dyspeptic, and who are disposed to be feverish and irritable; but the " mulberry-calculus " is continually produced in persons who have nothing else the matter with them; and, when produced, it may be discharged. The " lithic-acid calculus " and its compounds (as I stated) have been formed to the amount of two thousand (of all sizes) in one individual [a]; but the " mulberry-calculus " seldom occurs more than once in a patient's life; or if it does return,—that is to say, if another be produced,—it is generally after a very long interval. The urine, in this state of things, is pretty good, and remarkably clear. The *amorphous* sediment of the oxalate-of-lime [b], is a very rare thing indeed; and as to the *crystallized* sediment of oxalate-of-lime [c], that is still more rare. A calculus of this description, often acquires an immense size in the bladder; and it does not appear to be produced accidentally. The lithic-acid or the phosphatic calculus [d], will be produced accidentally, when there is a clot of blood, or a foreign substance has been introduced into the bladder; but this depends upon a peculiar state of the system, which is not understood;—a peculiar diathesis, which appears unconnected with external circumstances. It sometimes *follows* the deposit of a lithic-acid calculus, and is sometimes *succeeded* by it; but nothing is more common than to find it alone. It sometimes happens, that oxalic acid ceases to be formed, and lithic acid is produced in abundance; and then the deposition in the external part of the calculus is lithate of ammonia [e], instead of oxalate of lime. I have myself known several persons discharge a calculus of this kind. They have been perfectly well; but have suddenly been seized with violent pain in the kidney; which has continued some days,—perhaps only for some hours, and sometimes only a few *minutes*. The pain has shot down towards the bladder, and then ceased; and after a few days, in passing their urine, they have been surprised by something making a noise in the *pot-de-chambre*. Sometimes there has been violent irritation; with all the ordinary symptoms of a stone in the bladder. The stone has escaped; and then they have been perfectly well, and have had no return. I know several persons, in whom this happened many years ago; and who, ever since, have been in perfect health.

Treatment.—The *treatment* here, as the urine is acid, is exactly the same as for the lithic-acid diathesis [a];—that is to say, if there be any inflammatory state of the system, we must suppress it by the ordinary antiphlogistic means. If no inflammatory state can be discovered, still we must put the patient on an antiphlogistic plan. Dr. Prout suggests the propriety of changing the *oxalic*-acid diathesis for that of the *lithic*-acid, by exhibiting muriatic acid. It is merely a suggestion; and I do not know that it is founded upon practical experience.

c. Cystic-Oxide Diathesis.

The *cystic-oxide* diathesis is a very peculiar calculus; and the state of the body in which it is formed, is not known. This calculus is generally supposed to originate in the kidney.

Treatment.—The *treatment* of the case, would depend upon the circumstance of the urine being *acid* or being *alkaline*. If it be acid, we must treat it in the way I have mentioned [a]; if it be alkaline, then we must treat it as I shall hereafter mention.[f]

[a] See Page 1144.
[b] See Page 1136.
[c] See Page 1138.
[d] See Pages 1138 and 1139.
[e] See Page 1139.
[f] See Page 1149.

Prognosis Unfavourable.—Dr. Prout thinks that, in this diathesis, the prognosis is unfavourable[a]; for, in most instances, the kidney has been found diseased; and, in others, there has been an inveterate hereditary tendency to disease of the urinary organs. It appears to be a very exclusive diathesis; for it is found with no other deposition in the urine. There is no other calculous matter *within* this, as a nucleus, or *without* it;—except the phosphates, which are the effect of irritation. The calculus is sometimes incrusted with the phosphates; but that is the result of mere irritation,—not of a disposition to disease.

d. Phosphatic Diathesis.

Symptoms.—We have now to consider a far worse state of the system;—that in which the *phosphates* are deposited[b]; and which has been called "the *phosphatic*" or "the *earthy* diathesis." Here every thing is the reverse of what I stated to be the case, where the tendency is to lithic acid or oxalate of lime.[c] The urine is not scanty and high-coloured, but copious and pale; and often it is greenish.[d] On looking at the urine, we may tell what is the state of the parts. We may say that the individual has a phosphatic calculus in the bladder, or is depositing phosphatic sediment. The urine is of lower specific gravity, than in the cases I have already considered[e]; and lower than it is naturally. It is in these cases that the urine very soon putrefies. Sometimes we cannot keep it a day before it is quite putrid;—smelling strongly of ammonia.[d] Frequently, at the top of it, we have an iridescent and white pellicle; which consists of the phosphates, with (I presume) a little mucus. The sediment may be either pulverulent (or "amorphous")[f],—being a mixture of the phosphate of lime and triple phosphate; or it is crystallized[g]; and then we have the triple phosphates only, in white glistening crystals. The two chief calculi found in the bladder, are the "triple phosphate" (the ammoniaco-magnesian phosphate)[b], and that with a mixture of the phosphate of lime[b]; and in that case it is white, is not crystallizable, is friable, leaves a white mark on any thing it is rubbed against, and is very fusible.[h]

This phosphatic disposition, and these phosphatic concretions, are very rarely original. They generally occur subsequently to the formation of other calculi; and subsequently, in general, to the lithic-acid or oxalate-of-lime diathesis.[i] The way in which it usually takes place, is this:—the red sediment becomes a fainter red; and, from the phosphates being more and more formed, it becomes paler and paler, till we have a clay-colour; and then, at last, the phosphates only are formed;—the lithic acid and lithate of ammonia being no longer deposited. The urine then becomes more abundant,—does not shew such strong signs of acidity; and, at last, there is no acidity whatever. On the contrary, perhaps, it is even alkalescent; though that is rare when it is first made. Ultimately, however, (as I have already said,) it very soon putrefies[d]; and in that case it is very alkalescent;—affecting turmeric-paper a short time after it is voided, and depositing spiculæ of the triple phosphates.[k]

The two sediments of the phosphates,—the sparkling glistening crystals[l],

[a] Dr. Prout, on Stomach and Urinary Diseases. Book 1; Chapter 3; Section 4. (Third Edition; Page 239.)
[b] See Page 1139.
[c] See Pages 1143 and 1145.
[d] See Pages 1136 and 1138.
[e] See Pages 1143, 1145, and 1146.
[f] See Page 1136.
[g] See Page 1138.
[h] See Page 1140. ("Fusible Calculus.")
[i] See Pages 1143 and 1145.
[k] See Page 1137.
[l] See Pages 1137 and 1140.

and that in which there are no glistening crystals, but with which the phosphate of lime is mixed [a],—sometimes alternate. The same individual will, for a day, or a week, or perhaps a fortnight, deposit glistening crystals of the triple phosphate; and then, at other times, those which do not glisten at all; and sometimes the latter alternate with lithic acid; but then the lithic acid is very pale,—verging to the phosphates; and sometimes, before it gives way to them, there is an alternation of the two. If there be a great deal of crystallized phosphate, then the urine is very alkalescent. The urea is very copious; and crystals are sometimes formed, before the urine is discharged from the bladder. This deposition usually takes place after the urine is made; but, in bad cases, it will take place before it is voided; and the instant the urine is made, the deposition subsides to the bottom of the vessel.

In the second phosphatic sediment,—that in which there is a mixture of the triple phosphate and the phosphate of lime [a],—although the symptoms are similar, as well as the state of the urine, yet they are both far worse than in the first state. In this condition of the body there is no inflammatory state. There are no marks of inflammation; but there is a morbid irritability. There is a bad expression of countenance;—shewing distress,—shewing something wrong in the system. The patient is generally sallow and languid; and experiences pain in the loins. There is generally more or less dyspepsia, and some abdominal derangement. Very frequently, there is a want of sexual power and desire; and when a person complains of that, it is always right to examine the urine. In many cases, we shall find diabetes; in many others, an excess of urea; and in others, again, not only an excess of urea, but likewise a deposition of the "triple phosphate." [b] The urine will vary on different days, and at different times on the same day;—being at times copious, and at others less so.

Causes.—Many of these cases have arisen from an injury of the loins; and they arise, too, from the depressing passions,—from any thing that exhausts the vital powers. In some instances, they appear to have arisen from masturbation, or from excessive venery. Any local irritation, whether in the bladder or in the urethra, will produce them; and therefore this diathesis is rarely found in the kidneys. We generally find no marks of disease in the kidney; but usually in the bladder. When a lithic-acid calculus descends to the bladder, it usually produces irritation; and then the phosphates are produced. The bladder is often diseased, from various causes; and frequently it is inflamed;—so that these calculi appear to be far more frequently formed in the *bladder*, than anywhere else. They have been formed from an irritation in the urethra, reaching to the bladder; but generally it is an irritation of the bladder itself that produces them. Urine having this deposition, has continually been seen after an injury to the spine. After these injuries, therefore, and in diseases of the spine independent of mechanical violence, surgeons expect to find such urine; and, on examination, they generally do. Stricture of the urethra will induce this description of urine. It seems not only to act by irritating the *bladder*, but it also affects the *kidneys*;—causing them to give origin to urine imperfectly acidified. Great irritation,—whether it occurs in the bladder or in the urethra,—gives a tendency in the kidneys to produce urine with a deficiency of acid; and if it be deficient of acid, the phosphates are usually deposited in the way I before mentioned [c];—from the decomposition of the urea, and the production of other things.

[a] See Page 1140. ("Fusible Calculus.")

