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FIRST PRINCIPLES

OF

MEDICINE.

CRITICAL NOTICES.

"We know of no book which contains within the same space so much valuable information, the result, not of fanciful theory, nor of idle hypothesis, but of close, persevering clinical observation, accompanied with much soundness of judgment, and extraordinary clinical tact."—*Medico-Chirurgical Review.*

"We have facts in abundance, but it requires the exercise of the highest order of intelligence to deduce from them the laws which govern, both in health and in disease, the wonderful machine called man. . . . . Having explained the nature and cause of inflammation, Dr. Billing examines the various modes of action of antiphlogistic remedies; and points out, in a very clear and philosophical manner, the principles which should guide the practitioner in their application. . . . . We can strongly recommend Dr. Billing's 'Principles,' as a code of instructions which should be constantly present to the mind of every well-informed and philosophical practitioner of medicine."—*Lancet.*

"We should be ungrateful to any gentleman who has made such advances into a field of inquiry so unknown and so extensive as that of the nervous system, if we did not acknowledge our obligations for what has been produced. . . . It is the leading virtue of the author never to lose sight of the bedside; and the numerous points of treatment in regard to the exhibition of remedies, distributed throughout the work from the first page to the last, would, if extracted, alone form a catalogue worthy of being committed to memory."—*London Medical Gazette.*

FIRST PRINCIPLES

OF

MEDICINE.

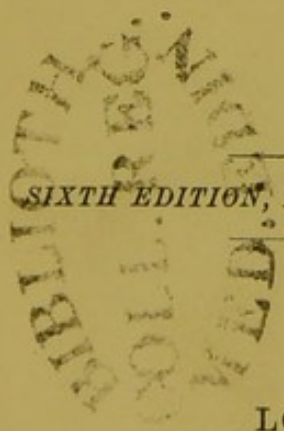
BY

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AUTHOR OF

"PRACTICAL OBSERVATIONS ON DISEASES OF THE LUNGS AND HEART;"
"ON THE TREATMENT OF ASIATIC CHOLERA," ETC.



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TO

THE RIGHT HONOURABLE

WILLIAM CAVENDISH, LL.D. F.R.S.

EARL OF BURLINGTON,*

GRADUATE WITH THE HIGHEST HONOURS

OF

THE UNIVERSITY OF CAMBRIDGE,

CHANCELLOR OF THE UNIVERSITY OF LONDON,

ETC. ETC. ETC.

THIS VOLUME IS DEDICATED

IN TESTIMONY OF THE HIGH RESPECT OF

THE AUTHOR.

Tu, qui natales antiquo sanguine claros
Ingenii decoras nobilitate novâ,
Accipe non magnâ turgentem mole libellum,
Et mea mansuetè quantulacunque lege.
Publicus his postquam favor adfuit, acriùs audens
Spem de se tandem cœpit habere liber;
Nec satis esse putat: si Tu dignabere laude,
Hoc saltem titulo tutior esse cupit.

---

* In 1837; now Duke of Devonshire.

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TO

THE THIRD EDITION.

THOUGH it may be thought that the third edition of a book requires no advertisement, I consider it quite necessary to explain some circumstances connected with this work. Feeling that no author has been more indebted to the indulgence of the public press for kind criticism, I have endeavoured to profit by the hints given me in every respect but one. The first edition was sent forth to take its chance in the world without herald of preface or advertisement, unadorned by dedication, and unaccompanied by any table of contents or index :* my original reasons for the last omission remain unshaken.

* * * * * *

I found that the former editions were more pleasing to fully educated medical men and men of experience than to the tyro. This was not my original intention ; and I have therefore taken pains to render the work more intelligible and useful to the latter, and have added much to suit the taste of both.

It does not appear to me that I used too strong an ex-

* To the fifth edition, however, in deference to the wishes of friends, an index was added.

pression formerly in speaking of the confusion which has existed in medicine; and, as an example, I need only refer to the striking fact noticed in this work, that the two words, *inflammation* and *irritation*, which are most frequently in the mouths of medical men, are up to this day perpetually used in a double or equivocal sense. Inflammation is correctly used to imply disease, and incorrectly to signify the process by which the damage done by the disease is repaired (pp. 26 and 104). Irritation is perpetually incorrectly used to signify a state of disease, as it can only be correctly applied to the *process* whereby any thing irritates, annoys, or over-excites a part: the irritant, irritating thing, whatever that be, by its operation (irritation), produces in the part a diseased state of morbid sensibility. One great objection to using the term irritation to imply disease is, that irritation (the act of irritating) produces sometimes inflammation, and sometimes only morbid sensibility; but, according to the old phraseology, "irritation produces irritation and inflammation," and "inflammation produces sympathetic irritation and constitutional irritation," and "sympathetic irritation and constitutional irritation arise from local irritation," &c. &c. In order to avoid this equivoque, I determined to adopt the term *morbid sensibility* as the name for the diseased state usually implied by irritation, and to use the word irritation only in its proper sense; and wherever the word irritation occurs in other works implying disease, it will be found that morbid sensibility may be substituted for it.

In this alteration of a term, I consider that I have done the student good service, rendering my own explanations more clear, and also those of other writers, by giving him an elucidation of the word irritation where it occurs as a disease in the valuable works of such authors as Sir A. Cooper, Travers, &c., and enabling him at a

glance to distinguish whether it be mentioned as a cause or a symptom.

Many of the valuable works of Orfila, Christison, and others, on toxicology, will be more easily understood by referring to the state of morbid sensibility explained in the following pages.

Again, I have shown (pp. 175-178) that there is in reality no such thing as a specific; and, on the other hand, have explained how some medicines become useful in such a variety of diseases as almost to realise the dreams of the ancients and alchemists respecting a *πανάκεια*, or an *elixir vitæ;* and thus why one empirical remedy, antimony, held the reins of the "currus triumphalis" until superseded by the more modern blue-pill. I may mention a few more of the explanations given. I have shown that tonics are not stimulants; why they may be combined advantageously with sedatives, or with stimulants, or with narcotics; how stimulants prove tonic; how sedatives or narcotics prove tonic; and, though not a homœopathist, how and why emetic medicines stop vomiting (pp. 156, 302, and 449). I have shown how every medical man has his hobby to carry him to the same point, which, though he thinks it very different from his neighbour's, is as like it as one four-legged jade is to another; how one man thinks he has made a discovery that he can cure cholera with sugar-of-lead, and that there is nothing equal to it; whilst tartar emetic, calomel, Epsom salts, or Glauber salts, or common salt, or mustard, or lemonade, or vinegar and water, &c. &c., will do the same thing; though none of them more quickly carry off the vomiting and purging than two of these hobbies in double harness—tartar emetic with some neutral salt, I care little which.

An anonymous writer once advanced against this work, that I differed from J. Hunter in the theory of inflamma-

tion,—as if he were "the law and the gospel." It may be seen that I differ not only from J. Hunter, but from his talented successors, Bichât, Sir A. Cooper, W. Lawrence, and others, in theory, on physiological and pathological principles, though little in therapeutics. On the subject of the *division and classification of remedies*, on the *cause of the sounds of the heart*, on the *proximate cause of inflammation*, on *morbid sensibility*, on *the physiology of the spleen*, &c., I feel confident of obtaining the future suffrages of the profession.* On the essential points of practice in the treatment of inflammation, I agree, of course, with men of such experience as Sir A. Cooper and Lawrence. It may be asked, then, what does it signify wherein we differ? It is, in my opinion, of great consequence to correct erroneous theories, and thereby enable students to arrive sooner at well-founded principles of practice.

Although this work consists rather of general pathology than what is called the practice of medicine, it will be found to contain the essentials of the treatment of disease. The greatest difficulties have arisen from the loose way in which remedies have been arranged and classified: I have endeavoured to remove these difficulties by the division into *stimulants*, *sedatives*, *narcotics*, and *tonics;* and by showing how these are to be combined with each other, so as to afford a guide to clinical practice.

We sometimes find persons doubting the efficacy of valuable remedies from not knowing how to apply them; for instance, bark (*i.e.* quinine), cubebs, dulcamara, mezereon, logwood, carbonate of iron, bismuth, arsenic, strychnia, digitalis, elaterium, hydrocyanic acid, blisters, bleeding, and brandy; each of these has at one time or other been said to be either inert or injurious, from misapplication, though they are powerful and efficacious remedies. We

* All conceded now (1868).

every day meet with old men who have scarcely ever used some one or other of these substances; though others, placed in an extensive field of practice, such as our hospitals, use them daily with advantage: there are persons who have been thirty or forty years in tolerably extensive practice (1836), who have not made use of a lancet as many times.

In going round the wards of an hospital, a pupil might remark to the physician at one bed, "What a small dose!" and at the very next, perhaps, "What a large dose you have given!"—large and small being both incorrect terms when the force applied is properly adapted to the quantity of disease and state of constitution. In practice there should be no such thing as boldness or timidity: boldness is an ignorance (for we must not suppose a recklessness) of the harm which too strong means may do a fellow-creature; and timidity is an ignorance of the efficient means which remedies afford of relieving human suffering.

In this edition I have added many cases, in illustration of principles laid down, as they are equivalent to diagrams in geometry. A person who has studied geometry can understand the proof of a proposition in general terms without a diagram—but not so a beginner; and a beginner in medicine requires a reference to cases, to render some general principles intelligible.

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TO

THE SECOND EDITION.

I WAS originally led to publish this Treatise by a recollection of the difficulties I had met with in the study of my profession, and by the hope that I might aid in removing them from the path of others.

Upon commencing the study of medicine and surgery, after having become acquainted with the more precise physical sciences in the University, I was appalled to find it a complete chaos. Our family physician, really a man of great talent, and one of our professors, disheartened me by his answers. I inquired, "What is fever?" Answer, of course, Cullen's definition. "But what produces it?" "Sometimes one thing, sometimes another; excessive cold or heat, or the effluvia from a person who has fever." "But what is the cause of the phenomena in the body?" "Spasmodic contraction of the extreme vessels." I could understand that cold might contract the extreme vessels, but I had been taught by the professor of chemistry that caloric expanded every thing. And, again, I did not see how effluvia produced spasm, nor how the spasm, even if it were produced, could make the skin extremely hot as well as cold. I was advised to read Cullen, and did so;

but without finding the information I sought. Again I asked, "When you give a dose of rhubarb or castor oil to stop a diarrhœa of several days' standing, how does it effect this object?" "By clearing away the peccant matter." "But would not the diarrhœa scour away this peccant matter itself?" "Not so well." This did not satisfy me.

Neither could the surgeon clear up these points: "For his part, he did not pretend to understand physic." I "walked" the hospital at his elbow as dresser; and inquired, "Why do you apply a cold lotion to that inflammation?" "To moderate the action of the vessels." "Inflammation, then, is over-action of the vessels?" "Yes." "Why do you apply that *astringent* (goulard or nitrate of silver) to that other inflammation?" "To diminish the action of the vessels." Now, the *action* of the vessels being *contraction*, my logic did not enable me to comprehend him; so, after asking why he put a cold lotion or poultice on one inflamed part, and a warm poultice or fomentation on another, and being told that I should find out by experience, I resolved on attempting to find out for myself.

I accordingly set seriously to work, and endeavoured to draw up a little code of general principles for my own use, as I could find nothing of the kind existing. The so-called systems of Cullen, Brown, Broussais, Rasori, &c. seemed mere individual opinions, totally differing from each other; and which was I to follow? Each of their originators appeared confident in himself, and despised his adversary; while their followers almost came to blows, arguing as much for victory as for the love of truth. I visited the different schools: the students of each hinted, if they did not assert, that the other sects killed their patients; but I found that, provided the physician of each school was a man of talent and experience, the mortality was

fairly balanced. I therefore concluded that, on investigation, some true general principles would be found to exist, by which the apparent inconsistencies of correct practice might be reconciled, and the contest between such systems as were essentially at variance be decided. But, though innumerable volumes of cases, and interminable heaps of insulated precedents, were to be met with, no treatise upon first principles had appeared.

After twenty years of intense application to clinical practice, as student, assistant, and professor, I found the same acknowledged necessity for reducing the conflicting systems of medicine to general principles; and I therefore ventured to publish the result of my own labours, compressed into 130 pages.*

The subject of clinical lectures is closely connected with the attempt to reduce the science to general principles. In medical publications, much just censure had been expressed of the neglect of clinical instruction, and of the omission on the part of hospital physicians and surgeons to render their experience available to the profession in general, and consequently to the public. In 1822 I had the honour to be elected Physician of the London Hospital,† at which time

* The trouble it cost in condensation makes me pleased whenever the term "little" is applied to the work; and I cannot deny myself the satisfaction of transcribing the words of Professor Stromeyer, of Hanover: "Dr. Billing's book is a very clever little *pathologia generalis;* his views certainly go beyond those of most pathologists, by his taking the nervous system into consideration. Upon the whole, I think it as much adapted for fully educated medical men as for students. Books like this are very rare; almost every writer strives, whatever few original ideas he has, to bury them in a mountain of generally known matter; whilst Dr. B. gives us a very intellectual (*geistreich*) view of his peculiarities." I must acknowledge, also, that I derived much satisfaction from the favourable notices of the medical reviewers, as their testimony gave me more confidence in the approbation expressed by private friends.

† The London Hospital, incorporated by royal charter in 1795, besides above forty thousand cases per annum of diseases and injuries, treated by

no clinical lectures were given in London: in the same year, however, I commenced this important branch of medical education, not merely instructing the pupils in the wards and theatre, but attending and explaining *post-mortem* examinations. This course I pursued, at a great sacrifice of time and some of health, for six or seven years; when the rising members who had been my clinical secretaries—Drs. Macbraire and W. J. Little (the latter now Professor of Comparative Anatomy, alumnus dignissimus of Müller and Grant), Messrs. Hamilton, Adams, Curling, &c.—being able to relieve me, I continued only the lectures, instructions in the wards, and once a week an anatomical demonstration, illustrating cases by recently obtained specimens, or by those in the extensive collection of pathological anatomy in the museum. In this mode I persevered up to the present session (1836), when, from being appointed Fellow and Examiner in Medicine at the University of London, it became impossible for me to continue it. I have of late years had the satisfaction of finding the example very generally followed in the metropolis, besides that of witnessing the success of the school in which it was first regularly established.

The medical officers of the London Hospital, I must also observe, were among the first who were mainly instrumental in *introducing* auscultation; and I am surprised that it is not yet (1836) by any means generally *adopted*. It is a source of real regret to me that so few medical men have taken the trouble, or known how, to avail themselves of this invaluable and indispensable method of detecting, so

the physicians and surgeons as out-patients, contains 440 beds, always filled with fit subjects of clinical study; the surgical accidents average 150 per week. Several foreign hospitals have twice and three times this number of beds; but they include persons disabled by old age, imbecility of mind, malformation, &c.—such as are taken care of in our workhouses, and asylums of various denominations.

as to combat, the most deadly diseases of the chest. On this score, Dr. Thomas Davies gained a well-earned celebrity; he not merely gave lectures to pupils, but collected the members of the profession at the east end of the town at his own house, and instructed them in this almost new sense of perception. From the time he became one of the medical officers of the London Hospital, in 1829, I derived great assistance from him in the clinical department, in the instruction of those young gentlemen who had the good sense to avail themselves of the opportunities afforded them of learning auscultation and the use of the stethoscope. One cannot be much surprised that the multitude are slow in adopting what in some instances has been treated with neglect, and in others has met with decided opposition, by men in high reputation and practice.* As to the stethoscope, I wish it were understood that it is not absolutely necessary, except for motives of delicacy; as the apparent difficulty of using it deters some persons from commencing auscultation, and has given occasionally an opportunity for opponents to use a tremendous substitute for reasoning—ridicule! It is disagreeable to apply the ear to the chest, if the patient, as occurs sometimes in charitable institutions, be not clean; and if the patient be a female, it is objectionable for other reasons: hence the artificial elongation of the meatus auditorius externus, called stethoscope, becomes eligible, though no better than the naked ear to judge by. I am in the habit of using a very simple one, which is merely Laennec's abridged, instead of being complicated, as it has been by other *improvers* of his instrument: it is rounded and cut away in the middle to make it light and convenient; the flat end being turned to the chest answers the purpose of the obturator; and it is only four

* This statement, made in 1836, may appear exaggerated to those who know the universal adoption of auscultation at the present day (1868).

inches long, which is sufficient for the purpose as to stethoscoper and stethoscoped.

One great difficulty in the way of learners of auscultation is their attempting to begin on patients: this is like trying to study morbid anatomy before acquiring a knowledge of healthy structure. If beginners would first learn the sounds of respiration and of the heart in healthy persons, which may be done in about ten minutes once for all, they would have little difficulty in detecting any unhealthy deviation from the normal state, and would very soon arrive at just diagnosis. I warn medical men that they must soon turn their attention to the subject, or be disgraced. Many affectionate parents are in the habit of feeling the pulse and looking at the tongue of their children, when they suspect disease to exist; they will also ere long learn the very simple process of applying their ear to the chest, and thus put the medical attendant to shame, if he cannot resort to the same means.

But the progress of the schools has been slow enough; it is but now (1836) that comparative anatomy, which is the only sure foundation of physiology, is *beginning* to be taught in London; and it required the energy and talents of a Grant, with a firm footing in a great school, to carry it into effect, and thereby to compel the others to follow the example. Professor Macartney, with all his energy and talents (and he does not need my testimony to establish his claims to both), fully imbued with its value, could not find support in his laudable attempt to establish it thirty years ago in Bartholomew Hospital; but I consider myself most fortunate in having early met with him, and imbibed a taste for physiology. The ingenious and persevering German comparative anatomists, with their microscopes, are unravelling many a *dignus vindice nodus;* and I am gratified to find in their recent publications con-

firmations of opinions advanced in this work seven years since,—as, for instance, my explanation of the cause of a limb being "asleep," benumbed (see p. 136), by reference to the medullary part of the nerves being in tubes (as asserted by Fontana), which has been demonstrated by Ehrenberg (Darstellung eines merkwürdigen Baues des Seelenorganes, Berlin, &c.); who has proved also that not only are there two sets of nerves (as referred to at p. 130), those of animal and organic life, but that there is a third set, of the senses, all recognisable by their structure when an isolated piece of either is subjected to the microscope. Remak (Archiv für Anatomie, Physiologie, &c., von Dr. Johannes Müller, Jahrgang 1836, Heft 1 und 2) has likewise shown the difference between the motor and sensitive roots of the symmetrical nerves—that the latter possess in addition some organic filaments, and that the glosso-pharyngeal belongs to the same order as the optic, auditory, and olfactory; thereby confirming Panizzi's opinion, that the hypoglossal is the motor, the lingual branch of the fifth the sensitive, and the glosso-pharyngeal the gustatory nerve of the tongue. Schwann (Müller's Handbuch der Physiologie, Coblentz, 1833), by experiment on the mesenteric arteries of small living animals, has demonstrated that I was right as to the *modus operandi* of cold as a remedial agent in inflammation. Schwann and Eulenberg, again, have shown that the middle coat of the arteries is not really muscular in structure, though influenced by the nerves, but elastic, as asserted by me (p. 31), consisting of that distinct tissue constituting the ligamentum nuchæ of ruminantia, the ligamentum flavum of man, &c.

The veterinarians also have contributed in their comparative department. Hausmann, by direct experiment, has added fresh proofs to my theory of inflammation (p. 77 *et seq.*). Sewell, of our own Veterinary College,

twenty years ago published plates showing the muscular coat in the bronchi of the horse; indeed, the muscularity of the bronchi was shown by Morgagni: nevertheless, it has been lately spoken of as a discovery, as mentioned in Youat's valuable Journal, in the Report of the Veterinary School of Alfort. Not that I agree that the muscularity of the bronchi can assist in natural expiration, for that is contrary to the physical structure of the chest—it merely helps to expectorate any noxious matter, whether generated there or introduced through the windpipe.

* * * * * *

FIRST PRINCIPLES

OF

MEDICINE.

THE first step towards treating disease successfully is to ascertain, as far as possible, the nature of the functional or structural *alteration* which has taken place in the *seat* of the *disease*,—in one word, the *pathology*:* in *default* of this knowledge, which is sometimes unattainable, we can only depend upon *analogies*, drawn from what we know to have been the fact in other similar cases, and from *physiology*, which is a careful *observation* of the *phenomena* resulting from the *functions* of the different *parts in health*.

An accurate knowledge of the various phases of *functions* in their healthy state is the more necessary, because *considerable deviations* from the ordinary routine occur *without disease*; and, as they are frequently much deranged without any discoverable

* Formerly denominated *proximate cause*, and defined to be "that which existing, the disease continues; and ceasing, the disease ceases."

alteration in the structure of the organs having taken place, pathological or morbid anatomy alone will not be sufficient to elucidate all causes of disease;* whilst, on the other hand, it is necessary to be aware that a considerably diseased change of structure may exist with little or no interruption of function.†

The *modes* by which students may attain a *knowledge* of the *nature* of *disease*, after learning physiology, or the nature of healthy functions (which is attainable from lectures and careful reading), are, accurate observation of the diseases which take place in external parts as they are submitted to our senses in CLINICAL SURGERY, and in the functions of internal parts as met with in CLINICAL MEDICINE; and then PATHOLOGICAL ANATOMY, the examination of the degree and nature of alteration which has taken place in the structure of the diseased part:‡ to which should be

* This is more especially the case in diseases of the nervous system; and it points out the value of remedies which exert an influence on deranged function, without the operation of any agent capable of effecting depletion of the vessels, or of changing structure, and which agents should be used with caution, lest they do more harm than good.

† Such consideration will lead to the detection of disease in an organ (as the liver, kidney, &c.) whose function is, or seems, unimpaired, when indirect symptoms and morbid sympathies exist, sufficient to attract attention to themselves only—as sickness of stomach from disease in head; cough, apparently of chest, from disease in liver; though the functions of the brain and liver seem unimpaired: and various other examples will occur further on.

‡ This was written before my pupil Quekett had penetrated into the mysteries of Hystology, a term not then invented, but which has rendered the names of Beale, Carpenter, Huxley,

added, the microscopical and chemical investigation of morbid products—urinary, &c.

The object of lectures is to convey to the student, in a condensed manner, that knowledge in abstract which will enable him to understand the special symptoms observable at the bed-side, and the remarks of the clinical professor; without which clinical instruction, all that the memory may be charged with from books or lectures is but vanity.*

Without entering into minute anatomy, it may be necessary, before proceeding any further, to give a general idea of the *apparatus* which supports the life of man, consisting of the HEART and BLOOD-VESSELS, the stomach and intestinal canal, called the "PRIMÆ VIÆ," the ABSORBENT VESSELS, and the NERVES.

The HEART is double, *i.e.* divided by a partition,

Paget, Quekett, and others, celebrated in this country; besides the host of continental microscopists, amongst whom the Germans took the lead. But, before them all, Bichât was the pioneer who opened and led the way to Hystology, by his *Anatomie Générale.*

* This is universally felt and acknowledged, and it is said that *too much* theoretical, or what is called book knowledge, is required of candidates for degrees. But this is not the truth; the fact is, that there is *too little practical* knowledge demanded, that they are not required to make themselves sufficiently acquainted with the clinical knowledge of disease and its appropriate treatment, to their own embarrassment, and the detriment of their patients, when they commence practice. This could be avoided only by adding at least another year to the usual term of hospital practice: but the "res angusta domi" in some cases, and the "auri sacra fames" in others, render it difficult for the authorities to carry it out. The author may be allowed to give an opinion on the subject, as he devoted seven years to unremitted clinical practice, in Great Britain and Ireland, and on the Continent, before he sought for a fee.

each half being a distinct forcing-pump, containing a certain quantity of blood, more or less of which is squeezed out at each beat, *i. e.* contraction; the blood from the *left* side is sent through the trunk and branches of the arteries, to nourish the different parts of the body ; the over-plus, and what is spoiled by use (in changes effected by the liver, kidneys, &c.), being returned through the veins to the *right* side of the heart, which transmits it by arteries into the lungs to be purified, after which it is *again* returned by veins to the left side, thus constituting what is called the CIRCULATION. This is the nature of the circulation with which the individual born begins life, before food has been taken—its blood having been derived from the mother.

Subsequently, the process of NUTRITION is thus carried on: the *food* swallowed is DIGESTED by the action of the *gastric* juice* in the *stomach ;* that is, it is converted into a gray, pulpy mass, called CHYME, which passes on into the intestines, where it is mixed with the BILE. The use of the bile is to *unite*

* The peculiar constituent of which, Pepsine, is secreted from the surface of the stomach (ventriculus)[a] in man and mammalia ; one of its special functions is to curdle the milk as soon as taken into the stomach. This pepsine is abundant in the ventriculus of the calf, which is salted and dried, and sold under the name of rennet, to be used to curdle milk in making cheese.

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[a] The first part of the alimentary canal, the pouch which receives food before it reaches the bowels. It may seem unnecessary to add this word ventriculus; but, to an English reader who is not medical, the word stomach conveys the idea of the whole abdomen, containing the bowels, because it would shock "ears polite" to use the word belly, which in the Bible—and every where, except in England—is used to express the human abdomen; and every where, except as aforesaid, the word stomach means only the ventriculus.

with and *separate* the *feculent parts*,* as white of egg is used to clear wine. Now, if a pulpy mass be allowed to stand in a vessel, the solid parts will settle to the bottom; but if rolled about in the hands, or in the manner effected by the peristaltic motion of the intestines, the more solid parts are kept in the middle, whilst the surface of the mass is the moistest; and thus a whitish liquid, called CHYLE (which was disengaged when the bile united with the feculent matter, and caused the chyme to appear gray), and which constitutes the new nourishment, is kept in contact with the lining of the intestines, where it is taken in by the mouths of the tubes called ABSORBENT vessels; and these absorbents, on account of the white chyle seen through them, are called LACTEAL (milky).

The *lacteal absorbents* conduct this *fresh supply of nourishment* to make NEW BLOOD; they *deliver* it first into the *veins*, near the heart, where it is mixed with the old dark-purple (venous) blood, which had been circulated, and is on its return to the right side of the heart; from whence this mixture of old blood and fresh chyle is sent through the lungs, to be purified, where it becomes bright scarlet (arterial) blood, and is thence returned to the left side of the heart, which sends it through the arteries all over the frame, to supply its demands.

All the business of constant support and renewal of parts, and supply of secretions, as the growth or repair of bone, muscle, membrane, and other struc-

* At the same time that the bile performs this part in digestion, it is also the means of getting rid of some of the superfluous carbon of the venous blood from which it is secreted.

tures, the formation of bile, saliva, mucus, and other secretions, is carried on by the extremely minute terminal branches of the blood-vessels; and whilst they preserve their proper tone and size, all goes on well; when their action is deranged, disease commences, often prefaced by pain or other disorder of the nerves. The ultimate minute branches of the arteries, from their fineness, are called CAPILLARY (from *capillus*, a hair). Besides which, the capillary arteries terminate in tubes still more minute, called simply capillaries, and which consist of a single homogeneous coat or membrane; whereas the arteries have besides outside of that a layer of muscular fibres, and another third coat over those.

The *colour* of the *blood* is caused by red PARTICLES (*blood-disks*) diffused through a transparent fluid, liquor sanguinis, which is water, holding albumen, fibrine, and other substances in solution. When blood is first drawn, the blood-disks may, by means of a microscope, be seen floating in the serum; but when it stands, they settle down to the bottom, in a fibrinous cake or clot (called cruor or crassamentum) which forms by coagulation. The upper part of this clot, which settles down from the serum, of a yellowish-white colour, affords a specimen of coagulable lymph, now called *blastema*, consisting chiefly of albumen and fibrine, carried in readiness to repair damages.

Some capillaries are too small to admit many of the red particles, unless when they are *enlarged* by *inflammation*, as in the eye, which, when inflamed, changes from white to red; besides which, even the *red* capillary arteries are so minute, that they are

not visible individually to the naked eye till enlarged by inflammation.

The human frame is nourished by *metamorphosis*, *i. e.* by the arterial and capillary tubes carrying and *depositing* in appropriate parts the various constituents of the blood which is sent through them by the heart. In this way muscles, bones, nerves, membranes, &c., grow and are nourished; for the blood contains the constituents of each: fibrine, &c., for instance, to make muscles; lime, &c., for the bones; phosphorus, &c., for the nerves; albumen and watery fluid for the formation of membranes, and to supply the secretions and exhalations which are either excrementitious, or necessary to lubricate the mucous and serous membranes.

The deposition of bone is a combination of chemical precipitation and crystallisation, modified by vital actions; as, for instance, when there is periosteal membrane, we see that it keeps up a vital state of bone, whether in the bone of a leg or in a tooth; when there is no membrane attached, as in the enamel of the tooth, crystallisation, with the temporary membrane which forms the mould of the young tooth, decides the form of aggregation; in case of fracture of a bone, the surrounding parts decide the form of the CALLUS which reunites it. Whilst bone is growing, there is a change as to deposition of the bony matter going on (as shown by the common experiment of feeding young animals with madder, so as to produce variegated deposits); but there is no reason to suppose that the substance of a healthy, sound bone of an adult is changing,

any more than that the substance of a tooth, or the wall of a castle, is changing, though there are preparations ready to repair a breach, if made.

As the soft parts and periosteal membrane of a young animal grow larger, the periosteum is kept lined by fresh bony deposit, and thus the bone grows larger, following its membrane; but when the membrane stops growing, no more bone is deposited, from want of space, and that already formed remains *in statu quo*, unless broken or diseased; and we see that the bones of dead adult animals, if not acted upon by chemical agency, remain unaltered by time, as skeletons in museums, mummies, or bodies under other favourable circumstances.

All the constituents of the animal frame exist in the *chyle*, from which the blood is eliminated; the blood-disks and liquor sanguinis are supplied by the chyle,—the disks, which are at first colourless, becoming red by the action of oxygen on the iron in their composition, the *shades* of red being modified by *carbon*.