[b] See Page 1139.

[c] See Page 1137.

Treatment.—In this diathesis, we must not keep the patient low, or bleed him. On the contrary, we must give meat, if he will bear it; and even allow malt-liquors. Although, perhaps, wine may (in general) be too irritating, yet acescent wine is good. The tendency is to alkalescency; and, if it do not disagree with the stomach and intestines, wine should be taken. Acids themselves are proper;—especially *citric* and *muriatic* acid. Mercury acts here as a poison. If we give mercury, in nine cases out of ten we shall find the urine become more alkalescent, the patient's pulse will become irritable, and all the symptoms about the urinary organs will be aggravated. Opium is required freely,—in order to lessen the irritation. The sulphate of quinine, or a decoction of bark, has been exhibited with the greatest advantage; and iron is frequently useful, though occasionally it is too stimulating. These things must be exhibited with regard to individual cases, as well as on general principles. Saline purgatives, of whatever kind, are improper; for as they consist of an alkaline earth and a vegetable acid, and the latter is decomposed in the system, we are actually giving an alkali [a]; which makes things worse. Saline substances produce great irritation;—such as cannot be borne. It is best to give mild aperients (such as "confectio sennæ", and castor-oil), in moderate doses; so as not to irritate, but merely to prevent an accumulation in the intestines. A small quantity of muriatic acid will be found sufficient;—five drops will produce a specific action on the urine; but ten or twenty may sometimes be required. There is no difficulty in ascertaining whether one particular treatment is proper or not; for the state of the urine will always determine that point. It is always right to employ litmus-paper, stained red; for, in proportion as the urine is alkalescent, it will restore the original colour; and (as I mentioned before [b]) it constitutes a far more delicate test than turmeric-paper.

Ascertain the Condition of the Urine.—It is the state of the urine which determines all the treatment. Whether there are signs of a calculus in the kidney or not,—whether there are signs of a calculus in the *bladder* or not,—whether there are any of the sediments which I have now mentioned [c] or not,—whether the person is going to be lithotomized, or has been already submitted to that operation,—the urine should be carefully examined; for we have to treat the case in all these circumstances. Where a calculus has been removed, we still have to remedy the condition of the system which gave rise to it; because that condition does not cease on the extraction of the stone. We should examine the urine which is passed first in the morning; because that is the least liable to be influenced by accidental circumstances, and therefore the most likely to shew the actual state of the system. It should be put away for twenty-four hours;—in order that we may make a perfect examination. In many cases, we may ascertain the point immediately; but the urine should be allowed to remain and cool; and the sediment, if there be any formed, will then be deposited. This kind of treatment is continually required after lithotomy, or the removal of stones in any other way; and, from the want of making a careful distinction,—from the habit of giving alkalies when there is any thing the matter with the urinary organs, infinite mischief is done. It is far better for nothing to be done, than to do something wrong; and mistakes, till very lately, were made every day,—almost every hour, in the treatment of these cases.

[a] See Page 1145. [b] See Page 1136. [c] See Pages 1143 to 1148.

SECTION IV.—CALCULI IN THE BLADDER.

Symptoms.—The formation of calculi is called "lithiasis" (from λιθος, *a stone*). When there is a stone in the bladder, the symptoms produced are usually a particular pain at the end of the penis;—a pain which the patient describes as "a *benumbing* pain", and which is increased upon exertion. This pain makes the patient pinch the penis as hard as he can; and if he feel a sudden call to make water, he usually puts his hand to the end of the penis; and children are in the habit of pulling the prepuce. There is a frequent desire to make water, and the stream suddenly stops;—the desire to make water, however, being still urgent. Sometimes a change of posture will cause the urine to flow again. Sometimes the urine, instead of suddenly stopping, will come away drop by drop;—the discharge being attended with great pain, and perhaps with blood. There is pain in the bladder itself, especially on motion; and likewise pain and tenesmus on evacuating the intestines. If the calculus be large, or very rough, there is pain in the neck of the bladder, pain and numbness of the testis of the same side, and pain of the inner part of the thigh, along the course of the anterior crural nerve, and sometimes down to the foot;—so that there is actually pain in the sole of the foot. All these symptoms are rendered worse by exercise.

Diagnosis.—Pain at the end of the penis, pain increased on motion, and increased whenever the desire to make water comes on, a frequent desire to pass urine, a voiding of it drop by drop, tenesmus, and the presence of blood in the urine,—all these symptoms may occur when there is no stone whatever. In the course of my life I have had every one of these symptoms, two or three times over, from mere inflammation about the neck of the bladder. The sudden stoppage of the stream, is the sign most to be depended upon. Disease of the prostate, and inflammation at the neck of the bladder, will cause many of the other symptoms. Dr. Heberden says that the pain on voiding the urine is felt *after* making water, in the case of *stone in the bladder*; and worse *before* passing it, in the case of *diseased prostate*; and that in the latter case it is not increased on motion.[a] I believe this is a general fact. The obvious reason why the pain is increased on motion, in the case of a stone in the bladder, is this. The stone is moveable, and may therefore come forcibly in contact with different parts of the organ, by motion; whereas the prostate is fixed. However, the prostate is rarely diseased, except in the case of old men. Dr. Heberden says, that even pain and swelling of the testes are sometimes observed in disease of the prostate.[a] But we may always ascertain whether the prostate is diseased, by passing our finger up the rectum, and observing whether it is enlarged; and the certain way of ascertaining whether there is a stone in the bladder, is to sound the patient. In the latter case there is frequently secreted a large quantity of ropy mucus; which may be drawn out to a considerable length, and which subsides to the bottom of the vessel, in the form of a white tenacious mass. Occasionally, a small fragment of a calculus comes away; and when all the symptoms have become violent,—whatever deposition there formerly was in the urine,—whatever was the diathesis before, it now becomes phosphatic.[b] The urine becomes pale and copious; it loses its acidity, and has great alkalescency; and if there be

[a] "Medical Commentaries"; Chapter 75. [b] See Page 1147.

any deposition at all, it consists of the phosphates. In this state of things, the agony becomes constant; the patient becomes emaciated; and death ensues. The phosphatic diathesis and the sufferings are proportionate to each other.

Morbid Appearances.—After death, the bladder is found to be diseased. The mucous membrane becomes diseased; the muscular fibres are enlarged; and perhaps even the kidneys are affected.

Cessation of the Symptoms.—This state of things may generally be prevented by the removal of the stone by a surgical operation; and sometimes it fortunately ceases, from a sac being formed in the bladder. The muscular fibres give way, and the inner coat protrudes between them. Not that the muscular fibres *rupture*; but the inner coat gets between the bundle of fibres; and we see externally, on one part of the bladder, a small protuberance;—consisting simply of mucous membrane internally, and peritonæum externally. Sometimes, if the calculus be rough, the symptoms are diminished by the deposition of the phosphates. Although the phosphates are in general produced by irritation, yet they fill up the interstices between the prominences of the calculus, and so render it smoother than it was before; and, in this way, the symptoms are sometimes alleviated.

Symptoms sometimes Absent.—But it is to be remembered that, although a stone *may* produce all these symptoms, yet it does not *necessarily* give rise to them. If the calculus consist of lithic acid, it may be small and quite smooth; and then it may give very little trouble. Indeed, such a calculus has been found after death, when its presence was not at all suspected. The health is sometimes very good, in such cases; and if that be the case, and the patient does nothing calculated to injure him, a calculus of that kind may not increase. A calculus may continue in the bladder for many years without any increase;—provided the person does nothing unfavourable;—that is to say, does not commit any excess,—does not increase the feverishness;—provided he adopts a moderate antiphlogistic plan. Dr. Prout knew a case, in which the presence of a stone in the bladder was ascertained by sounding; and, five or six years afterwards (at the time he mentioned it to me), the patient experienced little or no trouble from it; and frequently, for weeks together, the patient forgot that he had a stone in the bladder, or any thing the matter with him. But the case had been well managed; and the patient had been put on a moderate antiphlogistic regimen,—such as I before mentioned.[a] Dr. Prout also mentioned to me, that he knew a case where four renal calculi existed in the bladder five months, without producing any severe symptoms; and then a little irritation occurred at the neck of the bladder, which led to their removal; and yet one of them was nearly an inch in length. These, however, were *lithic-acid* calculi.[b] The *oxalate-of-lime* calculus[c] (if it be of any size) causes extreme suffering, and so also do the *phosphatic* calculi[c]; and for them an operation is indispensable. No regimen will answer the purpose here;—provided things have not gone so far, that a surgeon would not listen to the operation. Of course, the *nature* of the operation must be determined by the surgeon;—whether it is to be the removal of the stone by cutting, or its reduction within the bladder, or dilatation of the urethra, or any other plan.

Discharge of Calculi from the Urethra.—In the male, calculi of really

[a] See Page 1144. [b] See Page 1138. [c] See Page 1139.

considerable size are sometimes discharged; and instruments have been formed to dilate the urethra;—so as to bring them away without any incision; but these are *lithic-acid* calculi. Nature very frequently discharges them herself. This occurrence takes place far more frequently in the *female*, however, than in the *male*; and much larger calculi have been brought away, both by nature and by artificial dilatation. One which weighed as much as twelve ounces has been discharged by a female. These are very extreme cases. On account of the shortness of the urethra, it is very common for females to pass calculi, by an effort of nature; and it does not appear that females are, by any means, so subject to the complaint as males.

Vesical Irritation Favours the Deposition of Phosphates.—When the suffering has been very great, and an operation has at last been performed, it is generally found that the calculus is, externally, of a phosphatic kind; but an entire phosphatic calculus is rarely seen. In this state of things (when the phosphatic diathesis exists) the kidney is at first affected only functionally. From irritation of the urinary organs, it secretes morbid urine,—urine which has an excess of urea; together with a tendency to a phosphatic deposition; but, at last, actual structural disease of the kidney takes place. If the kidney could be preserved in a state of functional health,—if it could be made to secrete proper urine, it is probable that, although a stone existed in the bladder, it would not increase, even around an accidental nucleus. But the accidental nucleus produces irritation; that irritation is communicated to the kidney; the kidney secretes morbid urine; from this morbid urine deposition takes place; and so the calculus increases. The moment the urine becomes unhealthy, then a deposit takes place; and the mischief goes on increasing. Frequently, at its origin, the disease does not depend upon any external circumstance; but there is a real disposition to these morbid deposits; which disposition gives rise to them, and they go on increasing, till a calculus is formed. But if, by chance, any thing—such as a piece of bougie or a drop of blood—gets into the bladder,—so as to form a nucleus, this, by inducing irritation, will cause a calculus to form round it. If, by art, we could keep the urine healthy, it is supposed that a calculus would not be formed;—that the nucleus would not serve for any thing to collect around.

Calculi do not Increase Regularly.—It does not appear that a calculus goes on increasing regularly. The urine is not always equally morbid; the irritation is not always equally felt; and external circumstances are not always equally unfavourable. The patient neglects himself, from time to time; or some unfortunate occurrence takes place. Sometimes a calculus has been known to increase very much, and the state of the urine to become more and more morbid; and then, again, the process has been exceedingly slow. There is another reason to make us suppose, that the deposition is not constant. Many calculi have a laminated structure; and between the laminæ they appear to have suffered some diminution. There is a space there; and they frequently look as if they were worn by water moving around them. The occurrence of separate laminæ, indeed, is considered to prove their irregular deposition.

Age most Favourable for Lithotomy.—It is not only where there is great suffering, or where the urine has become phosphatic, that an operation is proper, provided the case is not too far gone; but if the patient be below puberty,—even although the sediment is not phosphatic; but is red, and consists of lithic-acid and lithate of ammonia,—then it is considered that the

calculus should be removed. If the individual be below puberty, there are many chances to one of the calculus increasing, and giving further trouble; and, though the patient may not be suffering much, it is generally best to to extract it.

Mortality from Lithotomy.—Lithotomy is considered to be less dangerous in children, than in adults. It was found at Norwich to be four times less so. Generally speaking, the ratio of mortality, from lithotomy, is about one in seven and three-quarters; but in Norwich it is said to be less than anywhere else; so that, for forty years, Dr. Marcet found that the average of mortality there was but one in eleven and three-eighths;—before puberty one in eighteen; and after that period one in four and three-quarters. Nearly one-half of the cases of stone in the bladder, are found to occur before puberty; and then there is an increased number again after forty; and but one female was affected with stone in the bladder, for twenty-three males. Some ascribe this to the quiet habits of females,—to the circumstance of their not being subject to laborious exercise; and others ascribe it to the shortness of the urethra. The latter circumstance must have great influence; but, in all probability, there is less disposition in them to the disease.

These are the only considerations for the *medical* practitioner. With the performance of the operation, I have nothing to do. All that we have to give an opinion on, is the condition of the urine;—taking into consideration, when contemplating an operation, the suffering and the age of the patient.

CHAPTER IV.

DISEASES OF THE BLADDER.

SECTION I.—CYSTITIS.

Symptoms.—The urinary bladder is, of course, subject to inflammation; and this disease is called "cystitis."[a] The symptoms are a burning and throbbing pain in the hypogastrium; tenderness on pressure; a very frequent desire to make water; and a most horrid pain at the neck of the bladder, while the urine is passing;—so that the patient, perhaps, can only void it on his knees. The urine is made in a very small quantity, perhaps every ten minutes; and it is often high coloured,—perhaps bloody. There is also tenesmus.

Causes.—This affection is induced by turpentine, cantharides, and other things which peculiarly irritate the urinary organs; but more particularly by gonorrhœa. The inflammation of the urethra spreads inwards;—producing inflammation of the bladder.

Treatment.—The treatment is simple, but requires to be put into practice vigorously.

SECTION II.—CYSTORRHŒA.

Symptoms.—The bladder is subject to *chronic* inflammation; and it is still more subject to an affection of the mucous surface; in which affection there is a great discharge of ropy mucus,—such as occurs when a calculus exists in the organ, and causes great suffering. There is not only this quantity of ropy mucus secreted; but the mucous membrane itself becomes hypertrophied. As much as several pints of this ropy mucus have been known to be discharged in a day; but it is very common indeed for a pint to be discharged. It subsides to the bottom of the vessel, and is quite white. It sometimes blocks up the urethra; so that a little difficulty is experienced, from time to time, in making water; and at last it is really purulent. This affection is called "cystorrhœa."[b]

Morbid Appearances.—After death, if the disease prove fatal, there is frequently a thickening of the mucous membrane to a great amount. The muscular fibres are seen distinctly; and, in some parts of the bladder, are very much developed. It would seem, indeed, that those muscular fibres described by Sir Charles Bell, and which run from the extremities of the ureters, become hypertrophied;—so that, at the orifice of the bladder, there is a triangle; the sides of which run from the mouth of one ureter to that of the other, and from both to the mouth of the bladder. We sometimes may pass our finger down half an inch;—so great is the development.

[a] From "cystis", *the bladder* (from κυστις, *a bag*); and "itis", *inflammation.*

[b] From κυστις, *the bladder*; and ρεω, *to flow.*

Treatment.—The treatment of a case of this kind must be antiphlogistic;—so far as the patient's strength will allow. The frequent application of leeches is proper; and if there be no excessive irritation, but more discharge than any thing else, turpentine in small quantities has been occasionally used with advantage; and so has "uva ursi." We may put an ounce of the latter to a pint and a half of water, and boil it down to a pint. Cubebs, likewise, have been occasionally serviceable. These cases, however, taken altogether, are very bad; and, in a large number of instances, a stone exists in the bladder; or there is a stricture, which gives rise to this irritation; as well as to hypertrophy, or disease of the prostate. If the urine be alkalescent (deficient of acidity), it may be well to give acids and narcotics, in order to lessen the irritation; and, for this purpose, we may give conium, opium, and hyoscyamus. But when the mucous membrane becomes hypertrophied, and there is secretion to such an amount as this, we can do little more than afford temporary relief.

SECTION III.—STRUCTURAL DISEASES OF THE BLADDER.

Hypertrophy.—So greatly disposed to hypertrophy are the muscles of the bladder, that no other muscles of the body (it is said) are so increased by exercise;—that is to say, if any difficulty exist in the passage of the urine, or there be any irritation about this part,—so as to make the bladder contract frequently, no other muscles grow to the same amount. Indeed, in some cases, the inner part of the bladder looks like the inner part of the heart. The muscular fibres and the mucous membrane are so developed, that, at first sight, we might think it was the right ventricle of the heart. The mucous membrane is often softened, both when it is hypertrophied, and when it is not. Sometimes the villi and the follicles are so apparent, that we perceive them instantly; though naturally they are so minute, that we cannot see them. The cellular membrane is frequently hypertrophied, so that the bladder will become hard; and if a sound be passed into it, the hardness is discovered. The mucous membrane is sometimes enlarged;—so that it presents the appearance of a polypus.

Fungous Excrescences.—Sometimes fungous excrescences, of a cancerous or encephaloid nature, take place. I formerly mentioned a case of this kind, where encephaloid deposit gave rise to hæmorrhage, which destroyed the patient.[a]

Scirrhous Tumours.—Scirrhous tumours are found in the bladder. They are sometimes original; and sometimes connected with disease of other parts;—with a diseased rectum, or a diseased uterus.

Cysts.—A cyst has sometimes been found in the organ. It is almost always connected with its internal surface; and, in that case, is most probably a mere sacculus.[b] A sacculus, however, may be formed originally; and it may become so very large, as to be the same size as the bladder itself. The bladder has sometimes been divided into two chambers, by adhesions extending across.

SECTION IV.—PARALYSIS OF THE BLADDER.

Symptoms.—The bladder is frequently the subject of palsy. When a person labours under paraplegia (a loss of power of the lower extre-

[a] See Page 228.

[b] The diminutive of "saccus", *a bag*.

mities)[a], he is generally unable to retain his urine. At first he is unable to make water; so that it continually requires to be drawn off. This we see in paraplegia from accident. After a time, however, the "detrusor urinæ" muscle loses its power, and then the sphincter also becomes paralyzed; so that the patient cannot *retain* his urine.[b]

Causes.—These parts are much disposed to become diseased in old men;—just as the uterus and the ovaria are disposed to fall into disease in old women. When the prostate and the parts of generation have done their duty, they fall into a diseased condition;—just as similar parts do in women. The bladder suffers with the rest; so that old men are frequently unable to sit like young ones, and will be obliged from time to time to go out of the room. Sometimes this will occur from accidental circumstances. I have known paralysis of the bladder occur from an opiate injection. This is worth knowing. From having a suppository, or an injection of opium, the bladder has become paralyzed; so that it has been necessary to draw the water off; and this has occasioned much alarm. On a repetition of the injection, the bladder has become so torpid, that actually retention of urine has occurred. Sometimes it is produced by a torpid state of the system,—where the head is oppressed. It is a thing which frequently occurs in fever; and sometimes, without any obvious reason, the bladder loses its power;—just as any other part of the body may do.