How these constituents are obtained is evident enough when the food consists of animal matter, the same as the substance of the individual, requiring only to be digested and dissolved in the stomach; but vegetable food affords them also, as the *animals* which supply meat obtain the constituents of their flesh—albumen, fibrine, &c.—from *vegetables*, —the only difference being, that if the flesh of an animal is to be nourished from vegetable matter, a much larger quantity of food is consumed: thus, when a man lives upon rice, or oats, or potatoes, or other vegetables, he must consume a much greater

quantity, in order to extract the nutritious matters, which exist there in much smaller proportion than in animal food. An ox or sheep is eating grass all day long, whereas a dog, cat, tiger, or other carnivorous animal, has a meal of flesh only once, perhaps, in the twenty-four hours. From half a pound to a pound of meat, with half a pound of bread, will suffice for the dinner of a man; whereas, if he have no meat, he will require a much larger quantity of bread, or boiled rice, or potatoes. Wheat-bread contains more nourishment than rice or potatoes; but unless butter, cheese, or other proteinaceous food be supplied with it, an extra quantity must be consumed. All alimentary matters consist of at least four elements—carbon, hydrogen, oxygen, and nitrogen; at any rate, those which contain no nitrogen, as arrowroot (fecula), cannot support life without an admixture of nitrogenised food, and it is the greater proportion of nitrogen in wheat which makes it superior to other cereal grains for nourishment. But there are no vegetables destitute of nitrogen. It is true that we separate from vegetables some matters, such as arrowroot, which could not alone support life, as containing no nitrogen; but then this is an artificial product; and the entire vegetables from which arrowroot is obtained, such as cereal grains, potatoes, and other roots, contain (in their albumen) nitrogen besides, and can sustain life. Arrowroot, cooked with water alone, is a most debilitating food, and could not support life long; but with milk, it is sufficiently nutritive, milk being equivalent to meat for nourishment,—as young animals, whether human or quadruped, make flesh and bones and fat, &c.,

from milk alone; and an infant, until nine or ten months old, does not require any other food beyond the milk of the mother, if she be healthy; or, if it be deficient, as is often the case in highly civilised society, nothing ought to be given to the child in addition but good cow's* milk, or, if that does not seem to be digested easily, a little water and sugar may be added to it. Feeding infants with farinaceous matters is unnatural and injurious; when cow's milk is too rich and heavy for the stomach, it may be rendered lighter by the admixture of farinaceous food prepared with water; but dilution with water and sugar is much better, and produces less flatulence.

No liquid nourishment, except milk, can alone support life; animal soups, or jellies like arrow-root, however concentrated, cannot nourish, unless bread, or some other farinaceous matter, be united, to supply materials, such as fibrine, not existing in the soup, but all of which are contained in milk—which becomes, in fact, solid food shortly after being taken into the stomach, as the pepsine (rennet) of the gastric juice turns it into solid curd —a circumstance which is often misunderstood. Thus, when an infant takes in rather more milk than it requires, by a provision of nature, it throws up some of it, and, of course, curdled by the pepsine in the natural process of digestion,—which curdling is often attributed to "an acid state of stomach," and the poor baby is dosed with magnesia, or soda, or something worse.

* Goat's milk or ass's milk may be substituted for cow's milk.

There is no aliment so good as milk for invalids, in many cases,—being highly nutritious, and yet unstimulating; but it is often too heavy alone, and requires dilution; and, in cases of great exhaustion, it is useful to combine it with stimulants, mixing it with brandy or wine, or in the form of wine-whey. It is not only infants that can be fed by milk; adults can live perfectly well upon it: for instance, in Switzerland, during summer, the men, who go to elevated situations on the mountains with the cows, to make cheese, have scarcely any communication with the villages for months; and during that time, when hungry, they eat a lump of the fresh curd, and drink either the fresh whey or milk, having no bread, potatoes, meat, or other food; and yet they continue in good health and condition.

Milk is, in fact, a highly concentrated nourishment, and contains a large amount of nitrogen. But too much stress has been sometimes laid, by chemical physiologists, upon the value of mere nitrogen; so much so, as to attribute strong nutritive powers to tea, because it is a super-nitrogenous vegetable; in fact, from their exaggerated accounts, one would be led to suppose a cup of tea equivalent to a mutton-cutlet, or that mushrooms (also highly nitrogenous) might be substituted for beef. The same ultra-chemical theories of the clever Liebig have also frightened many persons from taking a moderate quantity of fermented liquor with their food, lest, forsooth, the alcohol therein contained should burn away the oxygen destined for respiratory changes.

So far as we can discover by means of the microscope and chemistry, no *new* substance is

formed *directly* from the fluid *blood*, which is always contained in the capillaries as blood; but part of the transparent liquor sanguinis makes its way through (by "exosmose," soaking through), and the albumen which it contains condenses as it exudes, forming a pellicle like that of a soap-bubble, and sometimes not more persistent—not, however, containing air, but fluid, as in the secretion of urine, saliva, &c., for instance.

This minute bubble, with the fluid which it contains, is called a CELL, and *every* living process of animal or vegetable life is carried on through cells; thus, the mucus is a rapid formation of these cells, the urine a still more rapid one; a slower process is the "EPITHELIUM," or lining membrane of internal parts, and the cuticle externally, which is a succession of cells that, instead of running off like the secretions, remain side by side, and unite, becoming solid, connected, epithelial scales; and as they wear out, or are rubbed off, as on the skin and in the intestines or other parts, fresh ones succeed them. Muscles, &c. also are kept up by metamorphic deposition of cells.

Secretions are carried on by fine capillaries, which, by their great number and extreme minuteness, envelop, in the form of a vascular membrane, the follicles or ultimate or terminal ramifications of the excretory ducts of all glandular organs: for by the researches of Müller, Weber, Rathke, Kiernan, &c., into the intimate structure of the glands of adult animals, and those of Müller, Von Bär, and others into the mode of embryonic development and growth of glands, the correctness of the opinion of Malpighi, Cruikshank, &c., is demonstrated, viz. that the

greatest analogy exists between them and the most simple crypt of the intestinal mucous membrane, or cuticular sebaceous follicle; that, in short, a gland is made up of innumerable cryptæ (*culs de sac*, like the fingers of a glove), which are ramifications of the excretory duct, each ultimate branch of which, in most organs, is only visible by aid of the microscope, and terminates by a blind extremity, in the parietes of which are distributed the finest capillaries, the secreting surface being covered with new cells. These capillaries are many times smaller than the cryptæ, follicles, tubuli seminiferi, tubuli uriniferi, &c., as they are called, in different organs, and do not communicate with them by open or terminal extremities, as Ruysch and even later anatomists had supposed; on the contrary, the finest capillaries are seen to join with one another, so as to form again larger and larger trunks, then called veins. Secretions, therefore, are vital transudations (exosmosis) through the sides—not terminations of the capillaries into the excretory tubes of the glands. Modern physiologists consider that the loose cells covering the secreting membrane are the immediate agents of the secretion, the operative parts of the process. Layers of these cells are successively formed, developed, and distended by secretion (into their interior) of the fluids peculiar to each gland; the cells burst, dissolve away, or are cast off; their contents are poured out, and flow into the ducts of the gland, together with the exuviæ (skins) of the cells. This crypt-formation appears admirably adapted for still greater multiplication of surface. We see here the

wonderful contrivance by which an enormously large surface is obtained for the purposes of secretion: a gland being strictly comparable to a mucous membrane so convoluted upon itself as to occupy as little space as possible in the economy of animal bodies, having one or more outlets left (the excretory duct or ducts, or sum total of all the excretory tubes), by which the secretion is emptied into its proper receptacle. Not the least interesting point in our present knowledge of the structure of the glands, is the strict analogy shown to exist between all glands and the LUNGS. Indeed, owing to the comparatively larger size of the individual parts constituting the lungs, and, consequently, the facility with which their minute anatomy may be investigated, they may serve to illustrate, by analogy, the structure of the apparently more complicated, because with greater difficulty investigated, glands. The latter, as just stated, consist of an excretory duct or ducts, which subdivide, as if *ad infinitum*, first into tubes and branches of first, second, third, and fourth orders; and at last into clusters of the finest pouches or follicles, the parietes of which are enveloped in a net-work of capillaries. It is precisely the same with the lungs: composed of an analogue called the trachea, the branches of first, second, third, and fourth orders are the bronchial tubes, which at their ultimate terminations, after the most elaborate branching out, present clusters of minute cells, which represent the acini or clusters of minute cryptæ or follicles. The air-cells of the lungs have, like the glandular crypts, their beautiful net-work of capillaries, from which the hydrogen and carbon, or

carbonic acid and water, are secreted (by exosmose), without there being any direct communication between them and the capillaries themselves. The lungs, however, are adapted for something more than a glandular purpose; they convey to the blood the material for aiding its purification, its excretion of carbon, &c.; for whether the atmospheric air be received into the lungs merely as a vehicle for carrying off, according to Lavoisier, Laplace, and Prout, the carbon and hydrogen secreted from the blood; or in order to afford oxygen for absorption by the blood, to be subsequently secreted in the form of carbonic acid and water, as Sir Humphrey Davy and the majority of chemists suppose,*—the peculiarity of the lung, in its analogy with the glands, remains.† From

* If the atmospheric air were merely a vehicle, respiration would be unnecessary; for carbonic acid, if it were a secretion, according to Lavoisier, &c., would flow off by the excretory ducts, bronchi, and trachea, as other secretions do, without the act of respiration: and it is unnecessary to suppose, with Davy and others, that oxygen is absorbed. But oxygen is necessary—hence the necessity for respiration. The oxygen is not absorbed, but receives and unites with the redundant carbon of the venous blood, which exudes by endosmose in combination with hydrogen—from which compound is derived the carbonic acid and watery vapour of expired breath: the difference between arterial and venous blood being not *plus* oxygen, but *minus* carbon.

† As all secretions are effected by the (galvanoid) agency of the nerves on the blood in a series of capillary tubes, it becomes an interesting object of physiological inquiry, how far the mere change of form in each glandular organ—merely by alteration of number and series (in the battery) of capillaries and nerves, as modelled on the ramifications of the excretory duct, the true element of the gland—produces secretions apparently so different, but, after all, differing only in the proportion of atoms of the

the free anastomosis between all the capillaries in a secreting organ, and their gradually forming larger and larger vessels constituting veins, without any direct communication with the tubes, cryptæ, or follicles, into which the secretion takes place, whatever of the blood is not secreted is returned.

It is but lately that it has been shown, by means of the microscope, how these secretions, or separations, take place—that is, the phenomena; but the intimate modification of the machinery is still the secret of the Creator. Thus, in the earliest stage of the fœtus, long before there is bone or muscle, the little moulds for them are formed and adapted so as to appropriate to themselves the materials which they require; the cells of the periosteal mould seize upon the bone-earth (lime), and let pass the fibrine, which is appropriated to itself by the sheath created for the reception of nascent muscle, as the neurilema-sheaths detain the phosphorus and other ingredients of nerve and brain material: all these moulds existing in miniature when the embryo man is the size of a pea, or of a tadpole,—though not then a tadpole, as some philosophers have dreamt.

There is, however, elementary* structure more elementary even than cells. Thus, in the origin of

four constituents, carbon, hydrogen, nitrogen, and oxygen, which are found in all, with a different proportion of the saline constituents of the blood appropriated to each.

* For the investigation of the structure and development of an embryo when it is itself an almost microscopic object, great facilities have been supplied by the invention of artificial hatching of eggs, whereby the subjects of investigation can be obtained, *ad infinitum*, in daily and hourly progress of existence.

muscle in the embryo, the first metamorphic deposition is a jelly, a blastema,* which, under the microscope, shows an uneven or granular-like subdivision, intermixed with nucleoli and nuclei, which become invested and *cellulose*, and then connected or accreted to each other in lines, eventually forming fibres. Nerves, bone, membranes, &c., are formed *in situ* in a similar manner, by the same inscrutable disposition given to them, and, under circumstances of damage, are repaired by a similar process.

The red disks of the blood cannot escape from sound capillary vessels, because they are solid, however minute, and cannot, therefore, pass through the membrane by exosmose;† but the fibrine, being perfectly liquid, in solution in the liquor sanguinis, does exude; and also the albumen, which is in solution, passes by exosmose, and then solidifies as the covering of the cell; and the fibrine within that solidifies into the nucleus, which seems to be the starting-point of vitality in the complex animals,—and the simplest of animals, the monad, is a cell containing a nucleus.

Albumen, then, is the substratum of every tissue, because it is the constituent of the cell-wall, which is the rudiment of every tissue, and which cell is uniform in each; but then the *nucleus of fibrine which it surrounds assumes the character of the tissue* in which it is developed, and so keeps up, or adds

* βλαστημα, a bud; and, in fact, the blastema, *olim* coagulable lymph, is the bud of every structure.

† Hence, when we find blood in any excretion, we may be certain that there is solution of continuity, more or less, of the capillaries of the part from which it comes.

to, or restores it, whether it be muscle or bone, nerve, membrane,* or areolar tissue.

Chyle passes into and *becomes* blood, and blood is rapidly *reconverted* into a similar fluid—such as yolk of egg or milk. The yolk of egg, secreted from blood, is almost identical with chyle, and supplies nutriment to the chick, its waste being compensated, so as to keep the yolk-bag always full, by the absorption or endosmose of the white, which, therefore, gradually disappears at the end of incubation. There is very little difference, in fact, between chyle, yolk of egg, and milk. As the fœtal chick is cut off from the circulating blood of the parent, it is supplied with a reservoir of chyle (the yolk), to supply its blood-vessels during the fœtal state, and to give it food for the beginning of its infant life; the yolk being taken up by the lacteals of its *primæ viæ*, just as milk, which is almost chyle, is rapidly converted into it in the stomach of the infant mammal, and taken up by its lacteals.

Although there be no red blood-disks within the egg at first, red blood is formed in proportion as the *nervous* system of the fœtal chick becomes developed, just as red blood is formed of the chyle from the white milk imbibed by the infant mammal; the albumen and other soluble constituents are separated from the blood, by exosmose, when the milk or egg is secreted, and the blood-disks are retained in the vessels; the new blood, however, formed from chyle or yolk, has

* Epithelium is not membrane; it is an unorganised *concretion.*

cells which become blood-disks,* colourless at first, but turning red as their iron is oxidated. The oxidation, however, is *not dependent* on atmospheric air, which can have no admission to the chick, but on the galvanoid influence of the nerves; it is not a single oxidation, but a *triple* compound of *iron* with *carbon* and *oxygen*, all three existing in the yolk; and, under the electro-galvanic influence of the nerves, the three unite into a *carbonate of iron*, which is of a dark-red colour, and rendered brighter by being decarbonised in the lungs when the animal begins to breathe. This must be the case with the embryo chick, whose nervous system is the first part perceptibly developed, immediately after which red disks begin to appear,—which has been attributed to atmospheric air, always found at one end of the egg; but this atmospheric air in an egg is a mere stagnant bubble, and not in contact with the embryo, being outside the lining membrane of the shell.

The rapid formation of red blood in the fœtal chick is highly interesting in reference to pathology, as it shows that red blood is formed from the albumen originally within the shell, without any addition of iron from without or of blood from the mother, as in the mammalian fœtus; and the amount of red blood increases in proportion with the development of the nervous system.

The want of red blood in anæmic states of ague, dysentery, and chlorosis, keeps pace with the diseased state of the nervous system; and though, empiric-

* It is easy to understand how these are formed, *i. e.* from albuminous nuclei, which condense after passing by exosmose.

ally, iron has been supposed to restore the healthy colour of the skin, it is not owing to its red colour, for quinine restores the colour in ague; mercury, and a variety of other medicines, in dysentery; and cubebs, as an emmenagogue, will restore the roses to the cheeks without iron.

From what has been here advanced, it may be inferred that the change of colour of *new* blood-disks takes place throughout the adult frame, as a part of the operations going forward in metamorphosis, and that the action of the lungs is upon blood-disks already *coloured eslewhere.* In support of this opinion, it may be stated, that the pathological deficiency of redness in the blood does not arise especially in patients whose respiration is embarrassed, or whose lungs are diseased, but in those in whom the nervous energy necessary to metamorphosis is deficient; for instance, the pale or, as it is called, anæmic colour of broken-down patients in protracted ague or dysentery, or those with liver disease, or chlorotic patients. Whilst, on the other hand, where the respiratory function is extensively diseased in consumption, the patient is often extra-florid, until great debility of the nervous system takes place, with general exhaustion and emaciation from defective metamorphosis, even when plenty of food is taken.

Metamorphosis is the key to pathology; that once understood, if we could attain an intimate knowledge of the processes, we might apply more direct remedies to their defects and aberrations, and establish therapeutics on a firmer basis. For instance, in all skin diseases the metamorphosis is imperfect; for instead of normal epithelial scales

being formed and established, they prove defective in various degrees; the simplest perceptible defect being that in which the scales are not sufficiently consolidated before fresh ones are formed, in consequence of a too rapid exosmose of cells, from debility of tissue, and hence the weak scales die as soon as shed, and become perceptible as a furfuraceous desquamation. Here the disease is visible to the eye; but there is a still minor shade in which there is only sufficient debility to produce a congestion in the basement membrane, from which* itching (prurigo) ensues, without any visible alteration. On the other hand, when the diseased state is greater than mere desquamation, we have a blastema† exuded by the basement substratum so rapidly, that there is not time for the epithelial scales to be organised, and consequently the moist exudation of blastema dries into scabs, as in psoriasis, or forces up the cuticle into vesicles, as in eczema, or ecthyma, &c.

We may, from analogy, consider that in diseases of other parts—epithelial mucous membranes, for instance, of all parts of the viscera, synovial or serous membranes, areolar tissue, the substance of muscles, tendons, or nerves—an error in metamorphosis is the

* A similar state of bronchial membrane produces dry, tickling cough.

† Blastema, the mixture of albumen and fibrine of the liquor sanguinis, which, the moment it is extravasated and motionless (from being taken out of the circulation), separates from the watery portion of the liquor (which is carried off by the absorbents) and becomes gelatiniform; it used to be called coagulable lymph. The blastema becomes further developed into epithelium, and forms the uniting material of wounded parts, skin, muscles, tendon, nerves, &c.

essence of disease, by producing solution of continuity, or by morbid deposits, one of the simplest phases of which is the degeneration of metamorphosis of nutrient cells into oily or fatty cells; in other instances, the cells help to produce solid gouty or calculous deposits; and in malignant diseases, distortion of the form of the cells themselves takes place, as in cancer, phthisis, &c.

In bronchitis, or croup, or diphtheria, there is redundance of metamorphic nutrient blastema caused by the relaxation of inflammation, which passes through the membrane by exosmose, and accumulates on its surface as diphtherite (*olim* false membrane); also in inflammation of serous membranes, though there be no apparatus of basement membrane, nevertheless an exosmose of metamorphic blastema takes place, which is capable of becoming an organised fibrinous adhesion, as on the pleura, peritoneum, or pericardium.

In some instances of simple incised wounds, the cut is healed immediately, if kept closed ("UNION BY FIRST INTENTION"), by the simple agglutination of the parts, by means of the albumen and fibrine, the blastema or blood plasma of the liquor sanguinis; and we know that not merely a part partially severed will reunite, but even a piece wholly cut off, if small, and not depending on vessels of any size, will unite by the first intention; as the top of a finger or a thumb, including even a bit of the bone, which had been cut off by an artisan with a sharp tool, has been replaced and has reunited; but as opportunities of witnessing such circumstances are rare,* some knowledge of physiology,

* The first authenticated case of this kind which I know of

and a reference to J. Hunter's experiments, are requisite to enable us to believe the fact.

No *inorganic* glue introduced under these circumstances could unite with cut surfaces, or *reunite* them; but the albumen of the living blood, which forms cells, is a living* material; and, as such, instantaneously adds itself to the cut living surfaces, and becomes a bond of union as a part of each of them, at the same time; thus restoring the continuity—of which there had been a solution—both of the areolar tissue and of the blood-vessels, of which albumen is a component part. This "vital" solidification of the blood plasma (fibro-albuminous coagulable lymph) is equivalent to the solidification of nuclei, or of cells of the blastema, into epithelial scales.

On the occurrence of a wound, a solution of continuity by cutting, if the union by first intention be prevented by disturbance or by the nature of the wound, it becomes necessary that the surfaces should be reunited by the ADHESIVE process—an interposition of an organised connecting medium; this repair is effected by the metamorphic cells of the part uniting with each other in a manner similar to that described above in the formation of the fibres of

occurred in Edinburgh in 1815; but since that period, the increase of machinery, especially chaff-cutters in stables, has supplied additional instances of fingers cut off and stuck on again.

* J. Hunter speaks of the "vitality of the blood:" he saw hypothetically that it had in it something analogous to that organisation which exists in the living solids: and which is here demonstrated by the author. The study of hystology has shown this to be albumen and fibrine, which constitute the first step of organisation in every instance, by furnishing the material of the cells which are the rudiments of each new formation.

muscle in the embryo. Cells and blastema are exuded from the cut surfaces, which concrete, remaining around the cut ends of the capillary arteries which have yielded them, and in communication with those open ends, so as to become organised, and to receive nourishment by the capillaries growing longer, continuing themselves onwards into the new formation until they meet. This spongy, newly organised mass gradually condenses, forming a firmer bond of union, a CICATRIX; and wherever solution of continuity is not reunited by first intention, but healed by the ADHESIVE process, a cicatrix or scar remains perceptible, a white line, as the newly formed solid has not the same amount of vascularity as the adjoining tissues.

When, from the magnitude of the wound or other circumstances, the parts cannot be brought close enough to be united by the adhesive process, the gap must be filled up by the slower process called GRANULATION, the progress of which is similar —exosmose of cells and lymph from the parts beneath, which become organised in successive additions at each side, until they meet and unite, the surface in the mean time appearing uneven, granular—whence the name.

During this granulation, there is always more blastema eliminated than can be used, *i.e.* become organised, and the redundant cells, being unattached, lose their vitality; consequently the fibrine enclosed is precipitated from its state of transparent solution, and renders the cells opaque, and these cells, mixed as they are with the plasma and liquor sanguinis, produce a cream-coloured, slimy fluid denominated PUS

—which process is SUPPURATION. This suppuration is not a wasteful excess of blastema, but an essential provision for the protection of the new granulations, which, if left uncovered, exposed to the atmosphere, would dry into a scab instead of forming the new substance required.

Pus forms in every part of the body, in areolar tissue and epithelial membrane. The normal cells of the part, in losing their vitality, become pus-cells, and vary in their appearance according to varieties in the circumstances of the inflammation; sometimes as gelatinous extravasated lymph and blastema, as in erysipelas, or in deeper-seated inflammation tending to abscess; but in either case, there may be resolution and reabsorption, with or without pus being formed. When the mucous epithelial membrane is inflamed sufficiently, pus is generated, the cells in the epithelial blastema being hurried forward and thrown off as a mucous or purulent discharge, instead of having time to condense into epithelial "pavement."

It has been asserted that granulation can, and does, take place without suppuration, as, for instance, in the healing of an ulcer of the cornea; but this is more apparent than real: the process is the same, but the tears wash away the blastema before the cells have time to become opaque pus, and *supply its function* of keeping the granulations moist. As for the other example adduced—that of the healing of abrasions of cuticle in some cutaneous eruptions —this is not granulation, but mere formation of new epithelial scales of cuticle from the blastema of the basement structure.

We have seen that adhesion and repair take place after damage, by the healthy, natural, nutrient process of cell metamorphosis; and that when inflammatory disease is present—as instanced in some skin diseases, or inflammatory exudation of serous membranes, producing adhesions, both being sequelæ of common inflammation—there is merely redundance of the natural process caused by that *relaxation* which is the *essence of inflammation*, as will be more fully explained.

Thus, in the healing, reparatory process, cell metamorphosis is normal; in inflammation, it is in excess—one state is healthy, the other diseased—they are different; and hence the healing process ought not, under any circumstances, to be denominated inflammation. Adhesion takes place as a part of healing, and adhesion takes place as the *result* of disease; but the healing adhesion ought never to be denominated inflammation—inflammation is disease; the expression "adhesive inflammation" is equivalent (spite of grave authority) to "a healthy disease." Adhesion takes place sometimes as the *result* of disease—pleurisy or peritonitis, for instance; but that adhesion occurs not as a part, but as a *sequel*, of the inflammatory mischief—it is the provision of nature for healing solution of continuity; but as no solution has taken place, the unbroken inflamed surfaces are glued together by the (unnecessary) *healing process, not by inflammation.*

In *malignant* disease, as *cancer*, the result is different—the cells of the blastema, on account of the malignity (occult), are incapable of uniting to form sound epithelium externally, or sound areolar

or other tissue internally. The reason of this is still unexplained, although thus much is ascertained—that cancer and other malignant cells are irregular and caudate* in their shapes, and mixed with oily, degenerated, and imperfect cells.

Under ordinary circumstances, a blow or injury of a gland or other part may produce inflammation, followed by exosmose of blastema, which may become an organised and persisting, "*indolent*," or innocent tumour; but in the *malignant* disease, this organisation cannot take place. If there be an approach to it, the metamorphosis is not perfect, for instead of formation of merely redundant fresh matter like the part, the fresh matter is of a new, imperfect character—not taking on the natural structure—but either extremely hard—"*schirrous*," imperfectly supplied with vessels or nerves—or, if soft, of a "*colloid*" or gelatinous consistency,—still, in either case, unlike the natural sarcose structure, deficient in nerves and vessels; and both of these tissues, on account of their imperfection, sooner or later break up, and then, instead of producing granulation with healthy pus-cells, which would heal, eliminate a succession of their own misshapen, imperfect cells, which are incapable of organising, and hence the malignant disease remains a hopeless sore.

During health, the capillary arteries continue their work of nutrition and secretion, the muscles

* When this was first discovered, it raised great expectations as to some improvement in the treatment of the disease; but it has not yet advanced us a step, any more than the discovery that digitalis made the pulse slow proved of any use in the treatment of consumption.

are fed, the mucous surfaces are lubricated just enough to prevent any sensation from the substances which pass along them, the serous surfaces are made sufficiently moist to slide upon each other without sensation,* and the skin is kept soft by an insensible vapour. All this time there is another process going forward also, which is, the *removal* of *superfluous matter* by the ABSORBENTS; if it were not for these, there would be inconvenient accumulation of what is deposited by the arteries: the serous cavities, as that of the abdomen, for instance, would become dropsical, if the capillary arteries went on moistening the internal surface, and there were no absorbents to carry off the superfluous moisture. Thus we see that absorbents take up the nourishment from the food to supply the wants of the system; they also take up the particles which become superfluous, according as the arteries deposit fresh matter: and *these* absorbents, like the lacteals, mix their contents with the old blood to be repurified. The *deposition*, above explained, of solid matter by the arteries is not difficult to be understood; and we can, by a reference to chemical action, account for the *removal* also even of *solids;* for solids become *fluid* (or gaseous) by what is called spontaneous *decomposition*, and thus *removable* by *absorbents*. Whilst bone is healthy, it is protected by its membranes from the action of solvents; but

* On the serous membranes there is no exosmose of albuminous cells, but merely of vapour, like the insensible perspiration of the skin. Nor is there exosmose on the epithelial mucous membranes, except from the follicles and glands, any more than there is from the skin.

when carious from disease, there is an extravasation of *serous fluid* in *contact* with it, which helps to dissolve it,—and, when dissolved, the absorbents will carry away the solution; though, when this process is too tedious, the "sequestrum" must be removed by operation.

The REMOVAL of BONE by the *pressure* of *tumours*, aneurisms, abscess, &c., as well as the CHANNELS left in *exostoses* for the *vessels* which *traverse* them, is effected by *pressure against vessels, not against bone.* The pressure of a tumour causes death of the part of bone, by compressing its vessels, and so stopping the supply of nourishment; the bone, when dead, becomes decomposed, and is carried off by absorbents. As to the channel in the growth of an exostosis, or in the natural growth of the bones of an infant's head, it is merely the deposit of bony matter *by the side* of those vessels which previously existed. Thus the pressure of so soft a body as the brain of a young individual causes the hard skull to grow larger, of which we have an exaggerated example in hydrocephalus.

Arteries are endowed with the power of contracting on their contents, so as to continue full even when a considerable quantity of blood has been lost either by hæmorrhage or artificial means. This contraction is the action of arteries, and is distinct from, and opposed to, the contraction and action of the heart. It is necessary clearly to understand this point in speaking of the phenomena of disease.

The contraction of the HEART is *muscular*—of the ARTERIES, *elastic.* The HEART *contracts* and re-

laxes ALTERNATELY. The ARTERIES keep up a CONSTANT *contractile pressure* on their contents; not, as has been commonly supposed, an alternate contraction and relaxation, but a continued contractile effort, both longitudinally and transversely, which is overcome by the action of the heart: when there is much blood sent into them, they are distended; and if there be little blood sent into them, as after hæmorrhage, their tendency to contract causes them to close, so as to keep always full, and to preserve a continuous stream of the blood, even during the temporary relaxation of the heart; and the ARTERIES YIELDING, and adapting themselves to the pressure of the heart, and RECONTRACTING on their contents, whilst the heart is relaxed and filling, is the CAUSE of the EQUABILITY of the STREAM in the VEINS; nay, the stream even in the arteries is much less in jets than is supposed by those who judge from the mode of its flowing from a wounded artery: for though, when there is a free escape from the wound, each impulse of the heart causes an unequal jet, it must be remembered that in the tube unwounded that force would have been partly expended in stretching the artery, whereas the artery when wounded ceases to be other than a simple tube, the elasticity not being called into operation, and there being no dilatation, on account of the escape of the blood from the wound.

The most simple mechanical illustration, perhaps, of this equability of stream is the *double* bellows of a blacksmith's forge, which keeps up a constant current of air, though the handle works with intermissions; so that the blast into the fire would be in

puffs, if it were not for the weight on the upper half of the bellows (equivalent to the elasticity of the artery), which keeps forcing out the air in a continuous current, during the time that the hand is drawing back to make another impulse.