Treatment.—If there be no disease of the spine, no organic disease of the bladder, no inflammation,—nothing more than the simple paralysis, without our being able to trace it to any thing more than torpidity,—then cantharides is one of the best remedies. So, perhaps, is electricity; and any thing else that is stimulating.

Stillicidium Urinæ.—The bladder may be in this state while the urine is dripping away; for when the organ is distended to a certain amount, the urine will pass (*guttatim*) involuntarily. This is called "stillicidium urinæ."[c] The patient will tell us that he cannot hold his water; while, in fact, the bladder is full, and can hold no more. It is therefore necessary, in these cases, to ascertain the condition of the bladder. Very frequently it happens, that this form of paralysis takes place temporarily. If a person do not make water in proper time, he loses the power of voiding his urine, and distension is no longer felt. The muscles have no longer power to empty the bladder, and it remains greatly distended; although the urine is constantly coming away. When we are told, therefore, that a person cannot hold his water, we have to ascertain whether he is not holding too much, and cannot hold any more.

SECTION V.—DISEASE OF THE PROSTATE.

Symptoms.—With regard to disease of the prostate itself, we may be continually consulted upon it; as it occurs so frequently in old men. From the pressure, there is frequently a great difficulty in making water; and sometimes it acquires so very large a size, that there is difficulty even in going to stool. There is pain there; and the abdomen, at last, falls into a state of disease; and death is frequently the consequence.

Morbid Appearances.—After death, we shall find the prostate full of large cells. It is very much hardened; and perhaps it has acquired an immense size. This may be ascertained during life, by the introduction of

[a] See Page 755.
[b] See Page 1118.
[c] "Stillicidium" is derived from "stilla", *a drop*; and "cado", *to fall.*

he finger into the rectum. Calculi frequently come from the prostate; and hey are sometimes found, in very large quantity, in the cells of that gland.)ccasionally they will grate against a sound, when it is passed on towards he bladder. They are generally small,—sometimes exceedingly so; and re always, I believe, found to consist of phosphate of lime.[a]

Treatment.—With regard to the *treatment* of disease of the prostate, we ave chiefly to resort to surgery;—drawing the water off regularly. On ccount of the great pain, however, it is sometimes necessary to employ arcotics; and I think it would be worth while, in such cases, to give iodine fair trial;—to rub in iodine and hydriodate of potassa externally, and to ive it internally. I have not had many opportunities of treating such cases, ecause they generally fall to the surgeon; but I have treated them occaionally; and temporary benefit has ensued. I have had two or three atients, in whom there appeared to be a temporary alleviation of the comlaint; and if any thing would afford temporary relief, it would be iodine. do not know whether it would *cure* a case of this description; but I hould expect to do more good by it than by any other remedy.

[a] See Page 1141.

BOOK VII.

DISEASES OF THE FIBROUS TISSUES.

CHAPTER I.

GOUT.

I HAVE now finished the consideration of diseases of the urinary organs;—so far as it is incumbent on me to treat of them. I will now speak of an affection, which is very much connected with disease of the urine; although it is another complaint. I refer to *gout*. When persons have the gout, I am never surprised if they have stone;—gout and stone so frequently go together; though gout is a disease which, in the first instance, affects the joints.

Etymology and Synonymes.—It is called "the *gout*" from the Latin word "*gutta*", or the French word "*goutte*";—which, in its turn, comes from the Latin word "*gutta*",—*a drop*. It is so called because it was supposed to arise from a deposition of *drops* from some morbid fluid in the joints. In Latin it is now generally called "arthritis",—"inflammation of the joints."[a] In the classics, it is spoken of under the head of "podagra", when it affects the *feet*[b]; "chiragra", when it affects the *hands*[c]; and "gonagra", when it affects the knees[d]; but all these "*agra*" are comprehended in the term "*arthritis*." Although this term means "inflammation of a joint" from *any* cause, yet it is now appropriated solely to *gout*.

Mode of Invasion.—When this affection makes its first attack, it generally begins at two or three o'clock in the morning;—just at the time that a fit of asthma commences; as, indeed, do some other diseases. Usually it first attacks the ball of the great toe. The patient wakes in the most excruciating pain. He then becomes feverish; and continues in this state till the next midnight; when the pain remits. The following morning, he finds his toe swollen and reddish; and he has exacerbations of the pain for several days and nights. The disease then frequently declines; the patient perspires freely. The cuticle of the part attacked, desquamates; there is violent itching for some days; and then there is an end of the business.

Peculiarity of the Pain.—The pain, in gout, it not only very severe, but is also of a very peculiar kind. Sydenham, in writing of his own sufferings, compares them to the gnawing of a dog; and patients who have suffered from it extremely, say they can distinguish between the pain of gout and that of rheumatism.

Progress.—After a time, sooner or later, the same thing occurs again.

[a] From αρθρον, *a joint*; and "itis", *inflammation*.

[b] From πους—ποδος, *the foot*; and αγρα, *a seizure*.

[c] From χειρ, *the hand*; and αγρα, *a seizure*.

[d] From γονυ, *the knee*; and αγρα, *a seizure*.

Perhaps the disease attacks the balls of *both* great toes; perhaps it flies from one to the other; and perhaps it affects the hands, the knees, or the wrists. So also it will shift its place, during the same attack;—running from one knee to the other, from one wrist to the other, from one ankle to the other, from the hand to the feet, and *vice versâ*. The more frequently it comes, the less probability is there of its being confined to the fingers or toes; and the more likely is it to spread to the ankle, to the wrist, or even to the elbow and other joints: perhaps the shoulder becomes affected. But it begins at first in the smaller joints, and affects them to the last;—going to the others only occasionally. Generally the intervals between the attacks grow shorter;—the patient has fits more and more frequently; and they often last longer. The joints, at last, may become stiff; and deposits will take place under the skin; so that the joints of the fingers and toes become enlarged, swollen, and harder than is natural. Occasionally a solid deposition of a white substance takes place, and sometimes it is fluid;—so that if we prick the part (which is soft) with a needle, we squeeze out a quantity of matter, like soft mortar. Not unfrequently there is a nephritic attack[a]; with a deposition of lithic acid, or some compound of it.[b] Occasionally these things take place with the gout; occasionally they take place only during the intervals; but a deposition in the urine, and a fit of the gout,—where there is a deposition in the joints,—are frequently very closely connected.[c]

Improves the General Health.—After the attack, people are generally better than they were before. They find it does them good; and therefore they are not at all sorry that they have had the disease. Many persons long for a fit of the gout, when they have not had it before. They say that gout is in the family; and that if they had an attack, they should do well. Those who *have* had it, if any thing be the matter with them, are satisfied that they should be a great deal better, if they had another attack; and many people try to bring it on.

Premonitory Symptoms.—Before the attack, there is frequently indisposition of some sort;—the symptoms that I mentioned under the head of "disorder of the digestive organs."[d] There may be languor, or lowness of spirits, or pain of the head, or wandering pains (*gouty* pains) coming and going in the larger or smaller joints. Sometimes there are palpitation and giddiness;—functional diseases, in short, in almost every part of the body.

Varieties of Gout.—If these symptoms exist for some time,—so that the patient really feels himself diseased, the disease is called "*atonic* gout",—gout without strength[e],—gout where there is not sufficient strength to bring it out. A gouty disposition exists; but there is not activity enough in the system to bring it forward. Sometimes, when the gout has come on in a very satisfactory manner, it will suddenly cease. It will not retire to another joint, but will suddenly cease altogether; and the patient will have some internal affection;—perhaps apoplexy, perhaps violent vomiting, perhaps gastrodynia, or perhaps violent colic. It will be some severe internal disorder; and it is then called "*retrocedent*[f] gout." Sometimes the affection within is of an inflammatory nature; and then it is called "*misplaced* gout"; but it is no matter whether we call it "retrocedent" or "misplaced"; for inflammation is very often ascribed, by old authors, to

[a] See Page 1111.

[b] See Pages 1138 and 1139.

[c] Lithic acid, developed principally during the mal-assimilation of the albuminous textures, may be considered as the characteristic feature in gout.—*Dr. Prout, on Stomach and Urinary Diseases. Book* 1; *Chapter* 3; *Section* 3; *Subdivision* 4. (*Third Edition*; *Page* 210.)

[d] See Page 1082.

[e] From α (privative); and τονος, *strength*.

[f] From "retrocedo", *to go back*.

some nervous affection, or to something else. We have only to consider that, if the gout does not come out satisfactorily, it is "*atonic* gout"; whereas, if it suddenly cease, and an internal part is affected in a violent degree, it is "*retrocedent* gout" or "*misplaced* gout", according to the affection that is going on.