It has been supposed that the circular fibres of the ARTERIES were muscular; that they contracted and relaxed at each pulse; and that the throb felt was caused by a *dilatation* of the artery. Those fibres are not like those of the voluntary muscles,* although they bear some resemblance to the muscular coat of the alimentary canal. On the outside of the circular fibres, a yellow fibrous layer exists. The contractile and elastic power of the arteries is due to the peculiar combination of materials, constituting the middle coat of the arteries. This structure is firm, and, though elastic, does not yield to the force of the heart at each beat, but, on the contrary, preserves the CALIBRE of the artery UNIFORM, as may be seen by laying bare an artery in a living animal, or when the artery is exposed in an operation: it does *not* dilate; it is, for the most part, LONGITUDINALLY

* This has been confirmed by the microscopical investigations of Schwann and Eulenberg (*De Telâ Elasticâ*, Berolini, 1836); whereby the long-continued controversy concerning the muscularity of the arteries is completely set at rest. They have unequivocally demonstrated that the middle coat of the arteries is composed of that peculiar elastic tissue (*tela elastica*) which constitutes the ligamentum nuchæ of vertebrated animals, the ligamentum flavum of the vertebral column of man, &c. No muscular fibres, like those of the voluntary muscles or heart, can be detected intermixed with the elastic tissues of arteries, and cellular tissue alone connects the various tunics. These elastic fibres are under the influence of the nerves, of electricity, and of chemical agents.

that the arteries are STRETCHED at each injection from the heart, by which their capacity is increased; the consequence of which, from their being bound down in various places, is, that there is a SERPENTINE motion in the artery where it is at all loosely connected.

The fibres of the middle coat of the artery, being arranged circularly, allow of their separation laterally, and thus *accommodate* themselves to the *elongation* of the tube, whilst they *resist* its *dilatation*. Now, it may be thought that the motion of the arteries *seen* at the wrist and in the temples is their dilatation; but, upon closer examination, it will be both seen and felt that this is the serpentine movement caused by the alteration of the curve, the artery being elongated at each injection from the heart.

Where the artery is perfectly straight, you may lay it bare and scarcely see it move; but the moment you compress it with the finger, or tie a ligature round it, you perceive it pushed at every pulse. To illustrate the deception of the sensation which the pulse gives, as if the artery were dilated at each beat:—if a long vein, removed from the body, have a syringe adapted to one end, the other being raised, or arranged with a spring-valve, which yields to the jets so as to keep it full, and fluid be sent through in jets, it will, upon pressure by the finger, give the sensation of dilatation, but the eye perceives none. Again, if one grasp the leather tube of a fire or garden engine, the sensation given will be that of its expanding in the hand at each stroke of the pump; but the eye contradicts the

sensation: it is merely the tendency to resume the cylindrical form from the outward pressure of the fluid, but not expansion.

Some writers have *attempted* to prove that the heart has an *active power of dilatation*,* by which it helps to *refill* itself by "sucking" in the blood, as it were; and one proof is brought forward, from the heart of any of the large mammalia, as the horse, ox, or whale, which affords the phenomenon of contracting and expanding after recent removal from the body: but the expansion is simple relaxation; and when a large heart is relaxing, if the hands be pressed on opposite sides of it, they will be sensible of an apparently active expansion from the mere gravitating recovery of position of such a mass of matter; the heart, in fact, not opening actively, but *falling open after* each *contraction.*

It will be shown now *by what means* the *blood fills* the *right auricle*, which, being flaccid, is easily distended; but it requires the muscular action of the auricle in addition to fill out the more dense ventricle,—this is the *use* of the *auricle:* it would be *unnecessary* if the ventricle had an "active power of dilatation." It is the constant pressure and equable stream which refills and distends the right auricle of the heart after each contraction; it is not, to use a vulgar expression, any suction of the heart, or suction of the chest, as has been attempted to be proved; nor is it an effect of vacuum and atmospheric pressure. There is no suction,† no atmo-

* An absurdity in physics. Even caoutchouc has no such power.

† Sir David Barry endeavoured to demonstrate experi-

spheric pressure, during *natural* respiration; for the glottis is sufficient to admit a free current of air: it is only in croup, or obstructed inspiration of some kind, as of an animal under experiment, that there can be any effect of atmospheric pressure.

A reference to the hydrostatic principle of fluid in bent tubes finding its level, will be sufficient to account for the capability of the heart to send the blood, with little effort, all over the frame, and for the refilling of the heart after each contraction. The heart sends the blood against the force of gravitation through but a small portion of the system; for in all the natural positions, upright or horizontal, by far the greatest portion of it is below the level of the heart. Now, the blood, being confined in (the arterial and venous) tubes, will, of course, on hydrostatic principles, return to the same level from which it flows; and as to the capability of the muscular power of the heart to inject the parts that are above its level, when any person compares the force necessary to be used in doing so with the force which an equal quantity of muscle in the arm is capable of exerting, it appears trifling: besides, whoever applies the hand to an aneurismal tumour may judge of the power of the heart. The blood, then, returning from the parts above the level of the heart, tends to refill it by gravitation, even if not

mentally, but unsuccessfully, that a suction, or atmospheric pressure, was produced by the expansion of the chest, exerting an influence in promoting the circulation; and the Committee appointed by the British Association to investigate the causes of the sounds of the heart, revived (1840) this opinion, which is inconsistent with the laws of physics.

aided by the contractile pressure of the arteries; the blood below the level of the heart, or rather arch of the aorta, returns by the tendency to find its own level; so that the BLOOD is PRESSED into the RIGHT AURICLE by the *weight* of the *returning blood* from all the parts *above* the level of the *heart*, added to the *pressure* caused by the *difference* of the *height* of the *arch* of the aorta *above* the *right auricle* of the heart, and, in addition, by *whatever remains* of the *contractile* pressure of the *arteries*. Another consideration has generally been omitted in calculating the power and facility with which the influence of the heart is communicated throughout the arterial system, which is, that any retardation which might take place from the friction through the tubes, is more than compensated by the sum of the branches being greater than each trunk from which they arise, so that the flow is facilitated; whilst, on the *principle of the hydrostatic press*, though the injecting force of the heart is spread over a greater space, it is not weakened, —being *multiplied*, not divided.

We must not consider the elastic contractile effort of the arteries as one of the moving powers of the blood, any more than the fly-wheel of a machine, or the weight on a double bellows, which only regulate motion, and are, in fact, a burden on the moving power, though they continue the motion for some time after the moving power has ceased to act. The moving powers are, the *muscular contractile force* of the heart,* *gravitation*, and the

* Let it not be objected that some lower animals, which have no heart, have still a circulation: the alimentary canal

hydrostatic principle above stated, of the *tendency in fluids to return to the same level.*

We must here take into consideration the phenomena depending upon the forcing-pump structure of the heart, mentioned above.

In the annals of medicine, nothing appears more extraordinary than that, until the beginning of the present century, no person should have thought of applying the ear to the chest for the purpose of ascertaining how far the actions of the heart and lungs were in a natural or deranged state; and Laennec is as much immortalised by this simple but valuable improvement as Harvey by his discovery of the circulation, Jenner by vaccination, or Stromeyer by subcutaneous tenotomy to cure distortions. To denominate this a simple improvement may appear strange to many, who have fatigued themselves by reading the prolix descriptions of the varieties and complications of auscultatory signs which have been given in books and published lectures.

Cui bono to give a description of the sounds of the voice, or of the breathing, or heart, to the extent of two, three, six, or more pages, to any person, unless, like Robinson Crusoe, he were living alone? inasmuch as, to know what the true sound is, he has only to apply his ear to the chest of any healthy individual of his family.

If we take, for example, a New Zealander, or any other person who had never heard a dog bark

performs the double function of stomach in making the blood, and heart in sending it on when made; as, in my opinion, the contraction of the alimentary canal of the higher animals sends forward the chyle in the lacteals.

or a cock crow,—how could we make him understand by any description in words, without an imitation, what the sound resembles? To a person who has never heard the sound of a common gong, describe it until he says he thinks he understands you; then let him hear it, and he will tell you that it is very unlike what he had imagined. Precisely the same would happen to any person who should read about auscultation before applying his ear to a healthy chest.

I will not therefore attempt (what Locke has long ago told us is impossible) to describe simple ideas of sense,—the natural sounds heard in the chest; but merely direct where the ear or stethoscope is to be placed, and enumerate the different sounds of the breathing, voice, and heart. By this means the natural sounds are almost instantaneously learned, and a person as readily distinguishes an unhealthy deviation as he perceives the change in a person's voice from its natural state to hoarseness, or the altered tick of his watch when out of order,—that is, if he know its proper tick,—for he may have never attended to that any more than to the sounds of the chest.

Of the natural sounds in the air-passages, there are three only to be learned; those occurring respectively in—1, the windpipe (larynx and trachea); 2, the bronchial tubes; and 3, the spongy lung.

The natural *sounds* of the heart are nearly similar to each other; the first occurs with the beat (systole) of the heart, the second immediately after. They are caused by the *valves,* which, being *membranous*, each time they *resist* the reflux of the

blood, are thrown into a state of sudden *tension*, which produces *sound*.

At the first perusal of Laennec's assertion, that the second sound was caused by the auricles, I perceived that it was erroneous, as being inconsistent with the successive actions of the heart, acknowledged by physiologists from the time of Haller, and fully confirmed by experiments on animals, —viz. that the auricles first contract; then, following continuously, as it were vermicularly, without any interval, the ventricles contract; and that subsequently there is a period of relaxation, or cessation of action, in each part, during the diastole* (expan-

* During diastole, the muscles of the heart are flabby, and yield to the pressure of a probe; whereas, during systole, they are felt to resist, or rather repulse it. The heart being a forcing-pump, it is merely necessary to apply one hand over it, and the other to the pulse, to be satisfied that the beat of the heart ("impulsion") depends upon the firm bulging of its muscles in the action of systole, exactly similar to the sensation felt by applying the hand to the cheek whilst the jaws are firmly closed, and the muscles alternately relaxed and put in action, as in mastication. The heart remains constantly in contact with the ribs, and does not *strike*, but *presses* against them. See E. L. Bryan's ingenious experiment in refutation of M. Majendie's opinion (*Lancet*, Feb. 8, 1834). Professor v. Kiewisch agrees with Mr. Bryan and myself as to the causes both of the sounds and impulse of the heart; as to the latter, his words are: "Wenn wir demnach unsere Fingerspitzen in den entsprechenden zwischen rippen Raum legen, so fühlen wir nicht, wie fälschlich angenommen würde, das Anprallen der Herzspitze an die Brustwand, sondern wir empfinden die Erhärtung und Schwellung der anruhenden, fixirten Herzwand;" which means—

If we apply the tips of the fingers to the corresponding interspace of the ribs, we do not, as erroneously assumed, feel the apex of the heart striking against the parietes of the chest; but

sion) between each beat (systole). I was thus satisfied, from the repose of the muscle at the moment, of the *impossibility* of the auricles having any thing to do with the second sound, there being no action of either auricles or ventricles going on; for it was during the time of entire relaxation of both.

Dr. Hope, in the first edition of his work on the heart (p. 49), endeavoured to prove that this second sound was produced *by* (he might have said correctly *during*) the "ventricular diastole," and "the blood *shooting* with instantaneous *velocity* from the auricles into the ventricles;" although, as he set out with acknowledging that the second sound takes place at the moment that the auricle is relaxed, the blood at that time could be only *flowing* into the ventricle *gently* from the veins through the auricles, as it

we feel the hardening and swelling of the fixed and immovable heart parietes.

Pr. Valentin distinctly agrees with me as to the sounds: "Das Spiel der Ventile mancher hydraulischer Vorrichtungen führt zu deutlichen Tonbildungen. Bedenken wir nun das der erste Ton mit der Systole oder dem Schlusse der Venösen Klappen, der zweite dagegen mit der Diastole oder der Schliessung der halbmondförmigen Klappen zusammenfällt (§ 587), so können wir vermuthen, dass *die beiden Herztöne, Ventiltöne sind*, die von den Schwingungen der angeschlagenen gespannten Klappenhäute herrühren."—*Grundriss der Physiologie des Menschen*, dritte Auflage, 1850, p. 198, § 607. That is—

The play of the valves of many hydraulic apparatus produces distinct sound. Let us, then, reflect that the first sound is synchronous with the systole, or with the closing of the auriculo-ventricular valves; the second, on the other hand, is synchronous with the closing of the semilunar valves, which leads us to conclude that both heart-sounds are valve-sounds arising from the vibrations of the stricken tense valvular membranes.

always does at that time; for the ventricles are partly filled in this way before the auricles (which are never empty) inject the blood into them, so as to distend them.

It was evident, therefore, that there was no cause in existence at the moment to produce the second sound, except the sudden tympanic tension of the ventriculo-arterial (sigmoid) valves; or, in other words, that the sound was entirely valvular; and having established that cause as "sufficient" for the second sound, I ventured, upon Newtonian principles, to assert it as the cause of the first sound, and can prove it to be so, the difference in form of the auriculo-ventricular valves and surrounding attachments accounting for the slight difference in duration and tone of the sounds. In health, there is no "*bruit musculaire*" (muscular sound); the first sound being slightly longer than the second depends merely upon the difference of the forms and attachments of the valves. The semilunar valves being inserted into circular rims, and themselves quite free, are tightened instantaneously; the auriculo-ventricular valves, with irregular margins, and attachments to carneæ columnæ, are not so instantaneously tightened, and therefore the sound is a little longer and less sharp. An idea of this may be given by striking on the table with the tips of three fingers firmly touching each other at the points, in the form of the three semilunar valves; the sound will be sharp and instantaneous: but when the fingers are allowed to separate ever so little, it is impossible to strike with them so as to produce this single sharp sound; and this illustrates the cause of prolongation of the first sound.

These opinions, which I had often put forward with friends and pupils, appeared to me such self-evident propositions, that, until I found Dr. Hope and others labouring to establish erroneous explanations,* I did not think it necessary to publish mine. At last I made them the subject of a communication to the Hunterian Society, 9th Feb. 1832, together with some practical observations, to show that pathological alterations confirmed my explanation. This was published in the *Lancet*, 19th May 1832.† Subsequently

* Even going so far as to try to support Laennec's mistaken assertion, that the ventricle contracts before the auricle, which is not correct. It is true that, when one action alternates with another, you may say whichever you please follows the other, if you pay no regard to the interval. The author respected Laennec when alive, and reverences his memory; but "*magis amica veritas.*"

† I here subjoin a short extract from the simple statement of the original communication:

"Upon applying the ear, or stethoscope, to the chest of a person in health, at that point where the heart may usually be seen and felt to pulsate—that is, between the cartilages of the fifth and sixth ribs on the left side—you feel the 'beat,' accompanied by a sound, *as if*[a] the sound were produced by a blow against the ribs, and, immediately after, a sound, rather shorter and weaker, appearing more distant, *as if* produced by the falling back of the body which gave the blow. . . . Now, these phenomena are caused by the ventricles and the valves, for, contrary to the opinion of the immortal Laennec, the auricles have nothing to do with the production of the sounds; the push is caused by the swelling up of the ventricular muscles in their systole to expel the blood; the first sound is caused by the tension, produced in the shutting, of the auriculo-ventricular valves, and the second sound is caused by the tension, produced

[a] It is this deceptive sensation which led Majendie and others to think that the heart leaves the parietes of the chest, and returns at each beat.

M. Rouanet brought forward a similar explanation in his thesis, which was noticed in the *Journal Hebdomadaire*, Sept. 1832, and copied into the *Medico-Chirurgical Review*, April 1833, as well as an extract from my essay. Mr. E. L. Bryan published a similar theory (*Lancet*, January 1833); but when he became acquainted with my priority, he very candidly wrote an acknowledgment, together with a critique on the "Report of the Dublin Committee of the British Association" (*Lancet*, Dec. 26, 1835, and Feb. 27, 1836).*

in the shutting, of the ventriculo-arterial valves. The cause here assigned might be thought inadequate to the production of the sound heard; but the little instrument used by gamekeepers to call partridges may be heard at the distance of a quarter of a mile at least, though consisting only of a bit of bladder stretched over a thimble, a membranous expansion which is five or six times less than the valves which act together in the heart, and which valves would give a much louder sound if not surrounded by soft parts. . . . This is a simple, unsophisticated explanation of the causes of the beat and sounds of the heart; and you will find that the morbid signs are all explicable as alterations of these."

The analogy of the mode of producing sound just alluded to is perfect. When sound is produced by the membrane of a drum or tambourine, it is done by a blow; but the sound of the partridge-call is elicited by the pull of the string, the knot of which is always in contact with the membrane; and, moreover, this membrane is, in its ordinary state, flaccid, not tight like a drum-head,—so that the sound is produced by bringing it from a state of relaxation to tension, as is the case with valves.

* Mr. E. L. Bryan's statement is: "Any flexible solid suddenly brought from a state of relaxation to a state of tension vibrates, and its vibrations are sonorous or not—*i. e.* audible or not—according to its physical structure. At the commencement of the systole of the ventricles, their auricular valves are

In giving the above explanation to my class, I was in the habit of exemplifying how the sound was produced, by a strip of paper about two inches long and half an inch wide suddenly stretched, the sound of which was heard all over the theatre. Dr. Hope subsequently mentioned, in his Appendix, 1835, his having applied a piece of tape for a similar purpose, and yet denominated my opinion "erroneous," and remained unconvinced.

Dr. Hope instituted a number of experiments, as is well known, in the endeavour to support his opinion, that both the first and second sounds were caused by the "motion of the contained fluids;" "the vibratory collision thus occasioned amongst the *particles of blood* producing sound." This cause, however, he relinquished for the "*bruit musculaire;*" and at last he was compelled to acknowledge, in his Appendix, 1835, that the cause of the first sound might be "*possibly partly valvular.*"

In the edition of his work published in 1839, he still adhered to the opinion of 1835, except that he quite acknowledged that the first sound is not merely "possibly," but actually partly valvular. But he coincided with the "Report of the London Committee of the British Association for the Promotion of Science," in the addition of bruit musculaire (*Medical Gazette*, Dec. 10, 1836).

Now, I maintain that the first sound, as well as the second, is entirely valvular, and deny that any part depends upon muscular noise (bruit musculaire);

flapped into play; at the instant of their closure, the whole substance of the ventricles and the valves are suddenly brought into a state of tension, and then consequently vibrate."

for when there is simple concentric hypertrophy (increase of muscle and muscular action), the cavity of the ventricles being diminished, there is diminution of sound, although there is more of the condition necessary to the supposed bruit musculaire. This contradicts his opinion, and confirms mine; inasmuch as it is the valves being encroached upon, and their having less blood to stretch them, which prevents their producing the usual sound. Again, when there is moderate hypertrophy, with proportionate enlargement, the cavity remaining the same, there is no appreciable increase of sound; though, if he were right, the quantity of muscle being increased, there ought to be increase of sound. My explanation accounts for the sound here remaining the same, as the valves are in their usual relative condition. Again, when the heart is enormously enlarged by hypertrophy and dilatation, in which case there ought to be enormous first sound (if bruit musculaire were a cause), there is scarcely any;* because the opening is so dilated that the mitral valves cannot act. Thus we have also pathological confirmations of my opinion.

In his last edition, 1839, Dr. Hope endeavoured to show that he was not ignorant of the valvular theory in 1830. He did not, however, understand it to the last; he there speaks of the valvularity of the second sound being confirmed by his experiments, as if he had not been labouring to overset it by his experiments, and as if I had not published

* As the left ventricle is usually the diseased part, the tricuspidal valve remains still capable of giving some sound, though embarrassed.

the valvular theory in opposition to him, when he was experimenting to establish the erroneous opinion which he afterwards relinquished for mine: his successive publications prove the fact. He says (p. 13), "that the sound was *not* attributable to the retrocession of the semilunar valves, I entertained a strong *presumption*." What was to have prevented him, as well as myself, from having a perfect *certainty* that it *was?*

I proved the *impossibility* that the second sound could proceed from any other cause than the valves; and Dr. Hope had exactly the same data to reason upon.

In his chapter headed "ERRONEOUS THEORIES," Dr. Hope states that my theory of the *first* sound is imperfect, because I do not add the bruit musculaire. This I deny: for, in the first place, there is no bruit musculaire; and next, the valvular "cause" is "*sufficient.*" I have accounted for the difference of sound by the difference of shape of the auriculo-ventricular valves; their attachments are different; they are set in stronger rims: the sigmoid valves are merely attached in a tube, as it were; whereas the auriculo-ventricular have a firmer and less regular attachment to the parietes of the ventricles, which being in systole at the time of tension, altogether a flatter and longer tone is produced. Again, and above all, as just stated, the sound is inversely as the muscular action, for when there is plenty of muscular action from hypertrophy, there is no first sound if the valves cannot act; hence *necessarily* it is the valves, not the muscles, which produce sound.

My principal object is to establish what I consider the truth of a fact valuable to the profession for diagnosis. I believe, however, that my opinion of the valvular theory—still disputed by some professors and writers on physiology—was then for the first time "in print" when it appeared in the *Lancet;* Dr. Carswell, it appears, had spoken of a part of it (for he got no farther than the semilunar valves), rather as an inference from an accidental case of disease than as a physiological induction; but I had explained it to my clinical pupils, Drs. Little, Frampton, and others, years before. Above 200 years ago, Harvey mentioned incidentally that the *pulse* may be heard in the chest; but he did not follow up the subject of the sound, which he attributes to the flow of the blood in the vessels: "Ita dum istis cordis motibus fit portionis sanguinis ex venis in arterias traductio, pulsum fieri et exaudiri in pectore contingit" (*De Motu Cordis*, cap. v.). In no other part of his works does he allude to sound.

Dr. Carswell, as just mentioned, had reported a case of heart-disease in which there was a perceptible sound, but which he mentioned as a morbid symptom only, without any allusion to the physiological sounds.

Laennec discovered accidentally that there was a regular rhythmical double sound, though he failed to understand it; and it was left for the author to discover and prove logically what he predicated of the true cause of the sounds. But logic is going out of fashion. If the brain of an individual contain natural logic, he can dispense with the artificial technical; but in any scientific pursuit, he will get on badly if he does not possess one or the other.

One writer says: "The first sound is certainly in part due to the impulse of the heart against the thoracic parietes; as is proved by the fact, that when the impulse is prevented, the sound is much diminished in intensity" (*non causa*). Of course it is diminished, if the heart be forcibly held away from the parietes of the chest; the sound will not then pass through the intervening air in addition, with the same intensity to the ear as it did through the solid parietes only; Majendie admits, that at the time of the first sound the heart is in contact with the parietes. The same writer proceeds to say that the dependence of the first sound upon the *striking* of the heart is proved also "by the circumstance that, when the ventricles contract with vigour, the greatest intensity of the sound is over the point of percussion" (*impulsion*). Who ever doubted this (*non sequitur*) truism, which has nothing to do with the argument? inasmuch as *percussion*, being an *un*truism, is *nihil ad rem*.

Having been the first to publish the valvular explanation of the sounds, I am bound to confute the assertion of Dr. Williams, "that I hold the same opinion as that in print by Dr. Elliott, and of which (he says) I was a *later* advocate:"* the fact

* *Lectures on the Physiology and Diseases of the Chest, &c. &c.* By Charles J. B. Williams, M.D., F.R.S. 1840.

The writings of Dr. C. J. B. Williams have justly so considerable a circulation, that I cannot permit his assertions to pass unanswered. He has paid me the compliment to mention my name in several works, but has, unfortunately (*hinc illæ lacrymæ*), uniformly misrepresented my opinions, which I cannot account for, as they are written in plain, homely English, not "wrapt in the obscurity of a dead language," like those of

being, that I proved the second sound to depend on the *tension* of the *valves*, produced by the backward pressure of the blood upon them *from the arteries;* whereas Dr. Elliott asserts, that the second sound depends upon the blood flowing *from the auricles*, which he even puts in italics; so that my demonstration is, that the sound is caused by the *valves* in *holding* the blood on the one side, whereas the "opinion" of Dr. Elliott, on the contrary, is that it is caused by the *blood flowing* in on the opposite side, and he uses the word "verrit" as expressive of the sound produced by sweeping or brushing along.

Dr. Elliott. But I do not despair of converting him at last, as, in the *London Journal of Medicine*, April 1850, he says: * * * "hence these (the heart and its valves), in their usual transition from slack to tight in systole and diastole, still produced their natural sounds. [Then, in a note.] This is my explanation of the natural sounds, inferred from the experiments before referred to. The ventricles with their valves, at each systole, are suddenly tightened on the contained blood, and thus produce the first sound," &c. This looks as if he were coming round from his opinion given at p. 206 of the Lectures, 1840, "that the cause of the sound must be in the solid structure of the ventricles" (*bruit musculaire*); and (p. 304), "*that the first sound is produced by the muscular contraction itself*, may be considered as proved by Obs. 8 and 9 of Experiment 1," &c. And again (p. 207), "the muscular contraction of the heart produced systolic sound, for we had the heart out of the body without its blood, *without valvular action.*" He cannot back out of this, "*litera scripta manet;*" and I do not quote his opinions without giving his words.

In his *Principles of Medicine* (2d edit. 1848, p. 305), speaking of "the rigors often experienced at the commencement or increase of inflammation," he says: "Dr. Billing plausibly ascribes this to the system sympathising at the death of the part which is under destruction by the suppurating process." Beg-

Again, so far from attributing the second sound to any thing but the rushing of the blood, he (following Dr. Hope) attributes the sudden nature of that sound to the rapid and vehement (as if relaxation could be vehement) diastole of the ventricle; and its abrupt termination ("*abruptam*" in italics) to the instantaneous impediment which the sigmoid valves offer to that motion of blood to which alone he refers as the cause of sound. Thus the only allusion he makes to the valves is, not as producing, but as cutting short, the sound; and so far from considering the valves to be the cause of sound, he

ging his pardon, this is exactly the opposite of what I had stated, viz. that the *suppurating process* is for the *restoration* (*not destruction*) of parts which have been destroyed by inflammation; and, in fact, in the passages to which he alludes,[a] I was combating the prevailing erroneous opinion, of suppuration being a part of inflammation, and pointed out that it is not till after inflammation has done mischief that suppuration, as a part of the granulating process, comes in to *repair* the damage. I instanced the rigors which accompany that destruction which takes place on the spreading of a carbuncle as an example of *rigors* being produced by *inflammation*, but not by *suppuration*, which does not occur till some time after the rigors; and what he has misunderstood is where I showed that the accumulation of pus in an abscess by *distension* produces fresh inflammation, and thereby destroys the soft parts next the surface, so as to let the pus escape, at which time fresh rigors occur from the *death of parts*, just as in carbuncle, but *not from suppuration*. It is true the *suppuration* produces the *pus*, which gives rise to no rigor if on an *open surface*, but which, if pent up and accumulating in an abscess, causes, by *distension*, *inflammation* and *rigor*. Dr. Williams might as well say that the *baker* filled the man's stomach because he made the *bread:* that might seem "plausible."

[a] *First Principles of Medicine*, 4th edition, 1841.

is evidently puzzled (as we may infer from the expression "fatendum est") to account for the sound ceasing when it does, "though the blood continues to flow into the ventricles after the sound has stopped," which my explanation of valvular sound renders perfectly clear: the passage shows that he looked only to the flow of the blood, and not to the valves, as the cause of the sound. In fact, so far from originating the opinion of the sound depending on the valves, he does not advance that as his opinion; and in his thesis there is no originality, but a professed compilation and adoption of the opinions of others—Drs. Hope, Williams, &c.

The following is the passage from Dr. Elliott's thesis:—"Nobis igitur (me judice) concludendum est, sanguinem a ventriculis agitatum et in arterias immissum, primum sonum cordis efficere: secundumque a sanguine pendere in ventriculos, dum horum fit diastole, ex *auriculis* influente. Hoc plane confirmatur a phænomenis quæ in vitiis valvularum cordis observantur. Naturam soni secundi *subitam* et *abruptam* oriri credo a diastole ventriculorum tam repente et vehementer inchoatâ ut sanguis vi magnâ auricularum parietes transcurrat: nec non ab impedimento quod in corpore sano fere instanter valvulæ præstant sigmoideæ sanguini, qui in ventriculos, dum horum fit diastole, ex arteriis vult refluere. Post sonum secundum quidem fatendum est adhuc plus sanguinis ventriculos inire: hic autem, ut annotat Hope, ventriculorum parietes (jam multo fluido distentos nec ultra ab illo fricatos) haud verrit, sed cum sanguine jam illic congesto, sese in silentio commiscet nec aliquid interea soni ab auriculis edi-

tur, quippe quæ sanguinem quem impellunt accurate usque sequuntur. Motum igitur sanguinis, tam a diastole quam a systole ventriculorum effectum, sonorum cordis præcipuam esse causam credendum est: quod ab observationibus quibusdam Doctorum Bertin, Williams, et Hope, singulari in modo confirmatur."

The London Committee of the British Association (including Dr. C. J. B. Williams), appointed to investigate and report upon the subject, appeared at last to agree with me as to the second sound, but made the unphilosophical addition of bruit musculaire to the true cause of the first (see *Med. Gazette*, Dec. 10, 1836, and Dec. 2, 1837). I say they appeared to agree with me, so far as acknowledging the valves to be the cause of sound; but they did not seem to adopt the true principle, which is, that it is the tympanic tension which produces the sound. This I judge from the expression in the Report, that "it is impossible that the auriculo-ventricular valves should close with a *flap*, in the same way as the sigmoid valves." They speak as if the surfaces of the valves flapping together produced the sound, like the click of a solid valve; and moreover, in conformity with this, in the republication of the same opinion in the *Cyclopædia of Anatomy and Physiology* (art. Heart, p. 616), edited by Dr. Todd, one of the Committee, my statement is *misrepresented*, by saying that the first sound is referred by me to the rapid *approximation* of the auriculo-ventricular valves; than which nothing is farther from my then clearly expressed opinion, which is, that both first and second physiological sounds depend solely on valvular *tension*.