Symptoms Relieved by Gout.—Some persons have had very extraordinary symptoms relieved by gout. I knew a gentleman who had had pain of the stomach (gastrodynia) for many years. I know not *how* many years it was; for he did not attend to it much; but at last a fit of the gout came on; and he has never experienced the pain since. Palpitation, after existing for a long time, has frequently ceased upon the occurrence of a fit of the gout. Strangury, cystorrhœa, piles, and almost every disease that can be mentioned, have ceased on the appearance of gout. Sometimes they alternate with gout; and if such affections be very violent indeed, then they may be called "misplaced gout"; for they have come on when gout should have appeared.

Predisposing Causes.—The disease, at first, most frequently commences about the end of January, or the beginning of February. There is no universal rule; but it occurs more frequently then, than at any other time. It occurs in males, much more frequently than in females;—just as is the case with regard to "stone."[a] It is also said to occur in *robust* males, far more frequently than in *weak* ones. It never has been known in eunuchs;—at least, so it is said. If such be the case, gouty old gentlemen have an easy remedy. It is also a disease that is very hereditary. This is one of the great hereditary affections. If it occur in females, it is generally in *masculine* females;—those who have a little touch of the male in them;—robust, hearty-looking women. I do not say this is the case *universally*; because I have seen the reverse myself. It occurs particularly in men who have circular chests, short necks, and what are called "*thick* heads";—not in those who have large foreheads; but in those who have bulky heads altogether, and who are of full habit. It occurs chiefly in those who eat a great quantity of flesh-meat, and drink a good quantity of wine. Among those who are predisposed to it, it seldom occurs till after thirty-five years of age. I have seen it in persons below puberty; and it is said to have occurred in infants; but, more frequently than not, it takes place in those who are above thirty-five, who indulge at the table, and who are of a plethoric habit. Such are the predisposing causes.

I mentioned that, for the most part, males suffer from it more than females[b]; and that where it does occur in the latter, they are very robust. The males who experience it are chiefly those who are thick, stout, and of a sanguineous temperament; but occasionally it occurs in persons who are extremely thin, spare, and emaciated. Although the disease, in a great number of cases, is connected with a certain development or form of body, yet, in many instances, it certainly does arise independently of any external appearances whatever. Sometimes very delicate women are subject to it;—persons who appear the least likely to suffer from it. In those cases in which the external appearances are not such as would lead us to suppose that the patient would have it, there is usually a strong hereditary predisposition; and where this predisposition exists, we shall have the disease,—whether it is hereditary or not. It will also occur in the most temperate individuals;—in persons whose habits are such, and *have been* such, as to make it very unlikely that they should have an attack of gout. The disposition to the disease may be exceedingly strong; and persons may become

[a] See Page 1152.

[b] See the previous Paragraph.

the victims of it, independently of the external appearance of the body, and independently of any of those excesses which so frequently produce it.

Increased Frequency of the Paroxysms.—I stated, with regard to the progress of the disease, that it generally begins in one great toe [a]; that, on the second attack, it perhaps occurs in both [b]; and that so it spreads to the other joints [b]; till, at last, after several paroxysms, many joints will be affected.[b] And not only does the disease become more extensive, but it also becomes more frequent; so that persons at first, perhaps, have a paroxysm every year or two; and then every year; then two or three paroxysms in a year; and at last they are scarcely ever without it;—they have it on the least exciting cause. I should have mentioned, also, that some persons never have above two or three fits in the course of their life. I know an instance of an individual who, when about thirty-five years of age, had an attack of regular gout; and, although he is now upwards of seventy, he has never had an attack since; though he has taken no particular care to avoid it. These are exceptions to general rules.

Gout formerly Desired.—I mentioned that many symptoms will cease, when an attack of gout appears;—so that it is a very common thing for persons who have suffered in various ways, to suffer no longer after they have had a fit of the gout.[c] This fact made so great an impression on the public, at one time, that gout was longed after as a great blessing; and people, with all sorts of complaints, would eat and drink, take a large quantity of wine, and do all they could to have a fit of the gout. As it is a disease which attacks the rich more than the poor, it was altogether a fashionable complaint. It was thought a creditable disease; and, at one time, every body longed for it, or declared that they had had it. This whim is strongly argued against in Dr. Heberden's "Commentaries" [d]; which it will be worth while to read;—not only on account of the elegant Latin, but for the excellent description which he gives of the disease; although, for the most part, he adopted poor and inert treatment.

Influence of Ardent Spirits.—The disease is particularly favoured by indulgence in wine. All fermented liquors do not appear to give the same tendency to it; and as to spirits, I am inclined to believe that, so far from disposing persons to the disease, they have a tendency to prevent it. At least, I hardly know an instance in which a person who has committed a great excess in spirits, labours under the disease; although wine-drinkers have it every day. It is a very rare complaint among the poor. Now and then we see it among them, because there is a peculiar predisposition to it in some persons; and sometimes it is hereditary, and will occur in spite of the absence of all the ordinary causes; but, for the most part, we do not meet with it in the lower walks of life. I have seen persons who, from their make of body, and from the occurrence of the disease in their progenitors,—many members of the family having had it,—were the most likely persons in the world to experience it; but who, from indulging in spirits to a disgraceful excess (and excess of that kind is *always* disgraceful) have not suffered from gout; although, beforehand, one would have said that they were most likely to have it by the time they were forty or fifty.

Paroxysms Induced by Slight Causes.—When a person is liable to gout, a paroxysm may be induced by the very slightest cause. If he indulge in eating and drinking too much, on any particular occasion, a fit of the gout is very likely to be the consequence. It will occasionally ensue from

[a] See Page 1158.
[b] See Page 1159.
[c] See Page 1160.
[d] Chapter 9.

mental anxiety. Exposure to cold—which, in another individual, would induce an inflammatory complaint—will, in those predisposed to gout, produce a paroxysm. Even accidents—such as a sprain of a joint—will become local causes; and the patient will have an attack of gout, in that particular part.

Induces Internal Affections.—When persons have the disease for a length of time, it is very common for internal organs to become seriously diseased. It is very usual to see persons who have been the victims of gout become asthmatic, or have disease of the kidneys, or have organic diseases of the stomach and intestines, or have chronic bronchitis. Very frequently, disease of the heart supervenes, and disease of the head occurs;—so that they die apoplectic. The gout, at last, is not confined to the extremities; nor are the internal symptoms merely functional; but the organs in the three great cavities of the body become diseased.

Prognosis.—The prognosis must depend on the original disposition, on the part of the patient, to the disease; and also, in a great measure, upon the resolution which he has to follow up our advice. A great number of persons who have the gout, are very disobedient in this particular.

Treatment: Regimen.—With respect to the *cure* of the gout, in general it is necessary that the patient should be very abstemious;—that he should live as low as he can to be in good health; and take as much exercise as he can bear;—only taking care that his health is not impaired by its violence. It is impossible to lay down any specific rule; and to say that a man, disposed to gout, should not drink wine,—should not drink beer,—should not eat meat, would be wrong. There are some gouty patients who would be better, if they left off fermented liquors; others would be better if they went farther, and ate no meat, but confined themselves to vegetable diet and milk. There are other cases, again, where this would be absurd;—the patient could not live without meat; and there are other cases where it is necessary to allow a certain quantity of wine. The stomach of many persons labouring under gout is so weak, that they cannot digest their food without a certain allowance of wine; but, generally speaking, the diet I have recommended, and as much pleasant exercise as possible without weakening the patient is advisable. No doubt, however, there should be extreme temperance: the patient should not take more wine, or eat more meat, than is necessary. Many persons will thus get rid of the gout altogether, with the most perfect ease; while others, who will not get rid of it (and these may be by far the larger number), will have it very much mitigated. It is necessary that they should be particular in their food;—that if they eat any food, they should take that which is the most digestible; such as fresh mutton, or fresh beef; without any sauce, or elaborate preparation on the part of the cook. They should take simple Sherry or Madeira, and not mixed wines. Above all, they should not take acescent wines, such as Champagne; and perhaps they had better take brandy-and-water. Many persons, from taking Rhenish wines, or Claret, or Champagne, have a fit of the gout directly. In general, Sherry agrees best; and therefore we should recommend it;—unless the person knows, from his own experience, that some other wine, or a small quantity of brandy mixed with water, is better for his constitution. I am supposing that the stomach of the patient requires such a plan to be adopted.

Friction.—Friction is exceedingly useful, when exercise cannot be adopted. It would be well for many persons who are lame in the feet, to be rubbed down, once or twice a day, like a horse. They would also find it a very great luxury.

Colchicum and Antiphlogistics.—In a regular fit of the gout, the best medicine that can be given, is colchicum. We should exhibit the wine[a], in half-drachm doses, every six hours; and it should be mixed with some other purgative; because we want its action to be speedy. The sulphate of magnesia makes a good combination with it. We may produce purging in twenty-four hours, or sooner; and when that takes place, the patient is generally relieved at once. Any good, active purgative will have a beneficial effect; but colchicum appears to be more efficacious than any other. Unless it purges, however, it will seldom have any influence. Now and then, the symptoms will all cease after two or three doses; but, in the greater number of instances, so desirable a result does not occur till purging takes place. It is better to quicken the purgative effect, in order to prevent it from griping; and the sulphate of magnesia will excite its action so much the sooner. Venesection may be advisable in young persons; but, in general, it is out of the question. Leeches applied to the part, are frequently productive of very great alleviation; and it is a great comfort, in general, to apply an evaporating lotion;—not cold, but tepid. A spirituous lotion thus tepid, does not produce a chilly effect. While these remedies are being employed, the diet should be scanty.

When the paroxysm is over (and it need never last long if treated in this way), friction of the parts is always found useful[b];—rubbing them with a flesh-brush, or the hand, and some salt-and-water, or similar stimulants. Sometimes it is necessary to give wine, or mild tonics, to relieve the languor that is left; but it is by no means *always* necessary. Occasionally, from the great severity of the pain, opiates may be required; but it is necessary to use the antiphlogistic measures that I mentioned.[c] If all this be done, and the patient's life is continued, the disease becomes comparatively trifling. I say "comparatively"; because it is always more or less painful. But it is not nearly so painful as it would be, if patients wrapped up their limbs in flannel; took no colchicum; and, in the intervals of the disease, indulged in every absurd way they could.

Application of Cold.—It is dangerous to apply cold to the parts, during an attack of gout. Some have done it; and Harvey, who discovered the circulation of the blood, was accustomed (when an attack came on) to plunge his feet in a pail of cold water. I know persons that do this; but no medical man is justified in recommending it; for it has frequently happened that some disease has suddenly begun within. There has been apoplexy induced; or violent gastrodynia; or an affection of the heart; and the patient has died very shortly. If the patient chooses to do it on his own risk, he may: but he ought to be warned of the consequences by his medical friend.

Gout is a disease which it is not easy to eradicate; but, by the employment of colchicum, the disease is rendered much less violent than it was a few years ago. Formerly colchicum was employed with great success; and then it was forgotten entirely, till within a very few years ago. When I was a student, no one thought of exhibiting colchicum, in any form. It was only spoken of as a thing once used;—as an uncertain diuretic, and a violent purgative; and it was thought that it would be better, if it were expunged from the Materia Medica. I mentioned the *wine* of colchicum[d]; but some give the powder, in doses of five grains, every four or six hours; and some give the "acetum colchici."

[a] "Vinum Colchici."
[b] See Page 1162.
[c] See the previous Paragraph.
[d] See the first Paragraph of this Page.

CHAPTER II.

RHEUMATISM.

Definition.—The next disease which I will mention, is nearly allied, in many particulars, to gout; and is called "rheumatism." As "gout" is named from the idea of the dropping of morbid fluid [a], so "rheumatism" is named from a similar idea;—the term being derived from the Greek word ρευματιζω (from ρεω, *to flow*). It is said that gout and rheumatism were not accurately distinguished from each other, till the year 1642;—both of them passing under the name of "arthritis." Bellonius, who was a physician that suffered much from rheumatism, is said to have been the first that made an accurate distinction.

Symptoms of the Acute Form.—Rheumatism may occur in an *active*, or in a dull *passive* form; and the two varieties require very opposite treatment. In the *active* form of rheumatism,—that which is commonly called "*acute* rheumatism",—there is heat, pain, and (in most instances) a swelling of the joints. These are not the *smaller* joints, as is the case in gout [b]; but the *large* ones; in general the wrists, the ankles, the elbows, the knees, the shoulders, and the hips. When these parts are affected with it, there is pain; but nothing of that violent kind which occurs in gout;—as if a dog were gnawing the joint.[a] It is as violent as a patient could wish it to be; but by no means so horrid as gout. The parts are generally hot and red; and frequently, from the pain being situated in the theca of the tendons, I have seen red streaks running in the situation of the tendons. There is generally swelling and puffiness in some part. Usually, there is feverishness, pyrexia, and a quick pulse. The pulse is not hard; but, in general, full and soft. The tongue is not foul and dry, but (in general) very white; and the urine is high-coloured, and deposits a lateritious sediment.

Diagnosis from Gout.—This disease does not, like gout, begin particularly in the night [a]; but invades at any time; and it does not come on at any particular season of the year. It arises from an evident exciting cause; and therefore it may come on at any time. It does not confine itself to one joint particularly; but leaves one and goes to another; and it will attack two or three at the same time. There is a shifting about;—it migrates in the most singular manner. Not only is there heat and an increased temperature, but heat generally makes the patient worse. Usually, too, there is profuse sweating; and the perspired fluid is often exceedingly sour to the smell. When the disease goes off, the parts do not desquamate and itch,—as they do after gout; but they merely cease to be hot, cease to swell, and cease to be inflamed.

The Chronic Form.—This is the usual state of things when the disease begins suddenly as an *acute* disease; but a similar state of things occurs in the *chronic* form. When the disease has lasted a twelvemonth, the parts are still hot, swollen, and painful; and the pain is increased if heat be applied. We find the same symptoms as in the acute affection; only they are less violent. In general, however, the sweating does not continue; for

[a] See Page 1158. [b] See Page 1159.

after the disease has lasted a few weeks, this symptom ceases; and the patient, perhaps, forgets it. It is sometimes a little difficult to make an accurate diagnosis;—at least it requires a little trouble; and it is well to ask about the sweating. If the disease have been acute rheumatism at first, there has been sweating; at least, it is unusual for a person not to sweat at the beginning of the disease.

Not Confined to the Joints.—Although the joints are the parts particularly affected, yet persons frequently have the disease in the back; and then it is called "lumbago."[a] Frequently it occurs in the back of the neck; and then the patient is said to have "a crick in the neck." It may affect the face; and, indeed, it may affect almost any part of the body, where there are fibrous membranes, aponeuroses, ligaments, tendons, or (perhaps) muscles. There is no danger whatever from this disease, except from one circumstance;—which is, that the membranes within the chest (the pericardium and the pleura) are liable to be affected. They are sometimes attacked during the disease; and when the latter has suddenly ceased, or has gone off gradually, inflammation within sometimes takes place. This internal inflammation will occur at all periods, and in all possible circumstances; but it most frequently takes place about the time of puberty, and in young adults; so that, in acute rheumatism, we should never omit observing the state of the chest;—just as, in the case of an obstruction of the bowels, it is right to ascertain whether there is a hernia or not.[b] Now and then, inflammation occurs within the head, and phrenitis is set up; but that is rare; whereas inflammation of the pleura and pericardium, particularly the latter, is very common.

Atonic Rheumatism.—The *active* form of the disease, I mentioned, may be either acute or chronic.[c] The chronic form *may* have active symptoms; but very frequently it has not;—the parts are not hotter than they ought to be; but, on the contrary, are relieved by heat. This is sometimes the case in the *acute* form of the disease;—that is to say, it occasionally happens that persons, when they are first attacked with rheumatism, have no heat;—the pain is not aggravated by heat; but the parts are cold, and are the better for the application of heat. It is generally, however, in the *chronic* form of the disease, that the parts fall into this state of atony.

Rheumatalgia.—The disease sometimes appears to consist of little more than violent pain. Sometimes people complain of pain apparently in the muscles; but it may be situated in the aponeuroses over the muscles. There is simply pain on motion;—a pain not at all increased on pressure; and there is no swelling. This form of the disease has been called "rheumatalgia." I do not know the necessity for giving it this name. Although rheumatism generally affects the fibrous membranes, yet sometimes it apparently affects the muscular fibres; and sometimes it appears to affect the nerves, or their covering; so that it will distinctly run down the sciatic nerve; though it is most frequently seen in the nerves of the face. I mentioned, when speaking of "tic douloureux", that sometimes, besides the genuine form of that disease, we have another affection called "*rheumatic* neuralgia", which is easily cured.[d] When rheumatism affects the nerves, it clearly exists in their course, and then it frequently assumes an intermittent form. This is particularly the case in the head.

Sometimes Intermittent.—Rheumatism is sometimes intermittent, when it does not affect the nerves particularly, but when it affects aponeuroses;

[a] From "lumbus", *the loin.*
[b] See Page 1048.
[c] See Page 1164.
[d] See Page 731.

and this form of the disease most frequently attacks the head. In this case it usually affects one half of the organ; and the pain generally comes on in the evening, about six o'clock; and continues, very violently, for a few hours. Occasionally, when it is intermittent in this way, the parts are hot, swollen, and throb; and the eyes water. But, in other cases, this is not felt; and the patient is all the better for wrapping up the head in a flannel petticoat. This is done among the lower orders; and with very good effect.

Thickening of the Affected Parts.—Occasionally the parts, when long affected with the disease, become thickened. We may have considerable thickening of the joints. The small joints of the fingers will throb, from time to time; and the patient will become a cripple, in consequence of the joints being inflexible;—just as in the case of gout.[a]

Rheumatic Gout.—As *gout* generally affects the *small*, and *rheumatism* the *large* joints, if rheumatism should affect the *small* joints, it is usually termed "rheumatic gout." Not that it is a combination of the two; though it sometimes may be. We may have the same appearances both from gout and from rheumatism.[b]

Exciting Cause.—There is, I believe, but one exciting cause of the disease; and that is the application of cold, or cold and wet; more especially if the patient be fatigued. I do not know that I ever saw a case, in the whole course of my life, that arose from any other circumstance.

Terminations.—I mentioned before,—when speaking of inflammation generally,—that rheumatism does not terminate in suppuration.[c] If suppuration occur, it must arise from another inflammation being accidentally present, or being excited by it. Neither does it terminate in mortification. There is sometimes effusion into the joints;—a considerable secretion of synovia or of fluid in the bursæ; and sometimes in the tendons. The parts may become rigid; and then, sometimes, mortification has been the consequence.