M. Bouillaud (*Traité Clinique des Maladies du Cœur*, 1841), though he agrees with me and M. Rouanet in the main, makes, as he says, some slight modifications; for instance (page 151), he considers as an "element" in the first sound, the thrusting (*refoulement*) of the sigmoid valves against the *parietes* of the arteries! and he says (what I can scarcely believe) that Rouanet (like the London Committee) thinks, that when the sigmoid valves close, some sound is produced by their *surfaces* meeting* ("*claquer*"). Straight surfaces meeting suddenly might clack, but the parts of these curves must meet in succession, as wheels of a machine work upon each other, and quite softly; the firm tension and sound do not take place until after they are quite closed.

Notwithstanding the proofs that have been given as above stated, it is plain that considerable difference of opinion still exists amongst those who think on the subject; and some professors are either unable or too indolent to make up their minds, contenting themselves with saying that the question is not decided; and, in fact, that the question was still not generally understood, or *sub judice*, may be inferred from a patient compilation published a few years

* I have not seen the thesis of M. Rouanet, but the quotation from it in the *Journal Universel et Hebdomadaire*, Sept. 1832, p. 427, does not so express it: "Aussitôt que les ventricules commencent à se contracter, le sang, pressé de toutes partes, jette les valvules mitrales et tricuspides contre les *orifices* auriculo-ventriculaires, et c'est à ce choc qu'est dû le premier bruit du cœur, ou le bruit sourd. . . . . Les artères distendues repoussent *le sang contres les valvules* sigmoïdes, et de là le second bruit du cœur, ou le bruit clair."

since, which gives the following notions of Professor Skoda and others.

He says: 1. "That the right and left ventricles, *the aorta, and pulmonary artery*, combine in the formation of the sounds.

2. "That of the systolic sound, one portion is due to the ventricles, and *the remainder to the origin of the great vessels*.

3. "That, in a normal condition of the heart, the synchroneity of the causes which produce sound in the heart and large vessels *causes the two portions to be blended* together into one sound.

4. "That, in disease, a separation of the two portions respectively due to the right and left side of the heart becomes evident to the ear. Thus, in organic disease of the *aortic valves*, *their first* and *second* sounds* are replaced by a double murmur; but normal systolic and diastolic sounds may be heard over the valves of the pulmonary artery, and a normal systolic sound over the apex of the organ."

In this paragraph I object to "their first and second" sounds, there being but one sound attributable to the aortic valves; moreover, there is not always a "double murmur," but sometimes a single "bruit de soufflet."

5. "That the ventricular first sound is due to *the stroke of the apex*† *of the heart against the chest-*

* Thus making both first and second sounds come from the aorta.

† As it happens, E. L. Bryan has shown in the papers before referred to that the *apex* of the heart *never touches* the chest-wall, and the *side* of the heart *never quits it*.

I must, however, give in Skoda's own words the *un*proof

wall, the sudden tension of the auriculo-ventricular valves, and the impulse of the blood upon their tensile surfaces during the closure of the orifices to which they correspond.

6. "That the *arterial first sound* results from the suddenly increased *tension of the coats (!) of the aorta and pulmonary artery produced by the shock of the blood impelled upon them.*

7. "That the *ventricular second sound* is either the second sound propagated from the semilunar valves, or the *result of the shock of blood against the ventricular walls*, and *the sudden disengagement* of the apex of the heart from the opposed pericardium!"

"Credat Judæus Apella" such an untenable hypothesis! Here is another element of heart-sound; a sound like the drawing of a cork, or, as some persons, when they hear a thing which excites compassion, regret, or some other feeling, apply the tongue to the palate, and withdraw it with a sound of "sudden disengagement."*

that he offers: "Wenn man am Kadaver an der Innerfläche der Brustwand mit dem Finger oder mit der etwas fest gedrückten Herzspitze, &c., anschlägt, so hört man durch ein aussen angesetztes Stethoscop entweder ein Klirren, oder einen Schall, der von dem gewöhnlichen ersten Herztone in nichts abweicht." (*Abhandlung über Perkussion und Auscultation*, p. 187.) Which I translate: "If the inner surface of the chest in a *dead body* be struck with the finger, or with the apex of the heart firmly compressed, &c., a sound or clink is heard through the stethoscope applied outside which in no respect differs from the ordinary first sound of the heart." Now, as neither the finger nor the apex of the heart ever strikes the inner surface of the chest in a *living* body, the first sound is not "due" to either in any degree.

* After all, though I have quoted this alleged cause of sound

The causes of the natural sounds of the heart assigned by Hope are *two:* (1.) The motion, and collision between the particles, of the contained fluid, and (2.) bruit musculaire (he acknowledged at last a soupçon of valvular sound).

By Dr.† ********, *two:* (1.) Majendie's blow; and (2.) bruit musculaire (he also coming round to a valvular sound).

Dr. **** follows the Report of the Committee of British Association, of which he was a member.

Dr. Latham, *one:* Bruit musculaire. A more philosophical *hypothesis*—for he does not advance it as more—rejecting that "intricate piece of physiology" which would make "the first sound a compound of three sounds."

Dr. *********, *four:* (1.) Bruit musculaire; (2.) "tightening" of valves; (3.) Majendie's stroke of the heart against the ribs; (4.) collision of the blood against the orifice of the aorta and pulmonary artery.

on the faith of the commentator, I cannot find it in Pr. Skoda's work (*Abhandlung über Perkussion und Auscultation*).

There *is* a passage in Zehetmayer's *Hertzkrankheiten* which does contain that expression,—"Dass das *plötzliche Losreissen* des Herzens von dem Pericardium, während der Diastole ein Moment zur Erzeugung des zweiten Tones beitragen könne, will ich nicht in Abrede stellen."

† The author has in this edition suppressed the names of most living authors, in deference to the suggestion of a true friend, who says—what he has already experienced—that the *amica veritas* is not powerful enough to defend him against the enemies produced by polemical writing; and that, as he is not making his depositions upon oath, he may write the "truth," and "nothing but the truth," without stating the "*whole* truth."

Dr. ******, *four* "*essential* causes" of the first sound, besides "various subsidiary causes." (1.) Muscular action (*bruit musculaire*). (2.) Valvular tension. (3.) Forcible shock of fluid against resisting membranes, *i.e.* "the projection of the ventricular blood against the orifices of the large vessels, the flattened valves (M. Bouillaud's *refoulement?*), and the bases of the columns of the blood they contain, combined with the sudden extension of the arterial coats beyond." (4.) "Impulsion of solids against solids (heart's apex against the chest-walls) indubitably increases the first sound, and gives it, in peculiar cases, a *knocking* character." He evidently thinks that

> The heart in the thorax "goes knickety knock,
> Like a pebble in Carisbrook well."—*Rejected Addresses.*

Apropos, there is a striking remark of E. L. Bryan, that "if the heart jumped about in the chest, as described by Majendie and others, it would be quite inconsistent with the wisdom of the Maker, and a torment to the possessor of such a troublesome inmate." Whereas he demonstrates that, on the contrary, by the vermicular, peristaltic succession of change of bulk of the auricles and ventricles, the actions of the heart in health are effected with a smooth, unobserved motion in the pericardium, the whole bulk remaining the same by the compensating alterations in that of the parts—which may be easily seen by opening the chest of an animal deprived of sensation by chloroform, as in Dr. Halford's experiment.

Dr. ****** tells us, with respect to the sounds of the heart, "that from the time of Laennec to the

present day, at least *twenty-nine* theories have been proposed in its explanation;" and from the laboriousness of his work, doubtless he is correct; but what a libel on the brains of the profession! (1851.)

Another, 1851, assigns *seven* causes at least! (1.) Bruit musculaire, assisted by (2.) valvular tension, which may act as a "sounding-board!" and other secondary considerations; (3.) Majendie's blow; (4.) the pressing back of the semilunar valves (M. Bouillaud's *refoulement*), and (6.) rush of blood; (7.) the sound (*bruit musculaire*) of the *auricles!!*

The valves "a sounding-board" to the bruit musculaire! Thus, according to his ideas, the sounding-board of a piano-forte would give the notes, *assisted* by the wires. (See *Handbook of Physiology*, 1851.)

As there can be but one cause of any natural phenomenon "true and sufficient," such as the cause of an apple falling to the ground, what are we to think of these fantasies? What a noodle Newton must seem nowadays for having said (*Princip.* lib. iii.; reg. phil. i.) that "more causes than are true or sufficient ought not to be assigned," since "Natura nil agit frustra," and "Frustra fit per plura quod fieri potest per pauciora." This principle was admitted long before Newton's time: Οὐδὲν γὰρ ὡς φαμεν ματην ἡ φυσις ποιεῖ (Aristotle, *Polit.* i. 1).

One first-rate physiologist, 1851, assigns *three* causes: (1.) Majendie's blow; (2.) bruit musculaire; (3.) rush of blood *through the orifices* of aorta and pulmonary artery. He ignores the auriculo-ventricular valves, though he acknowledges the second sound to be entirely due to the semilunar valves. Nay, he stands almost alone, for he goes so

far as to say that "The natural movements of the mitral and tricuspid valves seem to be effected with *perfect freedom from sound!*"

In the *Library of Med.* iii. 262, we have "Bruit musculaire for the first sound, valvular tension for the second; but, in addition, this sound may be *reinforced* by the *diastole of the ventricles.*" In my opinion, if it required reinforcement, it could not get it from a muscle during relaxation, whatever sound a muscle may produce during contraction. This is equivalent to the untenable assertion which Sir D. Barry made, that the diastolic *relaxation* of the heart had an *active* influence in carrying on the circulation. Such absurdities do men fall into from neglecting the very elements of natural philosophy and logic.*

* It was this conviction which induced the Senate of the University of London to insist upon these subjects preparatory to graduation in medicine. The College of Surgeons have been gradually raising the tone of their qualifications; and to the College of Physicians it is due (by putting a premium upon the education of a gentleman), that the profession has not quite dwindled into a trade; whilst the University of London has lent its best support to these views. If a surgeon does not know a little of the nature of the momentum of falling bodies, he will scarcely be aware that there is more danger from a pebble the size of a walnut falling on a man's head in the shaft of a mine or of a deep well—which comes with the force of a bullet—than from a blow of a brick-bat in a mêlée on the level ground. And it is necessary to understand the "hydrostatic paradox" (Bramah's hydraulic press) to be able to estimate the force which acts in distending an aneurismal sac, and also in the circulation of the blood. A mere smattering of pneumatics, hydrostatics, &c., the very elements of natural philosophy, would have prevented Barry and other friends of ours from talking nonsense about "suction,"

Having, from *facts* established since the time of Haller, deduced my theory by logical argument *à priori* and upon Newtonian principles, I have never sought for *experimental* confirmation. The onus lies upon those who oppose it, and they do not agree; each has different fancies not worth combating, and I have enumerated them only to let my readers see their incongruity and untenability.

On the other hand, Mr. Brakyn (*Lancet*, 24th Nov. 1849) made an ingenious apparatus, by means of the heart of an ox and a flexible tube and bladder, which demonstrates the sufficiency of the valves to produce sound with fluid or air, but does not afford any proof as to whether the living heart produces any sound besides, any "bruit musculaire." But G. B. Halford, then house-surgeon of the Westminster Hospital* (*Lancet*, 26th June 1852), by experimenting on animals (dogs and donkeys) deprived of sensation by chloroform, the heart exposed, and the circulation still going on, shows that the sounds were heard only whilst the blood was admitted into the heart. He goes on to state:

"The superior and inferior venæ cavæ and the pulmonary veins were now compressed between the fingers; and the heart continuing its action, a stethoscope was again applied, and neither first nor second sound was heard. After a short space of time, the veins were allowed to pour their contents

"active dilatation," "*increased* arterial *action*" in inflammation, "the sounds of the heart," *cum quibusdam aliis*.

* Now Professor of Anatomy and Physiology in the University of Melbourne. "*Poeta nascitur non fit:*" and Halford like Bryan, was born a physiologist.

into both sides of the heart, and both sounds were instantly reproduced. The veins were again compressed, and all sound extinguished, notwithstanding that the heart contracted vigorously. Blood was again let in, and both sounds restored. All that is claimed for the above experiment is its exemption from any rude interference with the mechanism of the heart's action. The cavities of the heart are untouched, there is no finger thrust into the auricle or ventricle, containing blood and admitted air, no hooking back of valves;* in fact, not one source of sound substituted for another. Both sounds are destroyed and reproduced by the same means; the strongest argument for their both depending on the same cause, which is simply the backened current of the blood, first against the auriculo-ventricular, and second against the ventriculo-arterial valves."

Mr. Brakyn's experiment *proves* that the valves acted upon by fluid produce sound; even this has been denied by M. Gendrin, and others. Mr. Halford's sagacious experiment *proves*, besides, that when the fluid is prevented from acting on the valves, there is no sound, though, as muscular action is going on, there would be, if that were the cause; and I give the benefit of *petitio principii* to those who contend for other causes, more especially to M. Gendrin, who does not state accurately even the time of the sounds. He agrees with Hope and Elliott, and compares the second sound to that of the *marteau d'eau* (*Maladies du Cœur*, 1841).

But (though I deny it) granting for argument's sake that there be some sounds usually accompany-

* As in the experiments of Dr. Hope and others.

ing the valvular (the true, necessary, and only) sounds of the heart, these other sounds would afford no assistance in diagnosis: it is only whilst the valvular tic-tac is normal that we can be satisfied all is going well; as soon as that is interfered with, we suspect something is wrong: whilst a tune on the pianoforte is being played, the rumbling of a carriage in the street, or conversation in the room, does not produce any distrust of the instrument; but if a note does not sound, or if we hear a wire rattling, we know that it is out of order. The engineman of a steamer smokes his pipe in tranquillity so long as he hears the tic-tac of his engine, though the wind and waters, and the voices of men, and ropes, and chain-cables, may be rattling around; but let him miss but one tic, or hear the whiz (bruit) of an escape of steam, and he is upon the *qui vive* immediately.

When first combating the anti-valvulists, one of my illustrations was, that supposing (which is not the case) there were any other sound normally accompanying the valvular sound, it would have nothing to do with the forcing-pump-like physiological or diagnostic phenomena, any more than the *drone* of a Scotch or Irish bagpipe has to do with the melody. Now the Calabrian piper has discarded this relic of barbarism from his instrument, and plays his tune without any drone (*bruit musculaire*). Perhaps the animals which Halford experimented upon were Italian, as their hearts gave no bruit-musculaire drone.

It may be satisfactory to the reader to give an account of Dr. Halford's experiments, extracted from the *Lancet* of January 3, 1857:

"We beg to call the attention of our readers to an account of some important experiments on the nature and cause of the sounds of the heart, published in this week's *Lancet*. The experiments were conducted by Dr. Halford, formerly house-surgeon at the Westminster Hospital, and they are strongly confirmatory of the opinions on this subject long ago promulgated by Dr. Billing and Mr. Bryan. Twenty-four years ago, Dr. Billing taught that both sounds of the heart are essentially valvular; and, despite the opposition of numerous and able physiologists, there has been a gradually increasing measure of assent accorded to his doctrines. As far as the second sound is concerned, nearly all dispute has now passed away; but concord is by no means established as to the causation of the first. Whatever judgment may ultimately be passed on this debated question, the experiments referred to must be considered as tending to strengthen the valvular theory; and they are instituted with as little disturbance of the thorax as is possible—a circumstance which invests them with additional value. This is not exactly the place, however, to enter into a disquisition on a physiological subject; we, therefore, refer our readers to Dr. Halford's experiments and remarks, which are eminently suggestive.

"*Experiments on the Action and Sounds of the Heart.*

"Dr. G. B. Halford has lately given some interesting and original demonstrations and experiments on the heart's action and sounds at the following

hospitals, viz. St. Bartholomew's, St. George's, St. Mary's, and the Middlesex.

"The subjects of the experiments were dogs, which were submitted to the full influence of chloroform, and then the lecturer proceeded to remove the whole of the anterior part of the thorax, having previously inserted the nozzle of a bellows into the trachea, and maintained artificial respiration (chloroformed by dropping the fluid into the valve of the bellows). These things having been done, the artificial respiration being continued, the heart's action was clearly and beautifully seen through the transparent pericardium, and the movements of its several parts carefully noted. The lecturer stated most positively that all observations on the heart's action, after the removal of its investing, restraining, and regulating membrane—the pericardium—were useless as applied to the action of the heart enclosed in its 'caul,' and moving with the smoothness of the eye in its socket. As well might we look for perfectly uniform action of the muscles of the forearm without their fasciæ and inter-muscular septa, as to look for perfect and uniform action of the heart without its pericardium. That celebrated anatomist, Cruveilhier, had given us, in the *Gazette Médicale*, August 7, 1856, a description of the heart's action in the case of an infant born with ectopia of the heart; but he seems to have forgotten, in the minuteness of his observation, that what he was beholding was a *lusus naturæ*, not destined (because not perfected by the Almighty) for more than a few hours' fruitless and irregular struggles; for, strange to say, it possessed *no pericardium*, had no support, but by

its own gravity made its fixed point where in the natural heart there is most movement, viz. at its connection with the aorta and pulmonary artery. He doubted not for one moment the accuracy of M. Cruveilhier's observations, but they referred to an imperfect, and not to a perfect, machine.

"But, to return to the heart contained in the pericardium, and *in situ*, the following are the principal facts to be noticed:

"1st. When the ventricles contract—that is, at the time when the impulse is given by the ventricular fibres—the bases of the ventricles descend towards the apex, and the auricles immediately follow, occupying part of the space previously taken up by the ventricles in their relaxed, distended state, and which is explained by the loss of their contents during contraction.

"2d. When the auricles contract, they recede in the opposite direction, and the distended ventricles again occupy the space receded from by the contracting auricles.

"The lecturer showed that, by the above simple action, a reciprocity or compensation exists between the auricles and ventricles; and that, although the chambers of the heart are continually receiving and discharging their contents, yet this is so regulated as that the bulk of the contents of the pericardium (in which must be included the first portions of the aorta and pulmonary artery) is always the same. For instance, at the time of the contraction of the ventricles, the loss of the bulk of the fluid they are ejecting is made up, or compensated for, by the bulk of the fluid pouring into the auricles, and by the in-

creased capacity, and hence increased bulk, of the pericardial portions of the aorta and pulmonary artery,—and so on; but want of space prevents further following out this interesting part of the subject. The lecturer asserted that if the ventricles contracted in any other direction than that of from base to apex, the auricles could not receive blood, but that, according to his views, and to the evidence of one's eyes, the contraction of the ventricles permitted, by the recession of their bases, the pouring in of blood to the auricles; and, further, that the contraction of the auricles both caused and permitted the complete distension of the ventricles.

"3d. When the ventricles contract, and their bases descend, the aorta and pulmonary artery, being elongated by injection, likewise descend, and their pericardial portions at the same time are suddenly and greatly distended, but by their elasticity they as suddenly react upon their contents.

"4th. The impulse is felt all over the ventricles during their contraction. The finger and thumb, spanning the diameter of ventricles, are perceptibly further separated during the contraction of the ventricles, and approximated during their relaxation.

"5th. The apex is not tilted forward during the contraction of the ventricles, so as to give any blow to the thoracic parietes. From what is stated above, it is evident that any part of the ventricles, being in contact with the parietes of the chest, will give, during contraction, an impulse, an *apparent* blow; and in disease also, the heart beating here and there, as the case may be, whether one of enlargement or displacement; but they who, marking such impulse,

refer it to the heart's apex, had better begin to reflect, and to be more exact, both in their physiology and pathology.

"The next experiment referred to the origin of the sounds of the heart, which the lecturer contends is valvular, and to prove which he proceeded thus: The heart being exposed as above, the sounds were perfectly audible through the medium of a stethoscope. A pair of bull-dog forceps were applied to the superior vena cava, and another pair to the inferior vena cava, just as they enter the heart; the pulmonary veins entering the left auricle were also compressed between the finger and thumb, so that the heart became empty. A stethoscope was now applied, and, although the heart contracted forcibly, no sound was heard; the forceps and the fingers were removed—that is, blood was readmitted—and both sounds returned. The vessels were again compressed, and all sound ceased; the blood was again permitted to flow through the heart, and both sounds were restored.

"In the above experiment, by preventing the flow of blood through the heart, the valves cannot become tense, and hence cannot produce sound; that is to say, the mitral and tricuspid have no longer to resist the backward pressure of the blood during the ventricular contraction, while the semilunar do not move, being kept firmly shut down by the pressure of the blood in the aorta and pulmonary artery; but remove the fingers and forceps—*i.e.* readmit blood—and then the mitral and tricuspid valves are not only called into play, but thrown into powerful vibration, resisting the pressure of the

blood in the ventricles; the semilunar valves are forced upon, and again called into action and made tense, and both first and second sounds are restored. Therefore, the first sound is heard when the ventricles contract, and the auriculo-ventricular valves are made tense, completely separating the cavities of the ventricles from the auricles; and the tension of these valves produces the first sound. When the second sound is heard, the ventricular systole has ceased, the aorta and pulmonary artery have reacted on their contents, and the cavities of the ventricles are separated from the systemic and pulmonary systems by the closure of the semilunar valves, the sudden tension of which produce this sound.

"Before concluding his remarks at the several hospitals, Dr. Halford stated that he wished particularly to draw the attention of the profession to the writings of Billing and Bryan. Dr. Billing had been the first to state accurately the cause of the sounds, and his writings* were of great value to all who cared to reflect. Mr. Bryan† had not only most logically supported the same views, but had published a theoretical paper on the heart's action, which his (Dr. Halford's) subsequent and repeated observations had proved to be correct."‡

* *The Lancet*, May 19th, 1832; *First Principles of Medicine;* and, *On Disease of the Lungs and Heart.*

† *The Lancet*, February 8th, 1834; and other parts of the same journal in 1832 and 1833.

‡ After one day giving his demonstration to half a dozen Professors[a] in private, and having their unanimous assent to the

[a] It is clear from this that "all is not Gospel" which has been taught in the schools for the last thirty-five years, and that the student ought to be "Nullius addictus in verba jurare magistri."

The sound of the valves alone affords a sure guide to diagnosis, and an easy guide to the author, to E. Bryan, and others who understand them: those who allege other causes of sounds, acknowledge that there is great difficulty of diagnosis—we do not. The last-named gentleman, long after he was a qualified and an accomplished practitioner, paid me the compliment of attending my clinique for many months, and I never met with a more rapid or certain diagnosticator than himself, and partly because there is no person with whom I have had the pleasure of being acquainted who possesses such an intuitive perception of the truths of physical science;* with

truth of the author's theory of the sounds, Dr. Halford made the unpalatable observation: "What was there to prevent any of you from understanding Dr. Billing's original statement as well as I? I only invented this experiment to convince those who could not comprehend without it." The gentlemen present were, some of them, F.R.S., who had been writing and experimenting on the chest; one of them refused the author's offer to explain it to him, and, therefore, made a muddle of it in his book: and, from not understanding it, he underrates the value of physical signs, as at p.—but I must not mention which, as it might identify the writer almost as much as naming him, which I do not wish to do, for his work is valuable, though chiefly compilation: he is respected in the profession, and a worthy man. I had spent above an hour, a few days before, upon another of them, without convincing him: but there are persons who can with difficulty understand that two and two make four, unless you demonstrate it by putting down two coins first, and then two more.

* It is not often that one has the opportunity of acquiring such a friend, and I had the satisfaction of saving his life; as the case is very *àpropos* of the present treatise, I may here mention it. His brother, Dr. Bryan, came to me one evening in great alarm, and said he feared Edward was dying, as he was

him all seems instinctive, from the phases of astronomy down to the leverage of a crow-bar.

But, to return from this digression. By anatomical investigation, we ascertain that tubes of various dimensions, called vessels, and which are named arteries, capillaries, veins, and absorbents, are the apparatus of every process in the *growth* or *removal* of all parts in *health*, and in the *swelling* or *wasting* of parts in *disease*. Moreover, we must not forget—

in a most anomalous state, from a sudden attack of difficulty of breathing, without previous warning or apparent cause. I found him lying on his back, with great pain in the chest, and respiring moderately, but with coldness of the surface, and a sensation of extreme oppression; this I attributed to the want of action of the heart, which was scarcely beating with sufficient power to produce perceptible pulse at the wrist. The first thing that struck him and those about him was the idea of spasmodic cholera, of which there had been some cases in the neighbourhood. He was perfectly in his usual sound senses, and though convinced he was dying, an opinion in which several medical men who were present concurred, he was not at all alarmed; he even made us smile through our anxiety, by his apt illustration, as he told me he felt as if his heart and lungs were of stone, like the Comandatore in *Don Giovanni*. He did not appear to me to be labouring under any disease enumerated in nosologies, but like a person who had been poisoned; there was a tendency to retch, and a sense of relief from bringing up the slightest quantity of fluid or gas from the stomach. I gave him some tartar emetic, as the action of vomiting, besides relieving the stomach, has, like venesection, a tendency to restore the circulation—an effect witnessed in ague, asthma, &c. Upon asking him what had occurred,—whether he had eaten mushrooms, or other possibly poisonous substance,—he went on to relate that after dinner, to amuse his nephews, he had been showing them fireworks; that whilst swinging about some of these with coloured

and it is a circumstance to be recurred to perpetually, both in theory and practice—that *nerves*, *accompanying* the *arteries* and capillaries throughout, complete the apparatus.

The NERVES are whitish threads, which are distributed to every part of the frame, however minute; communicating with the brain, for the pur-

light, he had fully inhaled the vapours, which did not at the time attract his attention; for the symptoms had not come on until after he had returned into the house. Hence I judged that the strontian (a poison as virulent as arsenic[a] or oxalic acid), with the sulphur, carbonic acid, &c., resulting from the exploding fireworks, had been inhaled and absorbed from the bronchial surface, paralysing the nerves of the heart. But what was to be done? He said, "This cannot last much longer." After some consideration, I said, "If you let us[b] bleed you, it will take off the load from the heart, and your pulse will rise." I will not repeat his complimentary answer: he was bled, with immediate relief; the pulse rose, and he rallied; but months elapsed before he recovered the effects of the poison. We should have much regretted his having retired from the ordinary practice of his profession, if he had not devoted his powerful mind and kind disposition to the treatment of the insane.

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[a] I may here add a case of *arsenic* taken in by the lungs. A housekeeper in a large establishment finding that one of the servants had a paper of white arsenic for the purpose of killing rats, which infested his room, very prudently took it from him, but ignorantly threw it into the fire: as the draught in the chimney was not good, the gray, garlicky fumes came into the room; and instead of throwing open the window and retiring, she stirred up the fire, at the same time again inhaling the fumes. This produced frightful dyspnœa and coughing, followed by sickness and faintness. I ordered a number of leeches (they were then in fashion) to the scrobiculus cordis, and afterwards a blister, and administered morphia freely, with wine: she soon rallied, but was annoyed for some months by faintness and irregular action of the heart.

[b] Dr. Little, once my pupil and always my friend, was with me, and the assistance of his clear judgment gave me confidence under the trying circumstances. Two other medical friends, acting according to the hint of Hippocrates, retired before the experiment was made.

pose of informing it of what is going forward in different parts, as when any thing touches the hand, tongue, &c.; and for the purpose of conveying the mandates of the will from the head to the muscles of voluntary motion; and, again, supplying to *all parts nervous influence*, which excites *action*.

The nerves communicating with the brain do not blend, as they unite, into larger and larger trunks, but preserve their individuality, however aggregated, like threads in a skein, or strands in a rope.

When we speak of the nerves supplying to *all parts nervous influence*, which excites *action*, reference must be had to the spinal cord and sympathetic or ganglionic system, independently of the brain.

We have reason to believe that the nervous influence is generated, or secreted, in the more vascular cineritious (gray) part of the nervous system in the brain and ganglions, and conducted by the medullary (white) part; the *medullary* part in the *spinal cord* and *brain* being an *aggregation* of nerves from all parts of the frame.

A variety of circumstances lead us to the conclusion that the nervous influence is analogous to, or depending upon, if not identical with, the electric principle, or fluid, whatever that be.

1. The contraction of muscle by passing electricity along the nerve to it, either in the living body, or when dissected out.

2. Volition is conducted along the nerves with a speed equalled only by electricity.

3. The extrication of caloric, called animal heat, during metamorphic changes, is analogous to the gradual action of galvanic apparatus, &c. &c.

It is necessary here to consider ACTION as depending upon the NERVES. *Muscles* and *capillary arteries*, though *differing* in *tissue*, have each inherent in their structures a faculty of contracting, *organic contractility: this contractility* being *acted upon* by the *nervous influence*, the *result* is *contraction* (action), the nervous influence being discharged into them from the nerves; and this discharge may be produced in a variety of ways, as by the blood in the heart or capillaries, the presence of food in the intestines, in muscle by the will or the electricity from a charged jar, or Faradisation—these being known agents of contraction in the animal.

All organic action is contraction, produced by nervous influence. This is termed by Bichât, contraction from "organic contractility," resulting from "*organic* sensibility," which he distinguishes again from *animal* sensibility; thereby making it appear that the nerves act upon an ideal inferior sensitiveness in the structures, not confining sensitiveness to the nerves. Now, by his "*organic sensibility*" must *not* be understood *sensitiveness*, but that liability, or *capability*, of *structures* to *answer* to *nervous influence*, in the same manner that steam or any other agent produces action in a mechanical structure; this organic sensibility is, in fact, *organic contractility:* so that he divided one property into two.

What Bichât calls ANIMAL *sensibility*, is that function of the *nervous system alone* by which communication is kept up with the sensorium, and by which pleasurable and painful impressions are perceived: his ANIMAL *contractility* is merely *organic contractility* of *voluntary* muscles called into action

by the will; but I would not give organic contractility a new name, merely on account of the different orders of muscles receiving their influence in one instance from voluntary nerves, and in the other from involuntary nerves. Pain is the result of injury done to the nerves, and to the nerves alone, the union of the nerve with other tissues being only to convey sensation, or to effect action: *sensibility*, therefore, is in the *nerve*. When pain takes place from injury, in parts which, though not under the control of the will, are still abundantly supplied with (organic) nerves to produce action, as in the heart or intestines, Bichât says this pain is "organic sensibility (action) augmented" until it "becomes* animal sensibility" (*Système Capill.* § vi.); but, on the contrary, it may be seen that "organic sensibility" (action) is diminished in parts where there is pain (in the *sensitive* nerves) from inflammation.