Occurs in Infants.—Rheumatism will occur in infants, as well as in old people; and this is worth knowing. I have seen many cases of the disease in very young children;—a circumstance very likely to be passed over. I have also seen disease of the heart in very young children;—as a consequence of pericarditis excited by this disease.

Pathology of Rheumatism.—[As certain forms of fever and inflammation are always accompanied by more or less of derangement of the assimilating processes, both primary and secondary; and such forms of fever and inflammation are not only preceded by long-continued derangements of the primary digestive processes, but frequently have their origin in such primary derangements; we[d] may perhaps be allowed to assume, that *some* diseases

[a] See Page 1159.

[b] When the lactic and lithic acids are developed together (as they may be, and often are), the phenomena may be supposed to show, that the mal-assimilation involves both the gelatinous and albuminous textures; and that the accompanying disease partakes of a mixed character; or, in fact, constitutes what is not improperly termed "rheumatic gout";—a form of disease which, as every one knows, is usually of a much more deep-seated and obstinate character, than either gout or rheumatism alone. According to these views, therefore, the lactic and lithic acids, considered with reference to rheumatism and gout, may be regarded somewhat in the light of *materies morborum*; or, strictly speaking, the undue presence of these acids in the urine or elsewhere, in certain circumstances, may be viewed as indices of the existence of certain diseased actions going on in the primary tissues of the body; and which are known by the names of "rheumatism" and "gout."—*Prout, on Stomach and Urinary Diseases. Book* 1; *Chapter* 3; *Section* 3; *Subdivision* 4. (*Third Edition*; *Pages* 210 *and* 211.)

[c] See Page 115.

[d] Dr. Prout.

to which we apply the terms "*fever*" and "*inflammation*", are (*practically* speaking, at least) only severer derangements of the secondary assimilating processes, modified by the peculiar nature of the organs or textures in which such derangements exist;—inferences that will enable us to explain the principles on which derangements of the *primary* assimilating processes, predispose to those peculiar derangements of the *secondary* processes which we consider to be nearly connected, if not identical, with those forms of fever and inflammation usually denominated "intermittent fevers", "rheumatism", and "neuralgia"; on each of which affections we [a] shall make a few remarks.

The exciting cause of the diseases just mentioned, is generally admitted to be *malaria*; and, if viewed abstractedly, and with reference to their specific nature, it is probable that malaria is the *only* exciting cause of these diseases. These diseases, however, are so generally associated with other diseases, arising from other exciting causes, that we rarely see them in their simple condition; moreover, diseases (as hectic, &c.) simulating them in many respects, are produced by other exciting causes than malaria; so that it often becomes a work of great difficulty, or even of impossibility, to distinguish one disease from another; and, consequently, to refer each exactly to its true exciting cause. How malaria acts in producing ague, rheumatism, and neuralgia, we do not know; but every one who has observed these diseases attentively, will probably admit, that the derangements of the assimilating organs constitute one of the first perceptible links in the series of symptoms; and, moreover, that these derangements of the assimilating organs are usually accompanied by the presence of great acidity in all parts of the system. Thus, in ague and rheumatism, during the sweating stages of the paroxysms, immense quantities of acid (chiefly of lactic acid) are thrown off by the skin; and sometimes by the kidneys. In these cases the saliva is commonly acid; and, in the severe and malignant diseases of this type,—occurring in tropical climates,—not only the saliva, but the whole assimilating organs, and even the blood itself circulating in these organs, have been observed to be in an acid condition. Thus, the dark-coloured fluid ejected from the stomach in yellow-fever, and some other analogous diseases, appears to owe its colour solely to the presence of blood, which has been blackened by the large quantity of (lactic?) acid present; and which blood and acid must have been thrown off together, from the unnatural fluids circulating in the vessels of the stomach itself. Now, the presence of so much lactic acid cannot be accounted for, except on the supposition that a certain portion of what ought to constitute, or actually has constituted, the albuminous (or, rather, gelatinous) parts of the system, is decomposed or destroyed; and—as gelatinous and albuminous matters or textures cannot be converted into lactic acid alone—that, consequently, other unnatural and probably poisonous principles are developed in conjunction with the lactic acid; to which in part, as well as to the lactic acid, many of the secondary consequences of mal-assimilation are to be referred. In other words, the alimentary matters, which ought to be converted into albumen, by the primary assimilating organs; and the albuminous matters of the blood—which, in the secondary assimilating processes, ought to be converted into the living gelatinous and albuminous tissues—are, by the deficient or disordered operations of the vital processes, converted (in a greater or less degree) into lactic acid, and other unnatural combinations.

Such, then, are the conditions of the assimilating processes, which we [a]

[a] Dr. Prout.

conceive to exist in the classes of disease we are now considering; the next question is—What constitutes the difference between ague, rheumatism, and neuralgia, when the cause and general conditions of the system in these affections are assumed to be the same? If our assumption be correct, the only answer of which this inquiry appears to admit is, that the circumstances constituting the varieties in question are—difference in the degree in which the same organs are affected; or differences in the seat of disease or organs affected; or, what is most likely, a combination of both these kinds of differences.

With respect to difference in *degree*, we do not think that this cause alone is sufficient to account for the varied character of the diseases in question. It is admitted, indeed, that difference in degree will, by causing the affection to be generally spread over the system, considerably modify the symptoms; but unless specific organs be actually involved, there can hardly be supposed to be any difference in the *kind* of the disease. We are, therefore, driven to the conclusion, that these different forms of disease arise from derangements in the secondary assimilating processes proper to different tissues or structures. In rheumatism, the same derangements, to a less extent, appear to exist in the primary assimilating organs; but, in this case, the secondary assimilating processes, by which the gelatinous portion of the muscular system and its appendages is produced and maintained, may be supposed to be more especially implicated; and the loss of power, and the great degree of pain usually present in rheumatism, may be referred to the disorder of the numerous nerves of motion and of sense; which, as well as the fibrinous portion of the muscles, are likewise necessarily affected by the derangements. Moreover, on these suppositions, we may explain the formation of the large quantities of lactic acid usually present in rheumatic affections; as well as the swelling, &c.; for as all the organs are more or less involved, and their functions paralysed, not only imperfect assimilation takes place in the part affected; but the apparatus destined to remove from the scene of operation matters which are unfitted, or no longer useful, likewise ceases to act; and hence such unfitted and useless matters accumulate, and cause swelling in the part affected.[a]]

Treatment of the Acute Form.—Whether the affection be acute or chronic, the treatment should be exactly the same. We have only to make two distinctions;—to ascertain whether it is the inflammatory form of the disease;—whether the parts are hotter than they should be, and heat does *harm*; or whether the parts are *cooler* than they should be, and heat does *good*. In the one case, antiphlogistic measures will be required; and in the other stimulants.

Blood-letting.—Sometimes, where the patient is plethoric, it is advisable to take away blood from the arm; and we shall find it buffed and cupped. But there is no danger from that circumstance; for if we go on bleeding, we may find the blood buffed and cupped, till we have got nearly all the blood out of the body. But venesection is not always required. Free *local* bleeding generally answers better; but there is no objection to *general* bleeding, if the strength will allow it; and if several large joints be affected, it will be *better* than local bleeding.

Cold Applications.—With respect to the parts themselves,—whether we apply leeches, or cupping, or not,—we shall find it of great use to apply cold water or cold lotions, as long as the temperature is higher than it ought

[a] Dr. Prout, on Stomach and Urinary Diseases. Book 1; Chapter 2; Section 3; Subdivision 3. (Third Edition; Pages 80 to 83.)

to be, and they feel comfortable to the patient. There is no danger in applying cold, with these limitations. If the patient should be timid, and yet long for cold evaporating lotions, they may be applied tepid (as in the case of gout [a]); but I never saw injury arise from applying cold in rheumatism, where the parts were hotter than they should be, and the patient felt hot.

Colchicum and Mercury.—The two best internal medicines are, without doubt, colchicum and mercury. Colchicum here, as in the case of gout, generally does no good till it purges [b]; and when once it purges the patient thoroughly, the disease usually gives way. It should be given in the same way as in gout [a];—that is to say, with magnesia; that it may produce its effect as speedily as possible. As soon as it purges, it is right to desist; and also as soon as its effect ceases. If we give a dose of hydrocyanic acid with the colchicum, it is better retained by the stomach. We may exhibit one, two, or three minims of the acid. But, every now and then, we shall find obstinate cases, which will not easily give way; although the greater part of them do; and then it is a pity to go on with the colchicum. We had better exhibit mercury, and get the mouth tender. If we do this, in the first instance, instead of giving colchicum, the success is about the same. Colchicum may gripe, and mercury may make the mouth sore;—so that we may not be able to continue them. We may then leave off the one (whichever it may be), and exhibit the other; or if we begin with one of them first, and find it does no good, then we may exhibit the other.

Bark.—As soon as the inflammatory symptoms have gone down, and the patient has been properly evacuated, many give bark and quinina. It has been said that bark is a safe and good remedy even in active inflammatory rheumatism; but we do not find, in Haygarth's work, any authority for such practice. We find, in his book, accounts of the successful treatment of rheumatism by bark; but then it was not till he had evacuated the patient upwards and downwards, and employed the antiphlogistic plan. After that, it is said that bark prevented the disease from recurring. I have not had occasion to use that medicine; for I have found the disease give way under the treatment I have mentioned.[c]

Narcotics.—It may be right to give narcotics, in order to produce ease; and a full dose of opium may be proper at night. There is no harm in it, provided we adopt antiphlogistic measures;—provided we bleed as far as bleeding is indicated, purge the patient well, and apply cold.