In fine, I prefer the term *organic action* to *organic sensibility*, and do not make use of the term "*animal*" sensibility at all. I use only the terms, *organic action* and *organic contractility*, of the contractile tissues; and *sensibility*, of the nerves.

Bichât, I repeat, makes an ideal inferior sensitiveness in the structures, not confining sensibility to the nerves, as he says, "the nerves are strangers to *organic sensibility*:" this leads him to become visionary, when he speaks of the lacteals exerting a choice as to what particles they will take up; which apparent choice is mere chemical or nervous effect on their tissues, making them cease to absorb what is

* As they depend on different sets of nerves, one cannot "become" the other.

unfit for them, whether that be the result of the unfit matter, causing them to contract and shut against it, or to relax so as to lose power; still no election in them, any more than elective affinity of chemistry. From thus refining too much upon the functions as connected with vitality, he overlooked the more simple explanations which physics afford, and says that "it is ridiculous to attempt the explanation of the phenomena of changes in animal functions by mechanical laws and the variations in dimensions of vessels, &c.;" but I think I have shown, that what he calls vital laws, are but these mechanical laws modified by the Deity: we do not yet know the intimate structure or mechanism by which a muscle or capillary contracts; but doubtless it is as simple as a pair of lazy-tongs, and as easily excited to action as they are by the hand, or as the piston of a high-pressure engine is by the steam. There is no subject more interesting, no pursuit more gratifying, than this investigation of the properties and processes of our animal frame: there is no subject of contemplation which gives us so exalted an idea of the omniscience of the Deity, and so humble an opinion of all human inventions, as the excelling utility and efficiency of all its parts. How beautiful, how wonderful, then, must be the Soul, when such infinite wisdom, such exquisite arrangements, are lavished on the structure which it is destined to inhabit for but a short space of time!

The ANIMAL HEAT has been accounted for in different ways by several ingenious physiologists: from the aggregate of their opinions and experi-

ments we may deduce, that *heat* is *extricated all over the frame;* in the *capillaries*, by the *action* of the *nerves* during the metamorphic processes which *change* the *blood* from *scarlet* arterial to *purple* venous; and *also* whilst it is changing *in the lungs* from *purple* to *scarlet*.

There is a perpetual *deposition*, by the capillary system, of *new matter*, and *decomposition* of the *old*—"METAMORPHOSIS"—all over the frame, influenced by the nerves: in other words, the galvanoid or electroid influence of the nerves, which occasions these depositions and decompositions, keeps up a slow combustion. In this decomposition there is a continual disengagement of carbon, which *unites* with the blood-disks, returning to the heart at the time they change from scarlet to purple; this *decomposition* being effected by the *agency* of the *nerves*, produces constant extrication of caloric: again, in the lungs that carbon is *thrown off* and reunited with oxygen, during which *caloric* is *set free;* so that we have in the LUNGS a CHARCOAL FIRE constantly burning, and in the OTHER PARTS a FIRE of VEGETABLE or ANIMAL fuel, the one producing *carbonic-acid gas*, the other *carbon;* the *food supplying*, through the circulation, the vegetable or animal *matter* from which the *charcoal* is *prepared* that is *burned* in the *lungs*.

It is thus that the animal heat is kept up: on the other hand, the EVAPORATION of PERSPIRATION keeps the SURFACE COOL; but in inflammatory fevers, where this is *deficient*, the body gets too *hot;* and in low fevers, when the nervous influence is not sufficient to keep up the full fire, the surface

gets cooler than the natural standard. This is peculiarly evident in the beginning of scarlatina and other fevers, where there is strong heat, with the arterial colour of the skin; but if the same becomes malignant and low, with deficient arterialisation, from diminution of nervous power, the temperature sinks, and the diminution of the charcoal combustion in the lungs is evinced by the dusky colour of the skin, showing that the carbon is not thrown off as it ought to be: and the same phenomenon takes place in depressed cases, and still more so in malignant cholera.

Whatever NERVOUS INFLUENCE may be, or however generated, we know that the *energy of parts* depends upon a something that is communicated to them by the *nerves* in conjunction with the ganglia, brain, and spinal cord; that while parts are supplied with this nervous influence, they retain their power of action, and not longer; that arteries become less susceptible of impression from external agents when the nervous energy is low; that when the vital powers are sunk, the capillary arteries cease to secrete; that various *phenomena* in the *healing* of parts damaged by *inflammation* are the effects of *healthy action* of the nerves, heart, and arteries. We find likewise, when *nervous energy* is *deficient*, that parts which had advanced to a certain stage of healing become flabby, as in stumps after operation when the patient sinks; and that when the power of the constitution, the nervous energy, fails, nitrate of silver will have no effect upon ulcers, except chemical decomposition—not that astringent effect which is the result of contractility depending on vitality. It is

well known, likewise, that a blister not rising from a cantharides-plaister is a bad sign, as being an evidence of approaching, or rather commencing, death; this must not be confounded with a want of action in the arterial capillaries—the cause here is a want of injecting force in the heart; but no vesication will take place even from boiling water, when the vital powers are sunk, as the *heart* has not power to effuse serum. This is a more satisfactory example than cantharides, because the effect of the hot water goes so far as to produce the local injury, for the cuticle is separated or loosened by the mere chemical effect of the heat; though it is not raised, no serum being effused, on account of weakness; and this loosening takes place equally in a dead body.

With respect to the *action* of the *heart*, all are agreed that its action is contraction, by which the blood is sent forward in the arteries, and that the power of the heart's action is measured by the PULSE when there is no organic alteration, such as defect or ossification of the valves, aneurism, &c.

The *action* of the *arteries* also is acknowledged to be contraction, whether considered muscular or not; but there is some difference of opinion as to the *degree* of action of the arteries in *inflamed* parts. It is very common to say, that in INFLAMMATION there is an *increase of arterial action;* but a consideration of the phenomena, and of the nature of arterial action, will show that in INFLAMED PARTS the CAPILLARY ARTERIES are WEAKER in their action; that there is DIMINISHED ARTERIAL ACTION, for the action of arteries is contraction: now the arteries in

inflamed parts are evidently larger than before—less contracted, that is, acting less.*

An inflamed part is redder and swollen; where the vessels are visible, as in the eye, we can see that the redness is caused by the minute vessels becoming larger, so as to admit more blood (*hyperæmia*). This enlargement of vessels is not from increased action,† but, on the contrary, from their action being diminished, their giving way, and being *dilated* by the injecting force of the heart. The way to diminish the inflammation is, by increasing the action of the arteries, as by cold or astringents, which make the arteries contract, that is, increase their action; so that, so far from the arteries in an inflamed part being in a state of increased action, one of the means of *diminishing inflammation* is, by *increasing* arterial *action* in the part inflamed. It is common to remark the *throbbing* of the carotid arteries as increased action; but the more they throb, it shows that they the *more yield* to the injecting force of the heart.

When the eye, or any other part, is injured by heat, a stream of cold air, or a blow, or when a can-

* This opinion, promulgated for the first time in the *First Principles of Medicine* in 1831, is thus confirmed by Mr. Simon in his valuable treatise on inflammation: "An artery, by its increased action, can only effect a lessened access of blood to the parts which it supplies; and an augmented afflux of blood, so far as it depends on the artery, can only depend on that artery being in a state of diminished action" (*Holmes's Surgery*, vol. i. p. 18; 1860).

† It appears to me, that Mr. Lister confirms my views, both physiologically and pathologically, in his interesting paper published in the *Phil. Trans.*, 1858.

tharides-plaister is applied to the skin, &c., the part becomes redder from the vessels enlarging and admitting a greater proportion of blood than there was before. Now in this first and simplest instance of inflammation, the heart does not act more strongly than ordinarily, not affecting the pulse; so that the capillary arteries evince debility, by giving way when there is no more injecting force than they bore before without distension: from this they sometimes recover of themselves, gradually contracting to their natural size; or if not, the simple application of cold, or an astringent lotion, makes them contract, and the redness disappears.

It is the opinion of some persons, even at the present day, that the motion of the *blood* is *accelerated* in inflamed parts; though the experiments of Parry and others proved the *contrary* to be the case, as follows from the *capillary arteries* being *enlarged;* inasmuch as when fluid passes through a given space, the current beyond that will be slower in proportion to the wideness of the channel; as in a wide part of a river, where the current becomes slower: and the same may be observed by passing water, mixed with grains of amber, through a glass tube with a bulbous enlargement in the middle; the current will slacken in the bulb, and resume its velocity beyond it.

Some will allow that the capillary arteries, where the blush of inflammation shows itself, are weak, as they visibly have given way; but still speak of *increased arterial action,* and say that the arteries *around* or leading to the inflamed part are in increased activity, as a part of the condition, or of what keeps up the inflammation; not considering

that an increase in their action would be contraction, and consequently a diminution of the flow of blood to the inflamed part: in fine, an increased action in the arteries, both in and leading to the inflamed part, is just what is required to diminish the inflammation.

But so far from the arteries leading to the inflamed part being in a state of increased activity, we have obtained evidence that they also become weak when the inflammation continues for some time. Hausmann, to whom we are indebted for many valuable experiments on inflammation, has made a series of preparations of the leg of the horse, in which inflammation had existed, showing the participation of the larger arterial trunks in the inflammatory condition of the *capillaries*, dilatation having spread from the minute vessels of the part inflamed to the main arteries of the limb. The increased throb which is apparent in these during life confirms my remarks on the subject, that the throb and full feel of the pulsation is an indication of the artery having yielded to the injecting force of the heart.

The more the heart acts, the more, of course, it forces the arteries of the inflamed part; and the pulsation, which shows the power of *action* of the *heart*, is erroneously by some considered as an evidence of arterial action; the throbbing of the carotid arteries, for instance. As the heart, therefore, acts against the capillaries, if we cannot cause them to contract strongly enough to resist its force, we are obliged to diminish the force of the circulation, either by taking away blood, as was formerly

the custom, which decreases both the quantity of blood sent to the arteries, and the action of the heart itself, and in this way leaves less for the arteries of the inflamed part to do; or, we can lower the force of the heart by medicines, such as digitalis, morphia, antimony, &c. Here, for illustration, the simplest cases of inflammation have been taken, in which the heart is acting naturally, or nearly so, the inflammation being from injury.

Sometimes parts are loaded with blood when we cannot find evidence of inflammation, which state is called CONGESTION. Inflammation or congestion are but varieties of distended vessels, which, if they cannot unload themselves, we assist by applications or medicines which make them increase their contractile action; or if that alone is not sufficient, by taking off some of the force which injects them, or, as it is called, the *vis à tergo*.

The difference between CONGESTION and inflammation is, that in congestion there is merely distension of the vessels; in inflammation, there is, in addition, alteration of tissue—actual deterioration, more or less, of the structure of the capillaries. Thus congestion may be produced in a part by a ligature; by the pressure of a tumour; by obstruction to the course of the blood, as by diseased valves of the heart: and vessels thus congested may remain so for a great length of time, and quickly resume their natural state, when relieved from the pressure of obstruction; in fact, the vessels cannot be said to be diseased. But the case is different with inflammation; the fault commences in the tissue. As soon as a want of that

harmony between the nerves and capillaries, which is necessary to organisation, takes place, their fine tissue begins to decompose, there is exosmose, extravasation of liquor sanguinis, the particles which were held together by this inscrutable agency begin to be precipitated from one another, the granules, nuclei, and cells of the metamorphic process begin to degenerate, and the part becomes softer;* and this takes place in every shade and degree, from the slightest scorch of the fire, or erysipelatous blush, from the wound of a gnat or other insect, to mortification and putrefaction.

When the valves of the heart are diseased, the obstruction, thereby caused to the circulation, produces *congestion* (engoûment) in the lungs, which is very different from the state of *inflammation* (peripneumony), although *both* are "*hyperæmia.*"

Let us see how far we can go in proving that the *capillaries depend* upon *nervous influence* for their contractile *action.* Blushing is, perhaps, the most unequivocal proof that an alteration in the dynamic force of the nerves is the cause of sudden dilatation of the capillaries. It is not the action of the heart alone which causes the partial flush ; for, first, the heart often acts more strongly without causing blushing, and, next, the blush is partial;

* The liver, lungs, or brain, when much inflamed, break between the finger and thumb like moistened bread ; the heart and other muscles are palpably softened ; the intestines soften so as to give way, and even so far as to become perforated ; and the bones, though not softened in their crystalline earthy structure at first, yet, when their membrane is damaged, they begin to decompose, and soften so as to yield to a knife.

whereas, when the mere action of the heart causes increased redness of the skin, as from exercise, it is not partial, as it is in blushing from mental emotion. And this, which is sudden weakness of the capillaries, has been commonly attributed to the "increased arterial action," and "determination to the face." I attribute this giving way of the capillaries to derivation of the nervous influence, which, being diverted to or expended in the brain more freely by mental emotion, of anger, embarrassment, or shame, robs, for the moment, the capillaries of the face of their energy. Fear, which for the moment diminishes the action of the sensorium, has the opposite effect. The author is quite aware how hypothetical this explanation is; but as he has not met with any other more plausible, he ventures to advance it.

What is called the blush of inflammation may be brought on in a part by reiterated strong electric sparks, or Faradisation.* It may be said that the effect of the electricity is on the tissue of the capillaries; but the first effect produced is pain, showing that the operation of the electricity commences on the nerves, sensitive as well as organic.† The same observations are applicable to the blush produced

* This relaxing effect of galvanic action on the capillaries, through their nerves, may be inferred from the rapid cure of some cases of amenorrhœa by Faradisation, which we may infer to result from the relaxing effect on the capillaries of the uterus.

† An animal may be killed by a strong electric shock, or by lightning, and not the slightest injury of the vascular tissues be discoverable by dissection; and as we know that the nervous tissue is the part affected by electricity, its lesion must be inferred to be the cause of death.

by heat from a fire; and we have a proof that this is the effect of nervous influence before injury or alteration of the structure of the vessels, by the common experiment of those who have sufficient resolution to hold the burned or scalded part to the fire, and remove it gradually, which will prevent the disorganisation that would otherwise take place—in common language, prevents blistering. The mischief is caused by exhaustion of the nervous influence: the sudden removal of the excitant leaves the capillaries destitute, and they *yield* immediately to the *ordinary injecting force:* but if the excitation be renewed and kept up, by holding the part to the fire, nervous influence is supplied from the neighbouring parts to the capillaries, with pain certainly; but, by slowly removing from the heat, the nervous influence will be gradually supplied, till the excitant be reduced to a natural standard, relieving the pain and incipient inflammation. On the same principle may be explained a fact pretty generally known, that if melted sealing-wax be dropped on the skin, and be immediately removed, the skin will blister, or at least feel scorched, and remain painful for some hours; but if the wax be allowed to cool gradually before removal from the skin, the pain, though severe during the cooling, ceases immediately, and no blister arises. These I consider to be proofs that the diminution of nervous influence, rather than alteration of tissue, is the prime cause of the relaxation of the capillaries; for if it were alteration of the tissue, not diminution of tone, the renewal of the heat would add to the previous mischief, instead of affording relief. Be-

sides which, if there were decomposition by the heat, it could not restore organisation.

The *progress* of inflammation shows the dependence of the capillaries on the nerves. A part may, in certain cases, be observed to become tender before it is red; for it has been observed by experimenters that the pleura or peritoneum of an animal is not extra-sensitive immediately on exposure; it first becomes tender, and then red. In inflammation of the conjunctiva of the eye, it is painful, feeling as if there were sand under the lid, some time before its vessels are enlarged. The pain of erysipelas of the face, or of shingles, precedes the redness. The action of cantharides in producing inflammation is another proof that inflammation begins in the nerve; for cantharides have no effect on the tissue of the capillaries, do not corrode or act in any way on their substance after death, when the nerves have no influence; whereas any really corrosive agent would act even more on the dead than on the living capillaries. Without, therefore, at present seeking for further proofs, I deduce from blushing, and from the effects of electricity, fire, and cantharides, that the capillaries are dependent upon the nervous system for that tone or energy which preserves them from over-distension.

The brain, spinal cord, and nerves, again, depend upon the due nutrition afforded by the arteries, which supply them with scarlet blood.

Though Bichât denies the influence of the nerves, or says that it is almost nothing in secretion, exhalation, &c., we may consider that the sudden alterations of these from mental emotion prove

incontestably the contrary; besides the proofs already advanced, that capillaries, which are the agents of these functions, derive energy from the nerves.

A cautious application of heat or electricity to an eye red from chronic inflammation will, in suitable cases, cure it, by stimulating the nerves. Spirits, oil of turpentine, squills, even solution of cantharides, &c., cautiously applied to a wound, or, through the circulation, to a secreting organ, will cause the capillaries to contract; in reality, stimulate them to action (contraction). But the same agents, applied too strong, exhaust the nervous influence, and relaxation (which has been erroneously called arterial action) takes place. This will explain why certain remedial agents, used to diminish inflammation, will, when pushed a little further, irritate, and subsequently increase inflammation.

It is sometimes remarked that "local irritation *detains* the blood" in a part, as if by some obstruction or attraction; whereas this phenomenon of hyperæmia may be explained by the increased capacity of the vessels causing a slower current, as before stated, thereby *permitting* the blood to be *delayed*. Besides the expression *detention*, and the terms *congestion* and *inflammation*, there is another word, DETERMINATION, used to express an habitual reception of more blood than natural in a part; as, "determination of blood to the head, with throbbing of the carotids." The throbbing of the carotids has been already explained not to be active, but passive. Now, the word *determination*, in ordinary language, would imply that blood is sent somewhere in particular; but the heart has no power

to direct any blood to one part more than another, although, if in any part there be an unusual relaxation of the vessels, they will receive more than ordinary; as, when the water is sent through the main pipe of one of the water-works, it cannot be determined to any house in particular, but whichever house has the largest cistern will receive most water.* This illustrates the fact that the state which is miscalled determination is not active, but passive. The term also used by Bichât, of the blood being "drawn or invited into an inflamed part," may be explained on the same principles.

Irritation, continued excitation of the nerves of a healthy part, as just shown, at last produces in-

* We have an interesting physiological illustration of this principle in the "determination" of blood alternately to the stomach and spleen. A given quantity of blood is constantly sent through one arterial channel, which branches off to the stomach and spleen; when the stomach is empty and collapsed, its arteries being likewise collapsed, the blood passes into the spongy texture of the spleen, so constituted and situated as to be ready to receive it; on the contrary, when the stomach is distended with food, its elongated arteries admit the blood freely, and consequently the spleen, being then less forcibly injected, collapses and contains less blood. The spleen thus performs the office of a mill-pond, by receiving the surplus of the stream when not required for the mill, the stomach; and, by this compensating contrivance, the quantity of venous blood sent to the liver from the two organs does not fluctuate. I have never found reason to alter this opinion respecting the use of the spleen, advanced in my thesis (*Dissertatio Medica, &c.*, 1818). Again, we have an illustration from comparative physiology: according as the lungs and thorax become developed in the tadpole, there is an increased development of arteries and capillaries, exactly equivalent to what is called determination; but the increased influx of blood is merely the result of increased vascular capacity.

flammation, by exhausting that nervous influence which gives the capillaries power; they thus become weakened, allow of over-distension, and the part becomes in the state of inflammation or congestion. This effect may be produced by electricity, which acts palpably through the medium of the nerves; so that redness produced in this way is as evidently through the abstraction of nervous influence as blushing.

This is a therapeutic operation often misunderstood; the morbid state of some organs, especially the uterine, is frequently anæmic instead of hyperæmic, and greatly relieved by electricity or galvanism, which, by exhausting the nervous activity of the part, induces relaxation and *increased* injection of the part, and in this way frequently relieves amenorrhœa.

Thus, in a part inflamed there is a diminution of organic action, in consequence of which the blood is admitted in excess. As long as the capillaries are supplied with nervous influence, as long as they possess perfect organic action, they preserve a due size; when they lose it, either from the influence not being supplied from the nervous system, or are robbed of it by heat, electricity, cantharides, or other cause, they give way, and admit more blood than before. Taking this view of the proximate cause of the enlargement of capillaries, we can account for all varieties of congestion, from a simple transient blush to the stage with which inflammation commences; and it must be almost impossible to draw a line between congestion and inflammation, one passing into the other by insensible shades. Hence

the numerous terms used by authors to express the gradations of distended capillaries: congestion, active and passive, engorgement, hyperæmia, erythema passing to erysipelas, &c.

When congestion or inflammation subsides without solution of continuity, or leaving any trace behind, that is called RESOLUTION; and it is very intelligible how cold and astringents promote this desirable termination; as does also a means not so commonly applied—an even bandage, with gentle general pressure, over an inflamed limb.

It does not follow, that where there is diminished secretion, there is obstruction; on the contrary, there may be more space for the flow, but then in a slower stream: for, as has been shown (p. 79), the consequence of enlargement of the capillaries of a part is, that the flow of blood will be slower in them; the supplying arteries remaining the same, the larger the capillaries supplied by these branches, the slower the current will be, as in the skin, kidneys, serous membrane, salivary glands, &c. Hence, to account for the diminished secretion, it is not necessary to suppose either any of the old doctrines, "spasm," or "*error loci* of the red particles, getting into the colourless capillaries:" it is enough to consider, that the fluid finds an easier way, by the enlarged capillaries, onwards into the veins, than into the ramifications or cœca of the excretory tubes, unfitted as the capillaries are for secretion, owing to the morbid alteration of their physical condition;*

* It is evident that the cœca themselves must be narrowed by that congestion or enlargement of the net-work of capillaries surrounding them, which is produced by inflammatory relaxa-

and besides, yet more particularly, through the alteration of their dynamic (galvanic or electrical) condition, consequent upon the alteration of the supply of nervous energy to the part, the original cause of all the disturbance. Local enlargement of capillaries explains that kind of diminished secretion where the heart is not deficient in injecting power; the relaxation of the capillaries, from want of nervous energy, producing a deficiency in the current of the blood; as in a dry skin when inflamed or feverish, or kidneys inflamed, or their capillaries enlarged by cantharides, so as to diminish secretion, in the manner just explained.

In some cases of disease, when the secretions of the skin and kidneys are deficient, we renew them by digitalis, antimony, &c., which lower the force of the pulse, thereby diminishing the distension of the capillaries, in conformity with the above statement. On the other hand, in health, stimulants, such as fermented liquors, by increasing the nervous energy in the kidneys, &c., and quickening the circulation at the same time, increase secretion. Or, medicines such as uva ursi,

tion, as is well known to take place in hepatitis, nephritis, &c. We can understand, too, that the tubes themselves may be thickened, until their calibre is obliterated by the internal swelling of their substance, as takes place in inflammation of the liver, &c. We cannot illustrate this better than by the influence of turpentine on the kidneys. When given in small doses, its action on the capillaries is tonic, and the quantity of urine is increased; but if too large doses be employed, the reverse takes place, and as soon as irritation or inflammation is produced, and evinced by pain in the back, the secretion of urine is checked.

digitalis, antimony, neutral salts, &c., have a local astringent effect when circulated, besides their influence on the pulse. Stimulants cannot increase secretion by quickening the circulation, when the capillaries are in a state of debility and morbid congestion; and a still further proof that they are in a state of morbid congestion, is the effect of cold to the loins in such cases in renewing the secretion; and also the constringing effect of cold water, even cool air, in promoting the secretion of insensible perspiration, and thereby softening the congested skin, in scarlatina.* Increased secretion takes place sometimes with a weak pulse. It will be found that this occurs in cases where, although the circulation is weak, the capillaries are not congested, as in hysteria; in the sweating of hectic, and also in the sweating stage of ague, after the hot, dry, congested stage has passed off, analogous to what was stated above of the effect of cold in scarlatina. In these cases, there is a deficiency of nervous influence, which, if the heart were acting strongly, would cause parts to flush; as we see, in fact, in the flushing alternations in hysteria, hectic, &c. But when the heart is not acting strongly, and there is a debilitated, anæmial, or flaccid state of an organ, the kidney for instance, which produces a limpid state of the secretion, this may be counteracted by giving either diffusible stimulus or local stimulus, such as turpentine, or a combination, such as sp. junip. co., &c., either of which, when circulated

* In 1815, it was quite the fashion to lift patients in scarlatina out of bed on the sheet, and drench them all over with cold water.

to the kidney, by eliciting more nervous influence, will restore the organ to its natural dynamic state, and thus both diminish the morbid secretion and render it less limpid.

The healthy operations of the capillary arteries have been traced, as far as their continued and gradual deposition of matter in its various modifications from solid bone to vapoury exhalation. Their depositions are very gradual, in proportion to the whole quantity of blood passing through them, a great portion of which returns by the veins unchanged, or at least unconsumed; so that there is always an abundant overplus ready for the demands of the system, to compensate loss of blood from wounds, or from bleeding employed as a remedy.

Whilst the processes described go on, the animal suffers no inconvenience—is in health; but when accidental mechanical injury, or other cause, changes the action of the capillaries, either by a direct impression on themselves, or by primarily injuring their nerves, the derangement of their action is the commencement of disease—secretions become altered, checked or profuse—nutrition is either diminished, so as to produce emaciation, or there is an excessive adipose deposition—vapoury exhalations are diminished to dryness or increased to fluid—bony matter is deposited in wrong places, or albuminous, fatty, and other particles, so as to constitute tumours—the nerves of parts become morbidly sensible, so as to derange the functions of those parts—portions, on losing their vitality, undergo spontaneous decomposition, and are removed by the absorbents.

To explain this more in detail, every DISEASE is some *alteration* of those very *actions* which, when perfect, constitute the *welfare* of the animal.

Many persons of great experience practise moderately well empirically, without much exertion of reasoning powers; but he who begins upon principle, and then profits by experience, must become a much more skilful practitioner. How many persons apply a poultice to an ulcer with a tolerable certainty of improving it, without ever knowing or caring for the *rationale* of the effect!

By studying the operations of nature, we are led to imitate by analogy. Independently of the regulation of temperature, the usual benefit derived from a POULTICE is that of preventing premature scabbing, by the soft moisture assisting the pus to protect the granulations. The German WATER-DRESSING has much the advantage over a poultice: the piece of lint dipped in water is lighter than the poultice; the oiled silk over all retains the moisture; and the whole does not spoil the sound skin, as the poultice often does. If poultices be too long applied, "PROUD FLESH" will form—a superfluous growth of healthy granulations, or of such as are weak and spongy. Exuberant unhealthy granulations may be checked by applying an ASTRINGENT, such as nitrate of silver, or sulphate of copper, &c., which, by constringing the vessels, gives a firmer, smaller granulation; healthy redundant granulations, by vinegar, which dissolves them; or in either case merely laying on a piece of DRY LINT, to absorb the blastema as fast as thrown out, will restrain granulation. This accounts for dry lint preventing the

healing of some ulcers, and assisting others, according as the granulations require repressing or not; and what has been here stated affords an explanation why in some cases dressings should be changed frequently, in others as seldom as possible. Strapping unites the advantages of keeping the granulations moist, with SUPPORT; but if injudiciously applied, injury is done by the pressure. Pressure should at first be so gentle as *not* to *compress*, and should merely be sufficient, by affording *support* (page 89, line 10) to inflamed and distended vessels, to stop the inflammation; after which, stronger pressure may be resorted to without producing pain.

I have above used the term *premature* scabbing, because the crust formed is sometimes of use; as, in the natural process of healing of an ulcer or abrasion, the crust sets bounds to the granulations, which otherwise might sprout too high, and protects the newly forming cuticle.

The application of dry lint will be enough, without an astringent, if the proud flesh be merely too great a growth of healthy granulations; but if the granulations are also weak, the astringent will be necessary in addition: this weakness may be known by a livid colour, and thin, instead of creamy, pus; and if still weaker, the granulations will even melt away, and the sore reulcerate. Now, an inexperienced person would suppose that the application of nitrate of silver (lunar caustic), or sulphate of copper, would increase the pain; but it is well known that, though they produce momentary smarting, especially if applied undiluted, this soon subsides; so that a patient will fall asleep shortly after the

application of nitrate of silver to an ulcer, which had banished rest for several days and nights by its morbid sensibility. The beneficial effect may be thus explained: The nerves of the part having become inflamed, and their vessels partaking of the debility of those in the surrounding tissues, the astringent diminishes the inflammation in the nerves, and thus removes their morbid sensibility, bringing them to the state of the nerves in a healthy granulating part, in which those below the granulations are sensitive, but not more so than natural. Oil of turpentine applied to a burn acts on the same principle of bringing the nerves to the state of those in a healthy part, not merely by astringency, but also by eliciting more nervous influence in a part whose vital power is depressed (p. 84).

This will aptly illustrate the nature of MORBID SENSIBILITY, usually designated by the vague term IRRITATION, which does not occur during the REPARATORY PROCESS, if the nerves are not inflamed. A considerable degree of pain may exist during even the healthy reparation of injury, when the healthy nerves are exposed and hurt; but there will be more disturbance and loss of sleep, with perhaps less pain, if, from the nerves themselves becoming inflamed,* morbid sensibility arises, either locally, or in the nervous centres, in consequence of the lesion of the nerve being extended to them, whether the lesion be in the sensitive or organic filaments: in the latter case, there can be no evidence of morbid sensibility, until the lesion is propagated to the nervous centre; as in tetanus, which has been known

* I know no other term by which to express their lesion.

to arise after a cut had healed almost by the first intention, without pain in the cicatrix; or convulsions from worms in the intestines, which have caused no pain.

By a process analogous to adhesive union (see p. 23), blastema, exuded in consequence of inflammation between SEROUS MEMBRANES, sometimes becomes organised, and forms ADHESIONS. But the adhesion is *not inflammation*, any more than the union of a cut; it is the *sequel* of inflammation—exudation of blastema—a *reparatory* process, though superfluous.

Nevertheless, I find an admirable practical pathologist and physiologist* make use of the expression, "new material lymph, the product of adhesive inflammation." Why should the albuminous lymph, which exists in the blood, be denominated a new material?—it is ready without any process for "healing by adhesion," as may be seen by merely preventing union by first intention, when it is produced, I say, by mere exudation, together with cells, without inflammation. And he even says: "its continuance (*i. e.* of inflammation—I should say, its occurrence)

* *Vide* Holmes's *System of Surgery*, article "Inflammation," vol. i. pp. 584 and 588. See also Simon, *op. cit.* p. 34. He says: "Textural growth, as a *constituent* of *inflammation*, becomes the agent of textural repair."