Treatment of the Chronic Form.—Exactly the same treatment is proper in the *chronic* form of the disease, if there are inflammatory symptoms; but whether the disease be recent or chronic, if the parts are not in this condition, an opposite plan should be adopted; and it is right to stimulate the parts. In this case, friction is an excellent remedy; and we shall find the hot-bath (particularly the vapour-bath) very useful. If the patient find alleviation from warmth and stimulants of all kinds, or the parts are colder than they should be, then this plan should be put in practice. The hot-bath should be employed, not every other day, but every day; and sometimes it should be used, in cases of extreme coldness and extreme pain, twice a day. It is here that electricity is of use; as well as friction; together with stimulating washes, stimulating liniments, and croton-oil;—which is a good stimulant when applied externally, and does not purge when so employed. Tartar-emetic, and sometimes moxa, have been employed; but only, of course, in very severe cases.

[a] See Page 1163.] [b] See Page 1164.] [c] See Pages 1168 and 1169.]

Acupuncture.—It is in this description of the complaint, that we find acupuncture of great use.[a] It is only in the fleshy parts that we can introduce the needle.[b] I should never advise it to be put into tendons and joints; though I have seen such things done. In general, it is only in the fleshy parts,—such as the deltoid, the biceps, the gastrocnemius, the rectus, or the gluteus muscles,—that it is right to put them. The best mode is to roll them by pressing them between the fingers; and they will soon pass to the desired length. We may insert them an inch and a half in depth; and if the bone is in the way, as in the case of the os femoris, there is no harm in the needles coming upon it; though there is no use in it; but they may go as far. The success of the operation does not depend on the number of needles; but on the time they remain in. If it be comfortable to the patient, we may let them remain in a couple of hours; that is, as long as a patient can bear to be kept still. There is no pain worth notice when they are introduced; and when they are in, there is no pain at all. It should be done every day; and occasionally we find relief as soon as they are taken out the first time; but, in other instances, not till they have been employed two or three times; or perhaps oftener than that. It is only where the parts are not hotter than they should be, that acupuncture is of any use. I never saw it do good when heat increased the pain. Acupuncture is not an absurd remedy. It is a *strong* one; but I am quite satisfied it is a real remedy, if it be properly applied.

Mercury.—In the *chronic* form of rheumatism, we find mercury of the

[a] Much information on this subject will be learned from Dr. Elliotson's Paper on Acupuncture, in the "Cyclopædia of Practical Medicine." (Volume 1; Page 32.) We subjoin his observations on the term itself:—"The passing of a needle into the body, is termed *acupuncture* (from 'acus', *a needle*; and 'pungo', *to prick*). From forgetting that the word '*puncture*' has two significations,—that it is used to express both the wound and the act of making it,—some have termed the operation '*acupuncturation.*' But to subjoin the syllables '*ation*' to the word '*puncture*' or '*acupuncture*', is as improper as to subjoin them to the words '*preparation*' and '*fabrication*'; each of which already ends in '*ation*', and has a similar two-fold meaning. An exactly parallel error would be to say '*manufacturation.*'" Dr. Elliotson gave the plan an extensive trial in St. Thomas's Hospital; and has published the result of that trial, in the Thirteenth Volume of the "Medico-Chirurgical Transactions" (Page 467). Out of forty-two cases, thirty were cured.

[b] M. Brettonneau says, that he has passed needles into the cerebrum, cerebellum, heart, lungs, and stomach of sucking puppies,—through and through, in all directions,—with no sign of pain, nor with any particular effect; unless when too large a needle was thrust into the heart; and, in one instance of this, a little extravasation took place into the pericardium. So far from fearing to acupuncture the heart, Dr. Carraco would have us do so in the worst cases of asphyxia. He declares that, in the presence of several persons, he kept several kittens under cold water, till they were apparently dead,—stiff, motionless, frothing at the mouth, without pulsation of the heart, and regularly sinking to the bottom of the water, every time they were thrown in; that he passed a needle into the heart; that soon the needle began to be gently agitated, then rapidly so; and that one voluntary motion after another gradually took place, till life was fully re-established; and that the animals did as well afterwards, as if nothing had happened. Death, however, by acupuncture of the brain or spinal-marrow,—as a secret mode of infanticide,—is notorious in works on State Medicine. "Guy Patin", says Foderé, "relates that a midwife was executed at Paris, for having murdered several infants at the moment the head presented at the os uteri, by passing a long and very fine needle into the brain, through the temples or the fontanelles; into the nape of the neck; or into the heart or its large vessels. Alberti and Brendel quote similar examples. In the "Causes Celèbres" we read the horrible story of a woman who, towards the middle of the last century, made it her business to murder all the new-born infants that fell into her hands, by acupuncture,—practised at the top of the vertebral column, or in the brain;—with the sole intention, as she told the judges, of peopling heaven more and more.—*Elliotson on Acupuncture, in the "Cyclopædia of Practical Medicine"; Volume 1; Page 34.*

same use as in an *acute* attack.[a] Whether the parts are hotter than they should be, or not, obstinate cases give way to mercury, when they will not yield to any other medicine. Nothing is more common than for persons who are the victims of chronic rheumatism (whether it be inflammatory or not), but who are suffering great pain,—more especially if the pain be worse at night,—to receive no benefit whatever, till they have undergone a course of mercury; and as soon as the mouth is sore, they will lose all the pain. Mercury appears equally useful in both kinds of rheumatism.

Guaiacum.—One of the best internal stimulants, in a case of this sort, is the ammoniated tincture of guaiacum.[b] Guaiacum is a stimulating diaphoretic, and is very useful in this form of rheumatism; though it is of no service in the *active* form of the complaint. The tincture made with aromatic spirit of ammonia [b], produces great warmth; and the patient remains warm for a longer or a shorter time. This is a medicine that may be given in various doses. Some persons are made hot with thirty drops; but others will take a drachm; and I have seen some who have taken six drachms, three or four times a day. There is no rule for it; but we should begin with half a drachm; and, as long as the patient is not warmed by it, and does not find it irritate him, we may increase it. Sometimes the warmth will last for one, two, or three hours; and, from a proper course of it, we shall find great alleviation. Sometimes it purges; sometimes it irritates the skin, and produces the nettle-rash; but when internal stimulants are necessary in rheumatism, I think this is one of the best.

Diet.—In the chronic form of the complaint, it is often necessary to support the patient well;—to give him wine, and nourish him assiduously.

Arsenic.—Arsenic has an excellent effect in this form of the disease, where the joints become cold. It frequently requires to be well persevered in; and (just like colchicum) it is borne by the stomach infinitely better, if we give prussic acid a little before it, or at the same time.[a] Arsenic is a medicine which is much disposed to irritate the stomach and bowels, and to produce gastritis; and, short of that, it frequently produces nausea and vomiting; but that may generally be prevented by prussic acid. The moment we find heat in the stomach and bowels, and pain on pressure, it should be omitted. We should ascertain this point every day; and when it occurs, the medicine should not be resumed till these symptoms have gone off. Arsenic also produces soreness of the eyes, and redness of the throat; and when any of these symptoms arise, we must desist from exhibiting the medicine; and not resume it till they are gone off. There is no particular rule for the dose. It is best to begin with two or three minims; and, as long as it is borne without doing the patient any harm, we may increase it. I have known cases where thirteen or fourteen minims were borne; but that is a large dose. In general, seven or eight minims are as much as can be given. I do not know that there is any danger in the œdema induced by the medicine; but it shows that it acts on the body, and therefore it is better to desist. With regard to the gastritic affection, that would be dangerous if the arsenic were continued; but, with a careful practitioner, no danger can arise from this remedy. In the chronic form of the disease, blisters, setons, and moxæ, may be of use;—just as in any other chronic inflammation.

Bark.—If the disease assume an intermittent form, we must treat it (in some measure) as intermittent fever.[c] We must give a large dose of qui-

[a] See Page 1169. [b] The "Tinctura Guaiaci Composita." [c] See Page 309.

nina or bark, either just before a paroxysm is expected, or afterwards; and smaller doses at intervals.[a] Or we may employ arsenic.[b]

Stramonium.—When rheumatism affects the face, a large dose of some narcotic, given just when the paroxysm is about to begin, often acts like a charm. It is an excellent plan to give a dose of stramonium, at the time the pain is coming on; and to repeat it in two or three hours. A large dose is generally required; and therefore, in the case of an adult, it is better to give a grain. In two or three hours, if there be no alleviation of the pain, and no affection of the head, we may repeat the dose. Sometimes the pain will not cease, till we have exhibited two or three doses; but I do not know more than one or two cases, in which this plan failed. It is certainly one of the best we can adopt. The ill effects of stramonium (as I before mentioned[c]) are dimness of sight, great thirst, and dryness of the throat; but these are not at all dangerous symptoms. The most unpleasant symptom is an affection of the head, drowsiness, giddiness, or delirium. I have frequently seen these induced, and then go away after a few hours; but if there be any hazard, an emetic may be had recourse to. If, however, we increase the dose slowly, this effect need hardly ever occur.

[a] See Page 313. [b] See Pages 318 and 1171. [c] See Page 1097.

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