The adhesion of the pleura after pleurisy is not inflammation, but the healthy action to repair an injury, precisely equivalent to the adhesion of the opposite surfaces of an incised wound, by means of coagulable lymph. Alison, in his clever *Outlines of Pathology*, speaks of inflammatory lymph forming the substance of granulations. I consider that it is healthy normal, not "inflammatory," lymph.

is a hindrance to that organisation of the lymph which is essential to complete adhesion."

In EPITHELIAL MEMBRANE the change is very rapid from health to disease: by a slight alteration of the action of the capillary arteries, which secrete a vapour or mild fluid to lubricate and protect the surface, as of the nostrils or lungs, it either becomes dry, or a thin saline fluid is poured out, which, so far from protecting the parts, irritates them and others with which it comes in contact. Again, after the mucous membrane has been throwing out the inflammatory fluid just described (as in catarrh), or a glairy, tough phlegm (as in bronchitis or pneumonia), the thickening of the discharge, and its becoming bland and opaque, yellowish-white (in other words, approaching to, and in some instances forming, actual pus), is the simple reparatory or restorative process; and we know that various mucous membranes, whilst inflamed,—the urethra, for instance,—throw out an ichorous fluid, which becomes true bland pus as the reparatory process proceeds; and it is the same with respect to the schneiderian membrane.

Thus, we see, we can have both blastema and pus, without solution of continuity. Sometimes blastema with cells and granules oozes from the capillaries of inflamed mucous surfaces, and concretes, forming diphtherite or FALSE MEMBRANE, as in croup or in diphtheria, analogous to the exudations on serous membranes just mentioned, but does not become organised as on them, or in healing by adhesion—hence called false. In dysentery, however, vessels do sometimes shoot into it,

showing the effort towards organisation. Similar formations are also sometimes passed from the bowels, which have been mistaken for a separation of the lining membrane. They are of a tubular form, different from the long, vermiform evacuations of merely condensed mucus which are sometimes passed from them. Hunter alludes to a close analogy between the throwing out of "coagulable lymph," blastema, during or after inflammation, and the formation of the lining membrane of the gravid uterus; but, according to the best obstetric authorities (Tyler Smith and others), neither the lining membrane of the gravid uterus, nor the catamenial casts, are inflammatory—the first being converted, and the latter exuvial, epithelium—the proofs of which would be foreign to this treatise. Sometimes an apparently false membrane forms in the unimpregnated uterus, which occurs in cases both of dysmenorrhœa and menorrhagia; and it is a question whether a diphtheritic blastema may not be considered as the foundation of polypi. Thus the same fibro-albuminous blastema, so useful for the purpose of repairing damage or continuing the species, sometimes kills—as in croup—by blocking up the windpipe; or produces blindness, by rendering the cornea opaque; or glues the intestines to one another, after peritoneal inflammation. And we have not only these false membranes, as they are called, thrown out on serous surfaces, as the pleura, but also pus, without breach of surface. The operations of nature are uniform and simple,—the reparatory process is uniform and simple. The throwing out of the blastema in these cases is equivalent to its being thrown out to effect union

by first intention, adhesion, or granulations; though, from the locality (the cornea, windpipe, &c.), it becomes inconvenient, or even destructive.

If, by a blow or other injury, as by caustic, or by any inflammation, the *life of a portion be destroyed*, whether superficial or deep-seated, it gradually decomposes, and separates from the living part; sometimes in the form of a discoloured slough, the fluid parts running off when the slough is on the surface. The *separation* is effected by *decomposition*, and *not* by the *absorbents* of the living part removing a portion of the dead parts, as has been by some asserted: the part at the line of separation of a slough of the skin, for instance, decomposes most rapidly, from the heat and moisture of the surrounding living part; whereas the centre of the slough sometimes dries up, like a piece of leather. Occasionally it happens that, from absence of moisture, the consequence of *gradual* extension of the mortification, the dead part, instead of decomposition, undergoes uniform desiccation, and the disease is technically termed *dry gangrene*.

After a recent injury, or the separation of a slough on the surface of the body, an open wound, an ULCER, is left, which, if the reparatory process go on naturally, will be filled up by granulation, as already explained. If a smooth, hard substance be laid in the wound (as a pea or bean, to keep open an issue), it prevents the formation of granulations; but, as the reparatory process, or effort, nevertheless goes on, pus is still secreted from the capillaries,—and as soon as the hard substance is taken away, the formation of granulations will recommence. Here,

again, we must not confound the reparatory process with inflammation: a properly managed issue is not in a state of inflammation; on the contrary, it is well known that if it become inflamed, the pea must be taken out for a while to ease it, or the part will become swelled, red, and painful; and either *proud flesh* will form round the margin, or *ulceration* take place.

Ulceration is the death of successive layers or minute portions of an open wound, of whatever dimensions, the solution of continuity having been effected originally either by spontaneous inflammation and decomposition, or by external injury; and the substance which successively dies in an ulcer is not *separated* from the living part by the *absorbents*, as has been generally asserted, but decomposes and dissolves away. Again, an ulcer is not necessarily in a state of inflammation; for, on the contrary, whilst healing, it is in a state of reparation; and it is any renewal of inflammation which causes enlargement—*fresh* ulceration. There is a little apparent contradiction in this statement, from the word ulcer (*ulcus*) signifying simply an open wound, whether it has been formed by other means, or by the process of ulceration, or ulcerating inflammation; but I repeat that, though the *diseased* process of ulcerating (spreading) is ulcerative *inflammation*, yet in the resulting wound when once formed there is not necessarily inflammation any longer existing; and it is, on the contrary, by carefully warding off inflammation that the surgeon cures the ulcer.

An ulcer, therefore, is *not* necessarily in a state of *inflammation*; it is the *space left* by the destruc-

tion of a part by mechanical or chemical injury, or by inflammation: but if the constitution be in a natural state, and the ulcer not influenced by any morbid poison, it goes on granulating and healing. If, on the other hand, inflammation be renewed in it, each renewal may cause fresh loss of substance, the spreading *ulcer* thus becoming what is called *phagedenic*.

When the whole part, killed by external agency or inflammation, separates at once, forming a *slough* instead of gradually dissolving away, it is called GANGRENE, SPHACELUS, or MORTIFICATION. A slough may be produced by caustic, as in making an issue, then called an ESCHAR; or by chemical caustic poisons, as I have seen the whole lining of the œsophagus slough away at once in a suicidal patient who had swallowed pure nitric acid, and who survived long enough for the sloughing membrane to be thrown off.

When I say that the absorbents do not effect the separation of a slough, I do not deny that they may, and do, nevertheless take up some of the decomposed matter; for we know that on the death of a part which is not superficial, and when, as under the skin, the dead matter, being confined, cannot run off, the absorbents will often by degrees convey it all away; but in the case of a caustic eschar, as well as of a gangrenous slough, it is decomposition, not the absorbents, which effects the separation; the blastema of the live tissue cannot stick to the dead tissue. When any injury, as from a blow, or inflammation, is sufficient to cause death of a portion deeper seated *below the skin*, the dead slough is called a core, as

in a boil or carbuncle; the decomposed matter may be carried off by the absorbents and (venous) capillaries, as we see in the case of an ecchymosis of extravasated blood; but in general, as the reparatory process causes the secretion of pus (suppuration), an ABSCESS takes place. It is sometimes incorrectly said that, when inflammation exists, it is of consequence to prevent suppuration. Now, what is to be prevented is, the death of any portion; if that take place, then suppuration is merely a matter of course, as a part of the reparatory process. After what I have stated (page 24), it is scarcely necessary to add, that I do not admit of the explanation, of pus being formed by the mechanical or chemical breaking down and *liquefying of coagulable lymph*, as asserted by Laennec, in speaking of empyema; nor the explanations of Dupuytren and others, of part of the sloughs of abscesses *dissolving into pus*.

The cavity of an abscess is sometimes lined more or less with blastema, analogous to the granulations and adhesions above spoken of. This CYST, as it is called, of the abscess does not set bounds to the abscess, but passively depends upon the quantity effused into it. When the inflammation is diffused or ramifies, we have diffused or ramified abscess, as from DIFFUSED CELLULAR INFLAMMATION.

Though it has been stated by high authority, that "inflammation is the means by which local injuries are repaired, and may be considered as the restorative principle," I contend that it is no such thing; but a state of disease; or else, why speak of employing remedies for it?

All *inflammation* is *weakness;* the part in which

it occurs shows laxity of substance and diminution of cohesion: we know that the capillary vessels are enlarged, and the tissues softer and more easily torn than in health; this is apparent to the eye, and confirmed under the microscope—of which the clear proofs in detail may be read in the writings of Paget, Simon, and other authors, both English and foreign.

The intrinsic nature of this weakness is the imperfection, more or less, of the metamorphic nutrient process of formation of cells and nuclei, which is incessantly going on for the support of the various parts of the animal, with the assistance of the nerves.

This weakness is of all gradations, from a slight hyperæmial blush to alteration of structure; and, when still further increased, actual destruction of structure. These degrees may be produced artificially and demonstrated, as by the application of pure potash; which will induce at first slight redness; or, when continued, pain and separation of cuticle, with organisation enough left to renew the cuticle; or, if pushed still further, destruction of the organisation, so as to destroy the apparatus (the epithelial membrane) which forms cuticle, and leave a permanent excavation. And these are the degrees of inflammation or inflammatory disease, in whatever part they occur, or however produced — by caustic, or fire, or frost; by blow or wound; or disease, acute, chronic, specific, contagious, or accidental.

This is the same wherever inflammation occurs—in the areolar tissue of fleshy parts or on the surfaces; whether the epithelial membrane of the skin,

or of the surfaces of the passages through which go the air, or the food, or the excrementitious matters which are expelled from the body.

A distinguished writer on inflammation (W. Lawrence) asserts, that the "adhesive inflammation which precedes the act of ulcerative absorption obliterates the vessels," so that there is no escape of blood. This, as an *enumeration* of *phenomena*, where an abscess has formed and pointed, is true, but is no more than a mode of stating the phases: as a *rationale* of the process, it is incorrect; there is no such thing as adhesive *inflammation* (as before stated, p. 26)—the inflammation is that which destroys the life of the part, whereupon the separation of the dead portion takes place; which has been erroneously attributed to the absorbents. The reparatory (adhesive) process, which is intermediate, by its lymph stops the vessels, so as to prevent hæmorrhage, and subsequently produces granulation and suppuration, as before explained. In fact, the succession of events is as follows: *inflammation*, death of part; *reparatory (adhesive) process*, effusion of lymph closing vessels; then *ulceration*, decomposition and separation of dead parts. Thus I can account for bone, tendon, cellular tissue, and other parts dying and dissolving, then gradually coming away by absorption, or in shreds and fragments; but the explanation of their separation from the living tissue by the absorbents nibbling them across, as it were, is neither intelligible nor credible. Again, the term ulceration is used by authors most contradictorily; as, for instance, besides its true meaning of eroding, we have the expression

"the process of ulceration,* by which the surface is restored."

When a part receives a blow of a certain force, there is an extravasation of blood from the capillary arteries, or an effusion of lymph, which causes swelling of the part. In this instance, healthy capillaries are compelled by force to allow their contents to escape, which are afterwards gradually removed by the absorbents. In disease, the process is similar; in erysipelas, the capillaries being damaged by inflammation, liquor sanguinis is effused, causing swelling, which is reabsorbed as the patient recovers; in dropsy nearly the same takes place.

By savine or cantharides ointment we can produce an inflammation—such a relaxation and debility of the capillaries of a part, that they break away from the adjacent parts, by which means warts are thrown off; and this, as regards the mode of separation, is analogous to the rising of the cuticle from a common blister. These phenomena have usually been wrongly attributed to the savine and cantharides producing "a higher degree of action of the vessels than the parts could bear," which is altogether irreconcilable with the true physiology of vascular *action* (see p. 78 *et seq.*). The surface inflamed by cantharides pours out liquor sanguinis as the sound cuticle is detached. The tuft of capillaries springing from the cutis, and which forms the epithelial basis of a wart, is destroyed by the inflammatory process,—by ulceration. The inflammation attacks and destroys the

* It ought to be, granulation. Ulceration erodes, does not restore.

vitality of the basement membrane on which the wart is formed.

The cicatrix after a wart, resembling the cicatrix of a pit of small-pox, is sometimes permanently visible, but not always so; as the cicatrix of a small-pox spot is sometimes not a permanent mark, or, in other words, *small-pox does not always pit.* The reason of which is, that the small-pox vesicle does *not always suppurate*, though it has incorrectly received the name of pustule: it is at first only a vesicle filled with serous fluid, which is *usually subsequently* converted into a pustule. The superficial nature or the contrary, the presence or absence of a cicatrix, depend upon the previous loss of substance, or otherwise, of the dermis or true skin, or merely of the cuticle. The separation of a wart may, or may not, be accompanied by ulceration of the surface from which the wart has been detached. In small-pox also, the maturation of the eruption, which is at first vesicular, consists in effusion of liquor sanguinis (lymph), by which the vesicle is enlarged, and, through the change of colour of its contents, is thought to be transformed into a pustule. This transformation may, or may not, be accompanied by ulceration of the dermis; if not, there is no pus and no pit. In confluent small-pox, ulceration of the bases of the pustules always occurs, hence the subsequent pits upon cicatrisation; in some parts, as the face, when several pustules run together, sloughing as well as ulceration ensues, from which originate the unsightly seams often perceptible. True pus is not formed, except on the surface of membranes, unless the inflammation has been sufficiently great to cause

that lesion of the capillaries which requires effusion of blastema and pus for their reparation, equivalent to granulation and suppuration; but, of course, when this takes place in a mucous membrane, the moisture, and substances passing along, in general prevent the granulating lymph from remaining or forming a coating; so that we seldom see false membrane on mucous surfaces, the pus only being perceived. Fortunately, true croup, or that accompanied with plastic exudation, is comparatively a rare disease; but I have known false membrane, diphtherite, form even in the urethra—at least, small tubular shreds of blastema. Again, we have, after the same degree of lesion, the restorative process sometimes throwing out blastema, equivalent to granulation, or rather to adhesive union without pus; as may frequently be seen upon the surface of the skin, the lymph immediately drying into cuticle, after a slight abrasion, or a common blister, when the cuticle is often restored without suppuration, and leaving no mark; but sometimes the skin is injured, and pus is formed during the necessary process of repair, leaving a mark. Occasionally, after a blister, even when the skin is not injured enough to require suppuration, we see a superfluous quantity of that lymph (blastema) which usually forms cuticle thrown out with the appearance of jelly.

The small-pox eruption, as just mentioned, is only a vesicle, though a reticulated one, being an aggregate of minute vesicles formed in succession, precisely like the vaccine. The vaccine always in the end pits, as there is loss of substance of the epithelial membrane, owing to the intensity of the

inflammation; but the chicken-pox, which is a more simple vesicle, and of shorter duration, rarely pits. The cause of the peculiar depression in the centre of the vaccine and small-pox vesicles, whilst the eruption is at its height, is this: each eruption first forms in a point, and that point, having gone through its inflammation before those that follow around it, is elevated on a smaller scale, and its coagulable lymph begins to dry up whilst the circumference is still fresh and swollen. The vaccine central dark spot has been attributed to the cicatrix of the lancet-puncture, and the variolous spot to the binding down by a sebaceous duct; but the lancet-puncture heals by first intention long before the specific inflammation begins; and there are many more than one sebaceous duct in the space of either a vaccine or variolous vesicle.

The effect of inflammation, as is evident from its proximate cause (relaxation of capillaries, and the degeneration of cells, more or less), is to SOFTEN the tissue in which it takes place. An inflamed part may feel hard on account of tension; but when cut into, the inflamed tissue will be found softened.

Inflammation as hitherto considered is what is called ACUTE, wherein either *resolution* or *destruction* of *parts* soon takes place—*cita mors venit, aut victoria læta.* CHRONIC inflammation is that in which the cause of the inflammation remains, producing reiterated lesion, followed by continual efforts of the reparatory process in depositing blastema with cells, which sometimes becomes organised and produces actual hardness, as in strumous and other tumours, syphilitic nodes and warts, chronic

hepatitis, &c.; sometimes a persisting open ulcer, as a chancre, in which the reparatory process goes on, and by depositing lymph thickens the edges, whilst the continued inflammation keeps the ulcer open by the successive death of minute portions; or, if it be not strong enough to produce death of portions, so as to keep the part in a state of open ulcer, it still renews enough of inflammation to prevent healing—that is, the organisation of the cicatrix—which, therefore, becomes a scab—sometimes single, constituting a scale, as in the coppery eruption; sometimes in successive layers, as in rupia; sometimes in clusters after pustules, as on the face.

A morbid poison not only inflicts the injury, but, by adhering in the tissue or constitution, perpetuates it till exhausted or expelled by some remedy. Thus a most minute portion of small-pox or syphilitic virus, on the point of a needle, or even absorbed through the cuticle, produces an inflammation similar to that from which it was taken. This inflammation is but the effect of chemical organic decomposition, like that produced by cantharides, or the poisonous bite or sting of an insect or reptile. The virus produces its effect by some chemical action on the nervous tissue of the part, instituting a morbid sensibility, which is sometimes propagated by the circulation to the whole nervous system:—this is evinced by racking pains in the spinal cord, brain, epigastrium; languor, convulsions, &c. &c.; with disturbance of all the functions. Cantharides on a large surface, or in over-dose internally, or the sting of a bee, will produce similar feverish symptoms.

All this passes off, we know, in a definite

time. So end small-pox, measles, scarlatina, typhoid, typhus, plague, and others, the poisons of which are either communicated by contact, or carried through the air to the lungs.

Syphilis is different. Its destructive decomposition is of a different kind—of a slower, more permanent nature. As the acetous fermentation is less violent, though more permanent, than the vinous, so the syphilitic decomposition (inflammation) is gradual, but steadily pervades the system if unchecked by remedies.*

* In these instances it is not the blood which is diseased, as assumed by the humoral pathologists. The blood may *carry* the virus which is generated by the diseased local action, but no change is discoverable in *itself*. We can see by the microscope that the virus of the discharges of different diseases consists of particles of different shape and size, enough to account for a different and specific decomposition produced by each of them in the parts with which they come in contact; and the corpuscles in the lymph thrown out, being of different shape and size from those of healthy granulation and pus, partly explains the non-healing of such unhealthy, if not malignant, sores.

This, which was written many years since, is remarkably confirmed by a communication from Dr. Halford, Professor of Anatomy and Physiology in Melbourne, who has lately published the following paper, addressed to the Editor of *The Argus*:

"Experiments on the Poison of the Cobra-di-capella.

"The melancholy accident which so lately happened with the cobra-di-capella induced me to make some experiments and observations upon the action of the reptile's poison, and they have proved so eminently interesting that I am induced to send you an epitome of them.

"I have to state, then, that when a person is mortally bitten by the cobra-di-capella, molecules of living 'germinal' matter are thrown into the blood, and speedily grow into cells, and as

The poisons of cancer and tuberculosis, again, are not communicated from without, but sporadically initiated in the body of the patient.

We have not yet obtained a constitutional cure for cancer; but, aided by the investigations of Kiernan, Müller, Ure, Quekett, Vogel, and other pathologists, I think we shall arrive at it. We have also still to seek the remedy for tubercles;

rapidly multiply, so that in a few hours millions upon millions are produced at the expense, as far as I can at present see, of the oxygen absorbed into the blood during inspiration; hence the gradual decrease and ultimate extinction of combustion and chemical change in every other part of the body, followed by coldness, sleepiness, insensibility, slow breathing, and death.

"The cells, which thus render in so short a time the blood unfit to support life, are circular, with a diameter on the average of one seventeen-hundredth of an inch. They contain a nearly round nucleus of one two-thousand-eight-hundredth of an inch in breadth, which, when further magnified, is seen to contain other still more minute spherules of living 'germinal' matter. In addition to this, the application of magenta reveals a minute coloured spot at some part of the circumference of the cell. This, besides its size, distinguishes it from the white, pus, or lymph corpuscle.

"Thus, then, it would seem that, as the vegetable cell requires for its growth inorganic food and the liberation of oxygen, so the animal cell requires for its growth organic food and the absorption of oxygen. Its food is present in the blood, and it meets the oxygen in the lungs; thus, the whole blood becomes disorganised, and nothing is found after death but dark fluid blood, the fluidity indicating its loss of fibrine, the dark colour its want of oxygen, which it readily absorbs on exposure after death.

"Let it not be thought that microscopic particles are unable to produce such great and rapid changes. It is well known, and I have frequently timed it with my class, that a tea-spoonful of human saliva will, when shaken with a like quantity of

for, notwithstanding the exertions of Andral, Carswell, A. Clarke, Louis, &c., we have not yet arrived at their true pathology. The treatment of tubercles which I have hitherto found most useful is that adapted to scrofula: as will be explained further on.

Sometimes TUMOURS are formed in consequence of blows; blastema and cells being effused, and, by the process already described, analogous to granulation, becoming vascular and organised (possessed

decoction of starch, convert the whole of the latter into sugar in a little less than one minute. If ptyaline, the active principle of saliva, exerts this power at most in a few minutes, then surely the active principle of the secretion of the serpent's poison-gland may exert an infinitely greater power in as many hours.

"It results, then, that a person dies slowly asphyxiated by deprivation of oxygen, in whatever other way the poison may also act; and so far as the ordinary examination of the blood goes, the *post-mortem* appearances are similar to those seen after drowning and suffocation.

"I have many reasons for believing that the *materies morbi* of cholera is a nearly allied animal poison. If so, may we not hope to know something definite of the poisons of hydrophobia, small-pox, scarlet fever, and, indeed, of all zymotic diseases?

"I will not take up your space further, as I intend to discuss the whole subject, which abounds with matter of the deepest importance to physiology and medicine, as critically as possible in my lectures at the University, which recommence next week; when I hope also to show the presence of the poison of our Australian snakes in the blood of bitten and inoculated animals, and to make some experiments on the possibility of saving life.

"I am, Sir, your obedient servant,

"GEORGE B. HALFORD, M.D.

"*April* 25, 1867.

"P.S.—At the suggestion of my friend Dr. Neild, I am going to try the inhalation of oxygen as a remedy."

of vitality), not removable by the absorbents, which take up unorganised—or, in other words, dead—matter only. Sometimes these tumours remain unaltered ("indolent"); sometimes the capillaries deposit more and more weak fat-cells, whereby the tumour is increased, until either it is removed by remedies or operation, or it exhausts the animal and destroys life. Now, that which arises here in consequence of accidental injury, sometimes also takes place as the effect of disease, as inflamed tonsils or other parts from cold, &c. Thus tumours form spontaneously, either with or without feverish accompaniment, and sometimes disappear by what is called *dispersion*, that is, cessation of the inflammation, and subsequent reabsorption. Sometimes a portion dies, and suppuration ensues; sometimes they remain indolent, or, on the contrary, enlarge; at other times grow larger and ulcerate at the same time, as in cancerous and other malignant diseases. Tumours are modified by the part they occupy, and by the constitution of the person. If the substance injured be fat, the arteries there, being depositors of fat, make a fatty tumour; if it be periosteum, an ossific; and if a highly vascular part, a vascular tumour. The tough bands which traverse fatty and other tumours are constituted by arteries, which, in a healthy state, would have to support membranous, cellular, or ligamentous tissues. A tumour of a lymphatic gland, or other part, in that debilitated, relaxed constitution called STRUMOUS, or SCROFULOUS, will become so likewise; and in a constitution tainted by CANCEROUS disease, cancerous tumours will form in any and every part. The same may

be said of tubercular disease, which differs entirely from common inflammation.

The same process which repairs, will, if induced morbidly, produce diseased growths, or morbid deposits, such as bony tumours from syphilitic or other inflammation of the membranes of the bones. During toothache from caries, the injured part, the tooth itself, being destitute of membrane, cannot be repaired; hence the inflammation excited in neighbouring previously sound part, the lining the membrane of the socket, produces no repair of the mischief, but only a useless deposit, as we see sometimes evinced by morbid growth of bone at the fang of the root, so that the tooth must be removed altogether. The arteries of the periosteum are always ready to deposit bone; whenever, from accident or disease, its vessels become imperfect, and the part spongy, as in nodes, *there is then sufficient retardation of the blood to allow of precipitation of bony matter.* The arteries cease to deposit when the spaces made by accident or disease are filled; if there be not enough of bone deposited to unite a broken limb, or if the consolidation has been prevented by motion of the parts, the surgeon often rubs the broken ends against each other, not for any effect upon the bone; but the real use of this expedient is to produce fresh laceration of the soft parts, so as to allow of renewed deposition of bony matter, and to make fresh spaces for its reception.*

* I have known, however, many instances where it was not necessary to resort to this violence. In one case, a poor man had been walking about with an ununited fractured fibula for many months, following an active occupation; this united rapidly by

Here, although inflammation may be excited, as a consequence of the necessary violence resorted to, and although it has usually been said that the intention was to produce inflammation, yet it will be all the better if the space for fresh callus can be made, and the necessary violence done to the capillaries, without inflammation. In fact, it is well known that the formation of callus in a recently fractured limb is sometimes so retarded by inflammation, that it becomes necessary to employ leeches and other means to moderate it.

In addition to what was formerly stated on the subject, I may here observe, that *nervous influence* is engaged in producing *nervous actions*, such as perceptions or thoughts; *organic actions*, such as those in the muscular fibres of the capillaries, heart, or intestines; and the *combination* of *nervous* and *organic action*—voluntary motion. If the expenditure exceed the supply of, or the generation by, the cineritious part of the nervous system, exhaustion is evinced in various ways: in health, by sleep; in disease, by delirium, stupor, or death;—the normal abundance of it constitutes *vigour*. The warmth of fire produces a sensation first of pleasure, then, if increased, of pain: the elicitation of the nervous influence does no harm if the person be in health, because it is kept up by the apparatus of the brain and nervous system which generates it; but if the

rest alone in the hospital. Another more extraordinary case occurred, in which a fractured femur was kept ununited by unaccountable mismanagement for two years, and yet united firmly, when properly arranged with starched bandage, and with rest, in three months.

individual be feverish, or if the nervous system be out of order, sitting close to the fire adds to the exhaustion and debility; nay, even in health, a lazy indulgence over the fire produces languor; and other luxurious indulgence of nervous sensation produces debility:

"Balnea, vina, Venus corrumpunt corpora nostra;"

for the lovers of "longs and shorts," we may add,

"Sed vitam faciunt balnea, vina, Venus;"

or, according to an older version:

οἶνος καὶ τὰ λοετρὰ καὶ ἡ περὶ Κύπριν ἐρωὴ
ὀξυτέρην πέμπει τὴν ὁδὸν εἰς Ἀΐδην.

Without knowing the immediate or proximate action on the nervous tissue, we judge by the phenomena, that alcohol produces sensation by calling forth nervous influence; its presence, like that of fire, exciting a quicker extrication of it. Here, again, whilst there is health, so that the nervous influence, *vigour*, is renewed, no harm is done; but, according to the constitution, the abuse of wine or spirit produces, sooner or later, an *exhaustion*, and the result is a feverish or irritable state, analogous to the bodily fatigue produced by expenditure of nervous influence in the successive discharge of it into the muscles, to keep up their action in walking or laborious exercise, causing a constant sensation of needing more stimulus.

Sleep is a *cessation* of that expenditure of nervous influence which takes place in *nervous action*, such as volition, and other functions of the sensorium; the *organic action* of heart, intestines, &c., continuing. The expenditure of nervous influence going on, under ordinary circumstances, quicker

than the generation of it, a periodical return of sleep is induced, which is necessary to the reaccumulation of nervous influence.

As the nervous influence is supplied to all the nerves in common, from the so-called nervous centres and ganglia, the expenditure of nervous influence in one part usually lessens it in others.* Fatigue from labour includes a certain exertion of the brain in the production of voluntary motion; but if the body and mind be fatigued simultaneously, as when a person has to walk much, the mind at the same time being anxiously occupied, the expenditure of the nervous influence will be more rapid, and the exhaustion greater. Again, the expenditure of nervous influence in intense study or professional business, especially if anxiety be combined, withdraws so much of it as to diminish the energy of the digestive organs; and in this way the cares of business become the fruitful source of indigestion and gout, particularly if, as in great cities, perpetual feasting add to the labours of the stomach.

It is well known that digestion produces drowsiness and chilliness, by diverting the energy of the brain, and by abstracting the nervous influence of the skin. And, reciprocally, digestion is promoted by the sleep thus produced, more nervous influence being allowed for digestion by the cessation of sensorial actions.

It is necessary here to notice the distinction

* The experiments and writings of Matteucci on the currents of nervous influence are highly interesting, as bearing upon this question.

between STIMULANTS, SEDATIVES, NARCOTICS, and TONICS, *under which four heads all remedies* may be arranged, a great confusion of language and ideas having prevailed on these subjects. For instance, any medicine which benefited a person, without evident effect on the bowels, kidneys, &c., was called a tonic; and inasmuch as it restored strength to the system, it undoubtedly had a tonic effect. Now this is the case so often with wine in debilitated habits, that it is no wonder the terms stimulant and tonic became almost synonymous; and the common mode formerly of administering cinchona bark in wine increased the error, so that bark was thought stimulant. We have a difficulty, too, in distinguishing the qualities of medicines, from many of them having two or more principles combined, as will be presently pointed out; we may, however, get very nearly pure examples of each—stimulant, sedative, narcotic, and tonic.

A STIMULANT is that which, through the medium of the nervous system, immediately increases the action of the heart and other organs, by calling forth the nervous influence, or by facilitating its extrication in them; for example, wine, beer, brandy, and other spirits, the products of alcoholic fermentation, ethers, and caloric.

A *stimulant* increases the action of the heart, and consequently excites for a time the sensorium to hilarity, by sending more arterial blood to the brain, besides its own effect on the brain when conveyed thither through the circulation; but in too great a quantity it produces stupor. Brandy produces stupor

by excess of stimulus, thereby exhausting nervous influence and the perceptive powers of the brain; as looking at the sun will take away the power of the optic nerves by excess of stimulus, and as too great noise will cause temporary deafness: though light and sounds in moderation yield pleasurable sensations.

The effects of stimulants are referable to a twofold operation, both upon the brain and nerves, and upon the heart and capillaries. Each of these systems, the nervous and the circulatory, is affected by a *local* and a *general* operation of the stimulus upon their respective centres. The stimulant (the alcohol of wine or brandy, for instance), as soon as absorbed in the stomach and carried into the blood, comes into contact with the internal surface of the heart, upon which organ it acts as an excitant locally,—besides its influence on the heart by sympathy, through the branches of the solar plexus of nerves passing between the stomach and heart,—and thus excites the heart to increased activity; from thence the spirit, mixed with the arterial blood, is propelled to the brain, which it excites to a more rapid elimination and distribution of the nervous influence. Respiration and the decarbonisation of the blood in the lungs (notwithstanding Liebig), provided they are healthy, is more perfect; the function of the heart, like that of every other organ, is carried on more energetically as regards frequency and force; the nervous centres receive, therefore, a more copious supply of arterial blood; the sensorium, if the brain be affected by no latent disease, is excited to hilarity; all impressions upon the nerves are perceived by it more acutely; the ge-

neration and the flow of ideas are accelerated; volition is more rapid; all the glandular organs, as well as the skin and mucous membrane, secrete more actively: through which, and perhaps by arousing even the comparative torpor of the involuntary muscles, as of the alimentary canal, appetite, digestion,* absorption, and defecation, are accelerated. These are the effects of moderate quantities of stimuli; in *excess*, phenomena the very reverse of many of them succeed: the brain is poisoned by the spirit in contact with it; the nervous principle which it contains is expended, and the generation and disengagement of more is interfered with; so that the capillaries, from the exhaustion of nervous influence, become more *distensible;* the imagination is rendered vapid, the perceptions and ideas confused. The brain will be overpowered with arterial blood from the increased action of the heart, which the stimulants have occasioned; for although arterial blood is the source from which the capillaries of the brain prepare or secrete the nervous principle, *over-injection* diminishes secretion (as in the kidneys, &c.). But mere increased action of the heart is not sufficient to produce the bad effects of over-injection, unless the local effect of the spirit upon the brain, as by increasing the distensibility of capillaries, &c., takes place simultaneously. The over-injection will lead to febrile† excitement, as it is called, the

* Nutrition is thus promoted by stimulants, and there is a certain degree of nutriment in the component parts of beer and wine; but to designate alcohol an "aliment" is absurd.

† And if pyrexia previously exists, stimulus will add to the malady, inasmuch as what produces a pyrexial state in the sound brain will increase it in the unsound, whatever Brun-

secretions in every part being diminished from want of nervous energy (besides the over-injection of the glandular organs themselves); and at length, stupor, coma, and even fatal apoplexy, may be the result.

Such are the visible effects of stimulants when administered to persons in health; and exactly similar are those we witness from their agency in disease, both for good and for harm, although modified by the malady itself under which the patient labours: useful in diseases of chronic debility, injurious usually in acute inflammatory and febrile cases. When the individual is weak, as during convalescence, wine produces an agreeable sensation, and promotes appetite and secretions, causing the skin and palms of the hands to feel comfortable and soft —neither hot nor cold. But when there is a very slight degree of feverishness, as from catching cold, or other cause of pyrexia, to be explained hereafter, the taste of fermented liquor is usually displeasing, and produces in general a sensation of chilliness over the surface of the skin, and at the same time dryness and a feeling of dry heat in the palms of the hands.

Stimulants have been divided into "diffusible" and "local." I here speak only of diffusible stimulants; what have been called local stimulants are not internal medicines, but merely irritating substances applied to the skin. All diffusible stimulants mix with the blood, and become distributed over the frame; we may take chloroform, ether, and alcohol as the most rapidly and evidently diffused.

onians, or the followers of Dr. Todd, may say; though stimulants become necessary in collapse, as pointed out by the author.

Phosphorus is diffusible, but in a slower degree, and is more permanent in its operation; other substances act first upon the stomach, and then upon the other organs, as the heart, by sympathy,—that is, from communication with the solar plexus of the sympathetic nerve; this is the case with such substances as capsicum, pepper, spices and their essential oils, mustard, and ammonia; for ammonia, though acting thus as a sympathetic stimulant, is so rapidly combined and changed chemically, that it does not circulate unaltered like the real diffusible stimulants. Substances such as cantharides, euphorbium, &c., used to produce blistering or rubefacient counter-irritation externally, ought not to be called stimulants, but irritants; they are not used as internal stimulant medicines. The essential oils, such as turpentine (including camphor, a concrete essential oil), and the gum resins, balsams, &c., which contain them, are of a mixed nature, acting on the primæ viæ, and on the heart through the sympathetic nerves; they are also, both as stimulants and irritants, partially circulated to the heart and brain.

A SEDATIVE is that which diminishes the action of the heart and other organs by repressing the nervous influence; for example, digitalis and tea, which latter, though called a stimulant by some, was long since proved by Dr. E. Perceval to have an effect similar to that of digitalis:* tea,† in excess, produces

* The publications of Rush, Rasori, and Tommasini, would, I think, satisfy any person that digitalis is a direct sedative.

† All teas are sedative, but green is by far the most powerful.

a sense of anxiety and oppression of the chest, with intermitting weak pulse, nausea, &c. The most rapidly acting diffusible sedative is hydrocyanic acid.

It has been often asserted that there is no such thing as a direct sedative or allayer of action; but that the sedative effect was only the secondary result of exhaustion from stimulus,—persons having argued from the secondary stupid state which comes on in intoxication from fermented liquors. It having been observed that a state of exhaustion succeeds intoxication, or any other abuse of stimulus, it became adopted as an axiom by Brown and others that there could be no sedative effect unless secondary, as the result of previous excitement; and many endeavoured to prove that digitalis at first produces a stimulant effect. The only apparently good argument, in my opinion, that they could bring forward is, that digitalis and other sedatives sometimes make the pulse quicker than it was before; but it becomes weaker at the same time: and every person who has witnessed a few patients being bled, must have observed that the pulse becomes quicker as the patient grows faint. Mere increased frequency of the pulse is not therefore a proof, as no person will call bloodletting to syncope a stimulant. It may, however, be contended, that during inflammatory complaints the pulse will become not only more frequent, but harder, that is, in fact, stronger, during the administration of digitalis: but this effect is not produced by the digitalis, but by the disease; if, when the patient does not take enough, a few particles only being administered at each dose—or other collateral

remedies being neglected — or, the inflammation being uncontrollable by any means (even in the most skilful hands), the inflammation increases, and the pulse becomes harder,—this is not the effect of the digitalis, any more than of venesection. Every practitioner of experience must have found the pulse become *harder after a bleeding* which has been insufficient to subdue the inflammation, until *another bleeding* has *softened* it: the same occurs with digitalis. Doubtless, digitalis, as well as *venesection*, by the relief it affords, may *raise* the *pulse* when it has been *depressed* below the natural standard *by inflammation* or acute disease, as will be hereafter explained; but still it is not stimulant, any more than venesection. We should beware of attributing to the remedies the changes of pulse which depend on the progress of the disease.

These references to bleeding may seem strange to the rising generation, who have never seen it practised; but bleeding as a remedy has been alternately in fashion and out of fashion, at intervals of half a century or so, during the annals of medicine. When the author was dresser under Thomas Blizard, at the London Hospital, he frequently in the afternoon had to bleed ten or a dozen patients, from twelve ounces to a pint each, as ordered by the medical officers: there are not now as many bled in a year, perhaps; and so completely has the practice been relinquished, that it is difficult to find a pupil in one of the public institutions who knows how to use a lancet. At that period, the leeches, at wholesale price averaging 1*d.* each, cost about 300*l.* a year: they do not now cost 300 shillings. During many

years as the pupil, afterwards as the colleague, of the late Dr. Frampton senior, the author never knew him to order a single patient to be bled. The author mentions these circumstances, not in recommendation of bleeding, for which in most cases we now possess much better substitutes,—such as morphia and antimony,—but to show the curious phases which take place in the practice of medicine, which alters its fashions something like the costumes of the fashionable world. A century ago, the men wore beards; then they shaved them off; and now they wear them again. The women cannot alter their beards, but they make up for it in their gowns: a century ago, the author's grandmother wore the waist with a peak down in front below the umbilicus, such as her descendants wear at present; and with hoops—which then were made of wood, now of steel; and ladies are again beginning to totter about on high heels, as Nell Gwyn did.

On the other hand, during a discussion at the Medico-Chirurgical Society not long since, a member mentioned the case of an elderly female, who, for chronic disease, had been an inmate of various hospitals in succession, and, it was ascertained, had been bled, not only many times, but many scores of times. It happened that this met with accidental confirmation from two or three other members present, who severally recollected the case in the hospitals where they had been pupils, and where each had bled her repeatedly *under* direction. Dr. Little has told me that, *àpropos* of this question, only about five years since, he undertook to show his clinical pupils at the

London Hospital the nature and effects of the unfashionable and neglected phlebotomy, which, he observed to them, though much practised at the early part of this century, was just as much out of repute in the middle of the last as it is now—as we may learn from such celebrated writers as Molière and Le Sage; the episode of Dr. Sangrado in *Gil Blas* is inimitable, and withal highly instructive even to the medical student. Dr. Little therefore took a dozen appropriate cases as they offered, treated them according to the method of *our* younger days, and thus demonstrated to his alumni the good effects of what they reckoned, from preconceived notions, would turn out manslaughter at least, if not murder. He says, what pleased and surprised them most was, the quick and great relief expressed by the patients from the bleeding. The cases here referred to, as described in a paper read before the Hunterian Society, were :

1. A case of coma, from asphyxia caused by falling into one of the docks. Death appeared imminent from collapse. Body almost black ; orthopnœa ; action of the heart fluttering; pulse faint. In proportion as blood escaped from the arm, colour improved, better breathing set in, some consciousness was manifested; and, by the time the arm was bound up, he answered questions distinctly. He rapidly recovered.

2. A man had been in the London Hospital about fourteen days with hæmoptysis, which had not yielded to the ordinary internal medicines and applications—turpentine, tannin, lead, &c. He had daily expectorated about half a pint of arterial blood. I

took away sixteen ounces by venesection. He never passed another *florid* sputum; and promptly recovered.

3. A man, advanced in years, had purpura—successive crops, for several months, on the trunk and lower extremities. Antiscorbutics, alteratives, tonics, did no good. He was about to leave the hospital—would have "discharged himself"—when, remembering that the writers of the last century recommended venesection, I bled him to the amount of twelve ounces. He remained an hospital patient a few weeks longer, but had no other crop of purpura.

4. Was a middle-aged woman with heart-disease, liver-congestion, and anasarca; much dyspnœa. Instantly relieved by, and grateful for, the abstraction of twelve ounces.

5. Was a case of advanced sinking from double peripneumonia. Hopeless, but bled for the sake of temporary relief. The patient expressed relief; but the case went on uninterruptedly to death. On *post-mortem* examination, both lungs were found gorged, and there was red inflammatory hepatisation throughout.

6. A case of apoplexy; cured.

The conclusion of the anecdote is amusing: when he prescribed the bleeding for each patient, he found that unless his son, Louis Stromeyer Little, or some other of the assistant-surgeons, was in the way, the order could not be carried out, as any pupil who attempted it "went niggling with the point of the lancet" in such a manner that he ran the risk of either not getting blood at all from a vein, or of wounding

an artery; and the Doctor was actually obliged ("When you want a thing well done, do it yourself, as Poor Richard says") himself to operate. But bleeding will never again come into fashion, because we have a better knowledge of the medicines which supersede it; of which numerous examples are given in this edition.

When I told Elizabeth Garrett (the cleverest person for her age and standing* that I am acquainted with in the profession) that I was getting out a sixth edition, she said, with her usual candour and *naïveté*, "You will have to modify your expressions about bleeding." It is quite true; for, as Molière says, "*Nous avons changé tout cela.*" Notwithstanding the inculcation of Epictetus, Περι τα εξωθεν, I cannot help boasting of her having been once a pupil of my old school of the London Hospital. She was compelled, by the difficulties thrown in her way by the Corporate bodies, &c., to migrate from one medical school to another; hence I augur that she will hereafter prove herself worthy to be claimed by several: as

> "Seven cities did contend for Homer dead,
> Through which the living Homer begged his bread."

Fortunately for her, however, she was not obliged to beg for any thing except permission to pay liberally for the instruction and *certificates* which she required.

* It is only a couple of years since she became qualified, according to the laws of the realm, to practise medicine in all its branches as L.S.A.; and, like other L.S.A.s, will, if she lives, become in due time M.R.C.P. Lond., or I am much mistaken as to the "signs of the times."

But to return to medicines: about half a century ago, there was considerable dread of cathartic medicines. Hamilton of Edinburgh wrote a treatise demonstrating not merely the safety but the advantage of purgatives so satisfactorily, that, until lately, salts, senna, scammony, jalap, calomel, &c., have been the order of the day, in spite of Broussais, who went even beyond the superstition of the ancients as to the danger of using cathartics; saying that they produced inflammation—gastro-enteritis.

The fact is, that the Deity has given man a great power of resisting poisons and bad treatment; and, as Professor Cleghorn used to say, when speaking of patients struggling through in spite of Brunonian treatment,—then strenuously contested,—"In short, gentlemen, we arrive at the conclusion that it is d—d hard to kill a man."

Again, after about half a century, Brunonianism was revived by Dr. Todd, but so modified as to be useful instead of deleterious, in proper hands, on the principle advanced by the author thirty years ago. (See pp. 91, 121.)

A direct *sedative* diminishes the action of the heart and nervous system; in a large dose, instead of hilarity, producing anxiety, depression, and despondency; nay, more, allaying action in the nervous system, so that it cannot direct the muscles; the patient becoming giddy and staggering, and even the optic nerve being so weakened as not to see distinctly; so that a person may reel or see double without being intoxicated: the same may occur from loss of

blood. It is well to be aware that opposite states may thus produce similar appearances, since the remedy which would cure one would not afford relief to the other: for instance, that coma of children which proceeds from inanition, and which might be mistaken for a plethoric state of the internal vessels, is relieved by stimulants, as is so well described by Gooch; see also cases described by Sydenham (*De Febre Intermittente*, 1661) as the "delirium from inanition, coming after ague; in which case, stimulants and nourishment cure, evacuants would be destructive." The disease called DELIRIUM TREMENS has likewise many symptoms in common with those complaints which are cured by sedatives, but itself requires stimulants, either alone or combined with narcotics. This disease arises in persons in various ranks of life, who, having accustomed themselves to use (abuse) much wine, brandy, or other stimulants, get on very well until they lose appetite for food, either from other disease, or from the drink damaging the stomach. As the liquid cannot nourish or keep up strength, they become weak in the limbs (trembling and unsteady) and in the mind (delirious), fancying that they see objects, such as cats, dogs, persons, &c., and hear noises, even the words of conversation, which do not exist; being at the same time utterly sleepless,—and they must soon die, unless sleep can be restored.

It is very necessary to be aware, however, that a precisely similar phase of disease takes place from debility of body and nerves in persons who use scarcely any stimulants, or even none, such as hysterical females, or females after parturition or

abortion followed by flooding,—which cases must be treated by narcotics and stimulants.

We see that when nervous influence is expended to the degree that ordinarily induces sleep, or the suspension of sensorial action, this suspension is retarded if any irritation produce a renewal of sensations, as toothache, or other pain; or if the extra-excitement of anxiety, in cases where affection or interest is concerned, continue to occasion extrication of nervous influence in the brain: and the power of continuing cerebral action (wakefulness) will be increased by introducing into the stomach a sedative, such as digitalis or tea, which, by diminishing the force of the pulse, and by its influence on the brain, counteracts the state which would induce sleep. But, observe, the natural powers are by this means forced; the consequence being, that, from the expenditure of nervous influence continuing, with diminution of the power of the heart and primæ viæ, the brain will become weaker; so that, although thoughts may be excited, they will be vague, and false perceptions will arise.* This state of morbid sensibility of the system is called being nervous, and is experienced by those who have sat up late watching the sick, or reading, and who, having forcibly kept themselves awake, either with or without tea, coffee,† or snuff,‡ become chilly,

* This is the *rationale* of some kinds of delirium.

† The effect of these luxuries has been misunderstood: for instance, tea and coffee—sedatives—counteract the effects of wine and other fermented liquors. On the other hand, we observe that persons render themselves debilitated and nervous by too much tea and coffee without fermented liquors, especially females.

‡ Snuff, *i.e.* tobacco, is a sedative, but at the same time a

start at the slightest noise, and suffer involuntary and unreasonable apprehensions of danger. Persons under these circumstances lying down in a cold bed, will frequently not fall asleep, or, if they do, will be harassed by nightmare;* but a warm bed, by diminishing the sensations transmitted from the skin, and at the same time increasing the circulation, will renew a plethora in the brain favourable to sleep; wine or spirits taken into the stomach will do the same, if the brain be not feverish; or even a draught of hot, watery fluid will have a beneficial effect, by the mere stimulus of caloric.

One example more of a direct sedative,—a common dose of salts makes a person paler, and cooler in body and mind. This, however, is not a simple sedative, being likewise an evacuant; at any rate, it is not a stimulant. Emetics have been called stimulants; but this is not reasonable, unless a full dose of ipecacuanha or tartar emetic make a person feel well and cheerful, and his pulse stronger, while he is sick. It is by the relief of disease afforded by emetic medicines, that the morbid sensibility, shivering, and depression in ague, cholera, influenza, or inflammation are removed; and from this cause, and not by the asserted direct stimulant operation of the

powerful emetic and narcotic; two or three pinches of snuff will produce sickness and vertigo with a person who is not accustomed to it, just as smoking "my first cigar;" and although this inconvenience is overcome by habit, the narcotic poison tells on some constitutions.

* Nightmare is caused by whatever forces attention on the sensorium during sleep; thus, it may be produced either by uneasiness in the stomach from indigestion, by cold of the surface, or by cold feet.

emetic, the patient becomes warm, and is relieved from chilliness and anxiety of countenance. All the purgative and emetic medicines are sedative, as also are salines, acids, and alkalies, and cold air.

Sedatives, as opposed to stimulants, diminish the injection of the brain, at the same time repressing the nervous influence; so that the cause of delirium, stupor, or coma from *sedatives* is *inanition;* whereas the cause of delirium and coma from *stimulants* is *congestion* or *plethora.* The opposites, brandy or excessive cold, alike cause fatal coma.

One cause of the confusion of terms is hereby explained. *Sedatives* are sometimes miscalled stimulants, when they relieve the vertigo, stupor, or coma of stimulants, or the drowsiness of fatigue or other plethora, because this relief is called arousing or awakening; as by digitalis or tea.* On the contrary, a *stimulant* (wine) given to a person fatigued, produces an inclination to sleep, unless it occasion feverishness.

Tea and coffee prevent sleep in those unaccustomed to them; but if those accustomed to them

* It is sometimes difficult to convince persons who have been in the habit of resorting to tea and coffee for the purpose of enabling them to apply the mind to any mental occupation, that these are sedatives, and diminish the action of the nervous system; but they operate only by counteracting the plethoric state of the brain induced by the continued stimulation of action, thus merely restoring the brain to its normal state. The same persons do not require tea on rising in the morning, when the brain is in its natural state, to enable them to study; strong tea or coffee at that time would produce nausea or distraction of thought. On the other hand, some persons, whose brain is in a plethoric state, require coffee or tea the first thing in the morning to enable them to become quite awake.

be deprived of them, they are wakeful, on account of the brain and heart (if not fatigued) having an overplus of nervous activity. Occasionally, tea or coffee appears to produce an effect the reverse of sedative; thus, on some occasions, it favours sleep,—a result attributable to the circumstance, that sleep is often disturbed in consequence of a plethoric or feverish state of the brain, produced by stimulant beverages, such as wine, &c.; or of the over-excitement of brain remaining after an evening passed in interesting society, at theatrical exhibitions, or in the arena of debate, when the ordinary status of the capillaries of the brain has been disturbed by exciting passions.

In other cases, coffee, tea, or digitalis favours sleep, by counteracting the irritable condition of the brain, depending on morbid activity of the heart's function, or other cause, the tendency of which to produce sleeplessness may be increased by the recumbent posture.

The reader will perceive in the bulk of these observations an illustration of the oft-repeated remark, that opposite causes produce in the animal economy the same effects. We have here pointed out that sleeplessness may arise from either excessive or insufficient injection of the brain; that both fermented liquors (stimulants), and tea, coffee, digitalis (sedatives), may, according to circumstances, prove hypnotic or the reverse.

But by the term *sedative* is *not* to be understood that which *puts to sleep*, which is the operation of a *narcotic*, but that which produces for a time an effect upon the nervous system as if it had been

refreshed by sleep. This, of course, has not the restorative effect of sleep; on the contrary, though the ideas are rendered free at first, exhaustion will at length produce weakness of thought (see p. 130), delirium, or the coma of inanition: as the sedative, besides its interference with the restorative influence of sleep, still further weakens the functions of the sensorium, both by its local effect on the nervous tissue, and by its sedative effect on the heart, whereby it diminishes the supply of arterial blood to the brain.

The NARCOTIC principle in drugs diminishes the sensibility of the nervous system, thereby lessening the perception of external objects, checking volition, allaying pain, and promoting sleep. It was shown above that stimulants, under certain circumstances, promote sleep; but they do not allay pain, in the manner of narcotics. Stimulants do not produce sleep or allay pain till they begin to oppress the sensorium. Narcotics, on the contrary,—which must be distinguished from stimulants on the one hand, and from sedatives on the other,—allay pain and produce sleep without oppression of brain or increase of pulse.

Digitalis and brandy, a direct sedative and a direct stimulant neutralising each other, cannot be expected to produce any combined effect; though opium, a narcotic anodyne or hypnotic, may be usefully associated with either, according as a stimulant or sedative is required.

Stimulants provoke the extrication and expenditure of nervous influence, as evinced by increased

action; sedatives, the reverse. Narcotics do not appear to alter the quantity of nervous influence, but merely to impede its communication: morphia, for instance, merely prevents the perception of what produces pain in a part; induces disinclination to muscular action; does not alter primarily the force of the heart, like wine on the one hand, or digitalis on the other, but soon renders it sluggish* by retarding innervation, and thus becomes secondarily sedative. Narcotics stop the conducting power of the nerves, which may be thus illustrated:—if the arm be laid across the back of a chair, or be otherwise compressed in one place, the hand becomes what is called asleep, from pressure on the nerves; sensation and voluntary action are lost, or, if not quite lost, much diminished—"pins and needles," a pricking sensation, being felt. The state of a limb thus asleep arises from the pressure interrupting the conducting power of the nerves, by separating the medullary matter. If the conveying cells be but slightly separated, the nervous influence is passed like the sparks of electricity, causing the pricking; but if the gap or space be too great, no sensation whatever is transmitted. If the arm be rubbed, so as to press back the medullary matter, the "pins and needles" are felt as it begins to meet. I have known the right hand remain powerless for many months† before the medullary matter could be rubbed into its place, in

* Hence its incalculable value in inflammation of that organ.

† The patient, being a military man, was obliged, when on duty during that time, to carry his sword in the left hand.

a person who, having fallen asleep with his head leaning on his fore-arm over the back of a chair, was affected with temporary paralysis of the hand from this cause. This case was precisely analogous to the state of temporary numbness called being asleep, only of longer duration. The cause was clearly mechanical, and independent of any affection of the brain, as the muscles which bend the elbow, and all indeed above the point of pressure, were in perfect activity: there was no pain or other symptom of inflammation from which it could be suspected that inflammatory alteration of the nerves had suspended their functions. Narcotics, then, judging by the phenomena described, and by others familiar to medical men, appear to interrupt the conducting power of the medullary matter, evinced by their influence over the functions of the brain and spinal cord; and as there is no mechanical pressure, we can account for this only by some chemical action or union with the phosphorus or other of its constituents altering its (galvanic or electrical) properties.

Different narcotics vary as to their effects. A minute quantity, less than a grain, of extract of aconite, dissolved in the mouth and swallowed, produces a pricking sensation, and diminution of power of the muscles of the fauces, so as to render speech and deglutition difficult. Belladonna produces a similar effect, less a sense of pricking than of dryness.

Tobacco, besides diminishing sensation, produces at first sickness and other symptoms in the tract of the ganglionic nerves. Stramonium and lobelia are somewhat similar in their action. These nar-

cotics are not used as hypnotics (to promote sleep), because their local effects are so distressing, that they cannot be employed sufficiently to affect the brain through the stomach and circulation; but they are prescribed externally to allay neuralgia and rheumatism and inordinate visceral actions, as of the lungs, heart, uterus, &c. The narcotics chiefly employed as hypnotics and anodynes are, opium, hyoscyamus, and cannabis. Of these, opium is infinitely the most used and most useful. Hyoscyamus has been employed in preference empirically as an anodyne; but those who perfectly know how to use opiates, seldom resort to it. Cannabis, when it can be obtained good, is more efficient than hyoscyamus, but not equal to the preparations of morphia. This is not the place to discuss its peculiarities; the reader may consult Dr. O'Shaughnessy's treatise.* The true guide to the use of hypnotics is, to ascertain what treatment, whether sedative (antiphlogistic), or stimulant, or tonic, or their combinations, should be employed in conjunction with them.

Temporary hypnotics (the vapour of ether or chloroform inhaled), called anæsthetics, have been lately introduced into practice with great and valuable effect, to diminish or hide the pains of parturition and of surgical operations, &c.; and are free from danger, if the atmospheric air be admitted freely into the lungs along with the vapour; but instruments have been used for the inhalation which exclude the air too much, and, in this way, have

* Or a very beautiful and imaginative episode in the celebrated novel of *Monte Christo*.

a tendency to suffocate the patient. There is no apparatus so good for the purpose as a handkerchief or napkin ; the only objection to which is, that it may waste a little of the chloroform ; but this ought to be a very minor consideration.

If an opiate be given alone, when the skin is hot and dry, with permanent thirst and other evidences of pyrexia, combined with, or proceeding from, some inflammatory affection, the patient may be forced into a sleep, from which he will awake still feverish, thirsty, and unrefreshed ; but this is not the fault of the opiate, but because the necessary sedative, antiphlogistic medicines or means—bleeding (?), &c.—have been neglected ; whereas, had sedative, emetic, purgative, or saline medicines been employed before or simultaneously, relief would have been obtained. This accounts for the extensive empirical employment of Dover's powder (pulv. ipecac. comp.), the sedative ipecacuan and neutral salt in the compound being antiphlogistic ; though seldom enough so in the dose usually employed, unless assisted by other medicines. Hyoscyamus having, unlike opium, a tendency to open the bowels, has a sedative influence somewhat similar to the Dover's powder, which accounts for some practitioners preferring it to opiates, but it is infinitely less hypnotic than opium ; and as there are cases in which it is requisite to use opiates in combination with stimulants, instead of antiphlogistics, the hyoscyamus tends in such instances to produce delirium instead of sleep. Opium has frequently got into disgrace from being employed without proper adjuncts (analogous to the error as to the operation of

digitalis, p. 123), not from the real effect of the medicine, but from the unchecked progress of the disease. Nay, we must go further. Opiates (morphia, &c.) are actually antiphlogistic (though in general not sufficiently so to be depended upon alone, as will be instanced further on); for, by retarding innervation, they render the heart sluggish, as before stated (p. 136), and become thus, secondarily, a most powerful assistant in the antiphlogistic treatment. I must observe, however, that though "calomel and opium" are powerful allies to the antiphlogistic treatment, they have often failed, from being employed without being supported by leeches, or purgative, or emetic, or diaphoretic medicines.

This consideration of the nature of stimulants, sedatives, and narcotics, will enable us to understand what has frequently puzzled practitioners, *i. e.* the uncertainty of the success of opium, or calomel and opium. Thus, there are some persons who are nauseated, or made extremely sick, by opium, as by tobacco: with these the calomel and opium would have an effect as if combined with other antiphlogistics; again, some persons are nauseated, or purged, or both, by the calomel: to these also the calomel and opium would afford an antiphlogistic compound; but there are others whose stomachs bear either calomel or opium without the slightest inconvenience,—and with these, of course, calomel and opium would not prove antiphlogistic with sufficient quickness to arrest an inflammation, such as pleurisy or peritonitis, without leeches, or antimony, or other sedative remedies.

To recur again to the difference between nar-

cotics and stimulants on the one hand, and narcotics and sedatives on the other: sedatives diminish action, but not by interrupting the conducting power; for digitalis or green tea tend to render the perceptions more acute, and produce wakefulness instead of sleepiness; it is not until the nervous influence is utterly exhausted, so as not to be sufficient in quantity to produce action, that there is any defect in the perceptions, and then there is delirium, not sleep. Aconite, belladonna, and tobacco, which contain the narcotic and sedative principles combined, are never used as hypnotic narcotics, because in large doses they produce a state of delirium tremens, sickness, and other inconveniences (p. 137); whereas hyoscyamus, which contains a sufficient proportion of the narcotic, with less sedative and no acrid, does not produce delirium tremens, except when misapplied as concerns its *sedative* property; and tincture of opium, which is narcotic and stimulant, never produces delirium tremens, though it may fail to procure sleep, if misapplied as concerns its *stimulant* property. Thus, when administered in cases where feverishness exists, the small proportion of stimulus in the tincture of opium* may increase the feverish morbid

* Opium itself contains in its composition a slightly irritating matter, though so little as to be scarcely worth taking into consideration. It was error as to the state of disease, as pointed out above, which led to the overrating this property. The irritating part has never been obtained separate, and does not appear to be any of the alkaloids, but is perhaps a resinous matter, which gives the pungent taste to crude opium. Morphia is perfectly free from it, and may be taken as the type of pure narcotic, the long-sought desideratum, an unstimulating nar-

sensibility, enough to counteract the narcotic influence, *if* antifebrile or antiphlogistic remedies be not used at the same time.

These three divisions of remedies may be considered physiologically as well as pathologically; that is, their action may be studied both on the healthy and diseased individual. We now come to the fourth division, *tonics*, which can only be considered pathologically, viz. with reference to their agency in removing a *morbid* state, by their gradual influence on the nerves of the ganglionic system. Their action is imperceptible; whereas stimulants, sedatives, and narcotics produce evident and immediate effects, either in health or disease.

Tonics are substances which neither immediately nor sensibly call forth actions, like stimulants, nor repress them, like sedatives (both of which act quickly on the cerebro-spinal nerves), but, nevertheless, give power to the nervous system to generate or secrete the nervous influence by which the whole frame is strengthened. The action of tonics (which can be traced to their effect on the nervous system) is gradual; if, therefore, there be any sudden increase in force of the pulse immediately after their administration, it should not be attributed to their tonic nature, as the pulse will vary with the disease, according as it is affected by the use or neglect of other remedies. Thus, either the advance of inflam-

cotic,—discovered and sold empirically under the names of "black drop" and "liquor opii sedativus."

mation, or the neglect of other appropriate remedies, or the administration of stimulants with tonics, will occasion that hardness of pulse which has usually hitherto been supposed to be the effect of a stimulant property in the tonic. On the contrary, a tonic, when it disagrees with the stomach, depresses the pulse, acting as a sedative by nauseating;* and even when it causes a quick pulse, which it sometimes does, with headache, this result is mere dyspeptic morbid sensibility. Even tartar emetic, which is recognised as the reverse of a stimulant, when its sedative operation is too great, or has been too long continued, induces a similar state of morbid sensibility, which has been sometimes improperly denominated "antimonial fever."

We have sufficient proof that the effect of quinine, iron, and arsenic, in neuralgia, &c., is direct on the nerves. There is a palpable analogy between the action of nitrate of silver, sulphate of copper, or arsenic, on sores, and their effect on the constitution when introduced through the circulating fluids. In either case, if used in too great quantity, they will do harm: externally, instead of constringing and healing, they prove caustic; internally, also, too much is poisonous: but bark, carbonate of iron, &c., which do not produce chemical decomposition, are free from the risk of acting as caustic or poison. Some tonics, then,

* The tonic principle in several vegetables is combined with others which are either nauseative or purgative; this is the case with the substance most universally used before quinine was introduced, viz. the cinchona bark, which sometimes purged or produced sickness, very commonly nausea.

in excess, as well as stimulants and sedatives, become poisonous. Arsenic produces inflammation, as a poison; but this is not to be referred to when considering the medicinal tonic effect of small doses of the mineral, any more than of zinc or other innocent mineral or vegetable tonics; the moderate tonic effect being a modification of vital actions, the violent caustic or poisonous effect a destruction of the machinery. There is no analogy between the effect of the tonic in proper doses, and the diseased state produced by it when it acts as a caustic poison. Lunar caustic properly applied will heal the skin; improperly, will burn a hole in it. He who does not know of what strength to use nitrate of silver or sulphate of copper as astringents, had better confine himself to oak-bark or alum, which cannot corrode; or if he does not know how to modify arsenic and croton oil, he had better trust exclusively to cinchona bark and castor oil, though less efficacious in many difficult cases. Thus, if a man be dexterous, he can perform lithotomy best with Blizard's knife; but if not, he had better use a gorget: as an awkward ploughman will go safer with a plough that is gauged by a wheel, than with one that is entirely dependent on the management of skilful hands, but which, when well guided, is the safest and most efficacious, especially in difficult circumstances and on rocky ground.

Therapeutics and toxicology require very different modes of investigation; and notwithstanding that experiments which have been made with poisons are very interesting, and useful for the purpose of finding antidotes, they do not advance us

much in reasoning upon the remedial use of these substances.

Thus, though strychnia is a most valuable tonic medicine, we have not learned its use, any more than that of arsenic, from its poisonous effects.

In some cases, by temporarily exciting the nervous system when weak, stimulants give the organs more power for the moment: the increased appetite and new nourishment augment the strength of nerve as well as of other parts; and thus stimulants and generous diet become in reality a part of the tonic plan; and from stimulants being so often administered with tonics, tonics have been thought stimulant. It is of the utmost consequence to know that they are not so, otherwise there may be a fear of using them where they would be very beneficial, combined with evacuants and sedatives; for quinine or other tonics may be advantageously used along with digitalis, diaphoretics, nauseants, laxatives, and even bleeding on the one hand, or with wine on the other. For instance, it is well known that ague attacks the most opposite constitutions, and that some patients stand in need of support, while others, on the contrary, require sedatives, such as opening medicines and emetics, with leeches over the liver,—still, with the tonics, bark or arsenic, in either case,—to cure the periodical paroxysms.

Medical men were formerly so strongly imbued with the idea of bark* being stimulant, that they

* Bark (cinchona) does not act always as a simple tonic, for, from its taste and effect on the primæ viæ, it sometimes nauseates or purges, and thus becomes sedative, as above mentioned,—ano-

prepared the patient, as they called it, by using the antiphlogistic treatment before they ventured to begin the tonic; but practical experience has long since disproved the necessity of this precaution, and few now spend time in unnecessary preparation by other medicines, but give them simultaneously when the state of the pulse, and other symptoms, indicate the propriety of so doing. Tonics, then, being intrinsically neither stimulant nor sedative, may be usefully combined with either; for whether we want to keep down the pulse in inflammation, or to raise it and the appetite, &c., in debility, it must obviously be desirable to give tone and strength to the nervous system at the same time; because tone and strength of the nervous system will not increase the action of the heart unless it be called forth by stimulants. We must observe this difference: tonics give strength, stimulants call it forth; a man may be very strong without putting forth his strength. We need not fear any danger from keeping the nervous system in good order by tonics, but we must beware of exciting over-action by stimulants, when either inflammation or fever exists. Stimulants excite action, but action is not strength; on the contrary, we shall see, when we come to consider fever, that over-action increases exhaustion.

A correct understanding of these distinctions will be found of great use. The constitution might sink under the depletion necessary to reduce in-

ther instance of the necessity of taking always into consideration the possible compound action of every medicine.

flammation, or subsequently during a tedious reparatory process, if tone cannot be kept up; but this may be done without stimulation. Often formerly the practitioner was foiled by "pouring in the bark and wine;" when, seeing inflammation relighted, he was obliged to leave off the stimulant; but as he included the tonic under that head, he left that off too, and so lost ground: or else, knowing by experience that if he left off the tonic, the patient would certainly sink, he continued the two together at all hazards, when perhaps the unchecked inflammation and stimulus united destroyed the patient by keeping up fever.

It must not be imagined, however, as is too often the case with students, whenever a patient dies, that he might have been saved: they will be convinced by morbid anatomy and experience, that many cases of disease are uncontrollable by human skill and means; but, at the same time, the seeing how much had been effected in cases inevitably fatal will encourage them to practise steadily on rational principles, and prevent their wavering in cases which are curable, though tedious.

Tonics, then, such as bark, by imparting healthy energy to the capillary arteries, have a beneficial effect on inflammation (the erysipelatous and rheumatic, for instance), even when opiates and sedatives may be necessary to keep down the action of the heart; but so long as the action of the heart is not below par, the effect of stimulants, if more than in the ordinary diet, would be injurious. Sometimes, even when the acute stage of inflammation has subsided or been subdued, the powers of the

constitution are so much reduced, that the reparatory process degenerates, so that parts cannot heal; hence the advantage of giving *tonics* to prevent this state as much as possible (even whilst we are keeping down the pulse by sedatives), if the constitution seem to require it; but by no means should we administer stimulants in the acute stage. As soon, however, as the acute stage of the inflammation is passed, and the reparatory process or passive stage of resolution commences, we must watch for the moment when it may be necessary to administer stimulants to prevent degeneration of the process, the local symptoms of which are lividity, diminution of temperature, &c.; the general symptoms, feeble pulse and anorexia. If tonics be not given early, as they act but slowly, there may not be time to introduce them into the system when the acute stage has been subdued; and there may not be sufficient strength for stimulants and food to work upon towards restoration, as in cases of rheumatism, erysipelas, wounds, &c.

It is evident that tonics must be considered distinctly from stimulants and sedatives, from the circumstance that we cannot cure an ague or neuralgia, either by stimulants or antiphlogistic treatment, without tonics. We know that many slight cases of either will get well if left to nature; but I allude to those which are severe or obstinate.

The term tonic is applicable to all those medicines which cure chronic inflammation without being either stimulant, or directly sedative or depletory. There are various cases in which sedative

or antiphlogistic remedies have not power to stop inflammation, and yet, together with the disease, are wearing down the constitution: under these circumstances, recourse has been commonly had to mercury. There are also cases in which arsenic, bark, opium, or other medicines, are preferable; but the great nostrum has been mercury: and yet, though so useful in the most ignorant hands, it has been thought difficult to account for or designate its action. It has often been called a stimulant, and yet it cures inflammation when all stimulants are carefully withheld, and so coincides in its action with the sedatives, and might as justly be called a sedative. But it also cures inflammation in debilitated habits, when wine and other stimulants are necessarily administered. I therefore consider mercury neither stimulant nor sedative, but tonic; that is, by its specific action on the capillaries, whether directly on their tissue, or through the medium of their nerves, it causes them to contract, when (though all the injecting force of the heart were taken off by sedative treatment) they would not have had power to close; for when introduced into the system, it circulates to the capillaries, and gives them tone to contract, analogous to the effect of an astringent applied to external sores. Arsenic, silver, antimony, copper, and iron, mezereon, dulcamara, colchicum, &c., have a similar action; some of which are more available than others in particular cases.

This is also the *rationale* of the operation of the so-called alteratives, and of what is called stimulating the secretions of internal organs. When

their capillaries are weak, they have their tone restored by mercury, and the secretions are thus renewed; but it should not be forgotten that mercury, like some other tonics, in excess becomes poisonous, and may cause inflammation in other parts, as it does in the gums, on the principle adduced before, that one degree of contraction of the capillaries is necessary to reduce inflammation, while a still further degree will stop nutrition, and bring on wasting and disease; as syphilis has been by some starved out at the expense of the constitution. Iodine, arsenic, and sulphate of copper, occasionally produce ptyalism, and are otherwise analogous to mercury in their action. Rheumatic inflammation in the fibrous and other tissues, the capillaries of which are very minute, cannot be cured by common depletory antiphlogistic means, as above mentioned; but yield to quinine, colchicum, mercury, antimony, &c., introduced into the capillaries through the circulation. Colchicum, which, like mercury, has this salutary effect, sometimes, like mercury, produces the inconvenience of a local inflammation, not of the gums, but of the intestinal mucous membrane, and in this way not unfrequently proves a dangerous drug, and greatly damages the constitution.

The tonic property is frequently combined with astringency; but that they are not identical is evident from quinine, which contains no tannin, and cinchona bark, which contains very little, being highly tonic; while tannin, oak-bark, and catechu are very slightly so. Still, however, we are at a loss to conceive any other than an astringent effect

produced primarily by the tonic substances; but the astringents act on the fibrous tissues, the tonics on the nervous. All the metallic salts have, more or less, an astringent tonic effect on the capillaries; and to this influence may be attributed the universal efficacy of antimony as an antiphlogistic remedy, it being doubly valuable in acute cases, from its sedative effects on the heart and pulse, combined with its locally tonic or astringent effects on the capillaries of inflamed or congested parts, as well as on those of all the secreting structures. Hence, too, its efficacy, in *small* repeated doses, in pulmonary and other cases where there is even great depression of the system, by its diminishing that relaxation of the capillaries by which the depression is caused. Nay, more, we can manage to insure its full antiphlogistic effects without the inconvenience of nausea, by combining it with a little opiate and aromatic. And yet persons who do not understand the use of antimony are afraid to use it, from the notion that it is a lowering and depressing medicine. It is true it may be so, if used indiscreetly, so as to induce excessive sickness or purging; or if misemployed in excess, so as to do mischief, as by poisoners; but in skilful hands it is a well-known, efficient remedy, both in medical and surgical practice, as will be explained further on.

From what has been stated above, we may fairly infer that tonics, so far from being stimulant, are commonly combined with a sedative principle, all of them in large doses tending to produce nausea and feeble pulse: this is the case with quinine and iron, quassia and zinc, camomile

and mercury, but, above all, antimony—which, the sedative and tonic being powerfully combined, has always been a favourite remedy with the best practitioners until lately, when the revival of Brunonianism has produced a wavering in men's minds, and an apprehension that antimony, which is so efficacious in inflammatory and febrile diseases, is debilitating or depressing, whereas it is exactly the contrary, by conquering the disease, if used skilfully, with judgment and moderation: whereby the tonic effect may be obtained without a sedative operation; but hitherto the employment of antimony has been empirical—its real nature and action, according to the doses employed, not having been ascertained. Nay, more; though, as stated above (p. 135), no effect can be expected if a sedative and a stimulant be combined, yet a medicine such as antimony, which combines most peculiarly the tonic with the sedative, *may* occasionally be administered in conjunction with a stimulant, on account of the tonic portion of its composition.

From the analogy of the efficacy of tonic medicine in curing chronic inflammations and neuralgic diseases, we may, I think, infer that the latter depend on a chronic inflammatory state of the nervous tissue—may we say, debility?

As I set out with observing, it may be seen that tonics must always be considered in reference to disease: thus, different substances which, considered physiologically, or in health, belong to opposite classes, become, in disease, tonics. Even

narcotics frequently become, in an indirect manner, most usefully tonic; as, for instance, when rest is prevented by the morbid sensibility of a sore which will not heal, banishing "kind nature's sweet restorer, balmy sleep;" stimulants in this case cannot procure repose nor give strength; sedatives are not required, or rather are contra-indicated; sometimes even one dose of a narcotic, by procuring a good night's rest, will renew the restorative energy of the system, and thus become tonic—although a single dose will not, in general, suffice. This is strongly exemplified in cases of chronic neuralgia, formerly denominated chronic rheumatism, or *cold* rheumatism, when there is no external appearance in the parts affected,—being thus distinguished from acute rheumatism, where there is redness and swelling of the parts in pain. The cure of these cases, which are always accompanied by debility of constitution, requiring quinine and wine, will be immeasurably promoted by a full dose of any opiate every night, so as to procure sound sleep; but these cases ought not to be tampered with by hyoscyamus, cannabis, conium, or any other of the inefficient substitutes for opium or morphia. The value of repeated small doses of opium in chronic periosteal diseases, and what are called irritable sores, as exemplified in Pott's treatment of gangræna senilis, is well known to surgeons, and also to physicians in chronic affections of the mucous membranes, &c. Its applicability to irritable sores shows that the efficacy lies in the narcotic quality, though it is commonly attributed to a stimulant one even by those surgeons who know how much more they can effect,

in such cases, by administering from a quarter of a grain to a grain of opium twice or three times in the twenty-four hours, than by giving wine, spirits, or beer, which are incomparably more stimulant. On the other hand, when the constitutional state is that of debility, rather than irritability (morbid sensibility), as in strumous and certain other cases, fermented liquors are of much more value than opium. There is nothing more efficacious than opium in catarrh; but, from the idea of its being stimulating, or heating, which it appeared to be chiefly where it confined the bowels, we find that all the experienced practitioners formerly combined it with small quantities of jalap, ipecacuanha, &c., in catarrhal affections.

We may take this opportunity of pointing out the common error with respect to opium. It will be much better to get a clear notion of the nature of remedies, and to call them by their right names; as, for instance, not to denominate opium either stimulant, sedative, or tonic, but to understand its use by its true name of narcotic. Its beneficial effect arises from its *narcotic property* diminishing that *morbid sensibility* which prevents sleep, digestion, and other restorative processes: and this is the PRINCIPLE to be followed in the administration of narcotics. The choice of them has already been explained, as to opium, hyoscyamus, morphia, tincture of opium, Dover's powder, &c. The addition of opium, when mercury is employed, is a judicious precaution, as mercury has a tendency, though primarily a tonic, to produce morbid sensibility secondarily, by irritating the nerves, which is well known to be its tendency,

as in mercury-mines and looking-glass manufactories. These few words will serve as a clue to the use and abuse of mercury. Mr. Skey, in a useful little practical work on the treatment of ulcers, has brought forward evidence which supports my opinion of the explanation of the utility of opium; though he seems to think the benefit is owing to a "stimulant effect of the opium upon the capillaries." Opium is invaluable to the accoucheur, to allay the morbid sensibility which occurs after parturition. Some use it in the puerperal state as a "cordial," some as a "sedative," some to "bring on" action, some to "allay" it; as, for instance, to assist labour when it flags; or, on the contrary, to check inordinate uterine contractions. If the accoucheur practitioner will recollect that the object is to *allay morbid sensibility*, he will be certain in its application; whether he be obliged to use the narcotic with stimulants on the one hand, or with depletion and sedatives on the other.

This distinction of *stimulants, sedatives, narcotics,* and *tonics*, assists us in understanding the operation of remedies in various diseases, it being recollected that the medicines which are used as *purgatives, emetics, diaphoretics*, and *diuretics*, such as salts, senna, jalap, tartar emetic, calomel, ipecacuanha, squill, colchicum, &c., are *sedative* in their operation. The effect of tartar emetic is sometimes intended to be merely local, for the purpose of emptying the stomach, and then it is given in a full dose; but it will perhaps surprise some to learn that tartar emetic, as a general sedative remedy, will allay sickness. For example, inflam-

mation of the mucous membrane of the intestines is accompanied by nausea and sickness;* these symptoms may sometimes be rapidly checked by frequently repeated small doses of tartar emetic, called by some febrifuge, or ipecacuanha with or even without opium.

We see that the action of medicinal agents becomes most opposite when the quantities are varied, and according to the state of disease which may exist; hence it requires great attention to separate the causes of phenomena, and duly estimate them. The whole practice of the healing art is full of apparent contradictions: for instance, opium makes the pulse stronger or weaker, promotes and

* A patient was admitted into the London Hospital, who had been labouring under diarrhœa and vomiting for two days, for which he had taken chalk-mixture, catechu, opiates, &c. unavailingly. His skin was hot and dry, with wiry pulse, dry tongue, &c. The author prescribed one-sixteenth of a grain of antim. tart. every two hours. He did not vomit after the second dose, and rapidly recovered. It was pointed out above that antimony acts as an astringent on the capillaries, and, in this way, on the congested epithelial membrane, in such cases as the one related; also tedious cases of diarrhœa after scarlatina or measles have been stopped in this way (opiates and vegetable astringents having been tried in vain); sometimes with calomel, according to the state of the liver, sometimes without; and I have proved similar treatment to be successful in cholera, whether Asiatic, or induced by drains, cesspools, &c. In each of these cases of obstinate diarrhœa alluded to, there was an inflammatory state of the membrane, evinced by wiry pulse and increase of temperature; and in one remarkable case of diarrhœa persisting for six weeks after scarlatina, in spite of opiates and astringents, as there was a palpably febrile state, I recommended small doses of tartar emetic frequently repeated, to which the diarrhœa yielded in forty-eight hours.

takes away appetite; the same means appear in one instance stimulant, in another sedative; venesection sometimes makes the pulse smaller, sometimes fuller. When we speak of remedies as stimulant, sedative, narcotic, and tonic, we are to consider their moderate action whilst they are working on the natural powers of the organs, and not their exaggerated or poisonous effects when they begin to excite either inflammation or morbid sensibility; or, again, when they suspend the vital functions,* as sedatives do in excess, in which case they have frequently been misnamed narcotics, as has been done with colchicum,† digitalis, hydrocyanic acid, &c; which, though in excess they may produce vertigo or insensibility, do not terminate in sleep, but in

* This may be evinced by the confused statements of Orfila, and other toxicologists: the symptoms immediately preceding death being so similar in many cases, though produced by different agents, that, in fact, from the final phenomena produced sometimes by oxalic acid or arsenic, these might be called narcotics. Stimulants and sedatives have both been confounded with narcotics, and *vice versâ*.

† When colchicum was introduced some years ago as a substitute for the *eau médicinale*, to cure gout and rheumatism, many persons asserted that it was a narcotic, on account of its rapid effect in removing the pain. Venesection, when it relieves the pain of pleurisy, or an emetic when it takes off a sick headache, might as well be denominated narcotic. Anæsthetic, a modern term much used, must not lead us to confound stimulants with narcotics, or sedatives, or venesection, all of which we know are in turn anæsthetic—for instance, brandy, bleeding, opium, colchicum, cannabis, hydrocyanic acid, chloroform, &c. Some persons may recollect brandy being given formerly to patients to help them to bear the pain of operations, instead of opium; and it is well known that brandy dulls sensation of pain or fear, though not a narcotic.

fainting or death. Brandy or wine, in moderation, acts as a stimulant upon the nerves of the stomach and other parts in a healthy state; in too great quantity, there is a noxious effect on the organ, its natural susceptibilities being perverted, and a sedative effect communicated to the nerves of the heart, &c., so that a person intoxicated will become sick, with cold sweat and a weak pulse, though wine and brandy are stimulants. Again, the state of disease causes deception as to the nature of an agent: for in inflammation, which makes the pulse weak from its severity, brandy, by increasing the inflammation, would weaken it still more; whilst sometimes, on the other hand, sedatives, as digitalis, antimony, and bleeding, as has already been explained, raise the pulse by relieving the inflammation.

Tonics, even mild ones, as quinine and iron, will excite nausea, when there is much of that morbid sensibility of stomach which, if more gradually introduced, they will eventually cure; others, in excess, as arsenic, will occasion morbid sensibility and inflammation of the gastric and intestinal epithelial membrane, which might appear to confirm the opinions of Broussais. Nevertheless, the full tonic or sedative effects of medicines may be produced without risk, and with benefit, if administered in proper quantities, and not misused, though this pathologist anathematised arsenic, salts, senna, tartar emetic, &c. Praised be Rasori and his followers, Tommasini and the rest, who have given us myriads of proofs of this, if our British practice did not afford a sufficiency. Sulphuric, nitric,

and oxalic acids, in their concentrated state, like arsenic, produce fatal inflammation; yet when sufficiently diluted with water, they not only afford an agreeable and refreshing beverage, but are efficient in allaying inflammation.

We may add a few hints here on the selection of tonics. Iron or "steel" (chalybeate) has been used from time immemorial as a strengthening medicine, and is powerfully so, and thus restores the colour of anæmial or chlorotic patients, as was supposed, from its chemical action on the blood-disks; but this is not the case, for you restore the red colour of the sallow anæmial ague patient by cinchona without iron; of the chlorotic patient by myrrh, turpentine, or cubebs, without iron; of the liver-diseased patient by mercury, arsenic, &c. without iron. Thus it is very true that iron does restore the red colour of the blood and complexion, but not more than other tonics which restore the health. Some chlorotic cases are cured by iron which have resisted other means, but sometimes it is *vice versâ*, and iron could not restore the colour of either the ague or liver cases. Iron sometimes disagrees by forming astringent compounds in the primæ viæ, which irritate them, and produce sympathetic headache, and confine the bowels. This may be corrected by combining appropriate laxative, alkaline, or other medicines, or, if not, in a variety of cases, such as chorea, epilepsy, &c., zinc or bismuth may be advantageously substituted for it: the latter, especially, being a powerful tonic, with a tendency rather to relax than confine the bowels, and it is a most efficient remedy for dyspepsia. Quinine, on the contrary, sometimes irri-

tates the stomach, and produces sympathetic nervous headache, through the par vagum or sympathetic nerves, without, however, any danger of plethora, or what is called determination of blood to the head; for when large doses of quinine produce headache, or even temporary deafness, in the way just stated, that effect, however inconvenient or disgreeable, is not dangerous, and does not require the leaving off of the medicine, if fairly indicated, for ague, neuralgia, &c., and it may be corrected by appropriate medicines, combined with the quinine. Mercury and iodine have been spoken of elsewhere. Arsenic is a most efficient tonic, very safe and manageable if used with caution; in general, from three to five drops of the liq. arsen. is quite enough. Many persons are so susceptible to its action, that one drop three times a day is more than they can bear,—so that, of course, even less will cure them.

The worst case of ague (with enlarged liver) which the author had ever seen, and on which the usual routine of remedies had been tried, including arsenic, which had been left off on account of the intolerance of small doses (three drops three times a day), he cured by two drops in the twenty-four hours, divided into three doses. And a most obstinate case of Indian dysentery, with diseased liver, which had resisted the usual remedies, and in which there was an extraordinary intolerance of arsenic, was cured, on a second trial of the liquor arsenicalis, by two single-drop doses, which, on the first day, produced symptoms of arsenical poisoning, sickness, and collapse, with violent jactitation, tremors, and other symptoms; but on the subsidence of these effects,

the dysentery disappeared, bile having been elicited in the motions—previously colourless.

Many persons are inordinately sensitive to mercury, to ipecacuan, or other drugs. The peculiar advantage of arsenic is, that, besides its powerful tonic effect, it operates on the liver as much as mercury, as in the last-mentioned case; and, in fact, acts in neuralgia and ague like a compound of quinine and mercury, without the inconvenience of producing salivation; and its influence in skin-diseases is unequalled by any other medicine. The oxide of silver, in quarter-of-a-grain doses, is a powerfully useful astringent tonic in relaxed uterine affections, menorrhagia, and tendency to abortion, and in some cases of passive hæmorrhages, and other disorders of epithelial membranes, such as indigestion from weakness of stomach, &c. The profession is much indebted to Sir James Eyre for a useful little treatise on this remedy, who never gave larger doses, —and the author has never found them required.

I have passed over a number of bitters which are called tonics, and also mineral acids, &c.; but these are rather employed as local tonics, to promote apoetite in the stomach, than as what we have been here considering, general tonics of the nervous system. They are, doubtless, tonics, although so far unequal to quinine, iron, &c., as not to be depended upon when prompt and decided tonic effect is required, as in ague and neuralgia, epilepsy, chorea, &c.

The varieties of inflammation may be understood by always recollecting that the arteries are acting against the heart, and that both heart and

arteries derive their power from the nerves; and it is the discrimination, inculcated above, of cases where stimulants are admissible with tonics, or where tonics should be accompanied by sedatives or evacuants, that constitutes skill in conducting the constitutional treatment of many diseases. Thus, inflammation may go on when the pulse is very weak, and when the heart is acting much more feebly than natural; but the arteries being even weaker in proportion, give way to a force less than what they easily sustained when in health. This we see in broken-down constitutions, where inflammation is cured by tonics with stimulants, which raise the pulse, but which, at the time, by improving the appetite and digestion, the formation of good chyle and blood, nourish and increase the energy of the nervous system, so as to communicate to the capillaries a tone or power to resume their healthy action, more than equivalent to the increased action of the heart. In some cases, by good food, and tonics such as quinine, iron, &c., with or without stimulants, we communicate an energy to the nervous system, which restores the healthy action of the capillary arteries.

To beginners, the treatment of inflammation in different ways must appear contradictory; even to practitioners of experience, it is sometimes difficult; but it will be found rational and consistent by those who have a clear conception of the *modus operandi* of remedies, and by a reference to the very various states, both of the parts and of the constitution, which exist under the name of inflammation.

Let us now examine some of the more common

phenomena of inflammatory affections, and the remedies applicable, in order to see how far we are borne out in the preceding statements, beginning with the simplest forms, unconnected with what is called constitutional disturbance, and proceeding to the more aggravated and serious states of disease. As an instance, let us take the eye, or some part of the skin, subjected to a blow, or a stream of cold air; or heat applied to the skin, so as to give pain and excite redness, without blistering; or the effect of a mustard-poultice, or of a cantharides-plaister taken off before it has had time to raise a blister, having only produced redness: here, upon visible parts, the first and slightest degree of inflammation arises, that is, a blush of redness, with a degree of tumefaction of the vessels, and pain, or a sensation of heat or itching in the parts. Or let us suppose a mucous membrane slightly injured, as that of the nose or windpipe, by sudden alteration of temperature, &c., producing either painful dryness, or an increased flow of mucus, with uneasiness or itching, which is the slightest degree of inflammation in those parts, commonly called catarrh; or the mucous membrane of the intestines injured by bad food, as sour fruit or sour wine, which produce a flow of mucous or watery fluid, with uneasiness or griping, called diarrhœa.

I must here explain the apparently contradictory assertion, that the distended state of the capillaries at one time produces an increased flow of mucus, and at another causes dryness. In their healthy state, the mucous membranes are scarcely moistened by their vessels, any more than the

serous—they are merely kept lubricated and soft; but the effect produced by the first degree of inflammation of the mucous surfaces is, by the relaxation of the exhalent capillaries, a more rapid extrication of the fluid part of the blood, a thinner saline serous (coryzal) fluid, instead of bland mucus; but as inflammation subsides, the vessels, recontracting, secrete a mild, scanty mucus again: these are the well-known phenomena of that slight degree of inflammation, catarrh, which occurs in cold weather, and lasts often only a few hours. The effect produced by a higher degree of inflammation of the mucous surface is dryness—a stoppage of secretion (as explained at p. 89 *et seq.*), which state Laennec denominates "*dry* stage of catarrh" (dry flux!), but for which the old term bronchitis is the correct one. It seemed as if he could not reconcile the use of the word *bronchitis* with the stimulant treatment useful in many cases of catarrh, and which he extends even to some cases of bronchitis; for though he has mentioned the use of stimulants empirically, he has by no means explained their operation, nor given any satisfactory rules for guidance in the selection of stimulants or sedatives in the "dry stage of catarrh," which has even led some to doubt whether catarrh be inflammation. It should be understood that the dry stage is bronchitis; and while it lasts, stimulants should be withheld, inasmuch as, at a stage higher than that, mischief and disorganisation would commence; but when there is merely catarrh, congestion and relaxation of the capillaries, the stimulants, by increasing nervous energy, on the principle laid down, do more good to the capillaries

than any increase of the heart's action could harm them. Thus stimulants with opium usually cure catarrh, and frequently augment bronchitis.

We cannot have a better opportunity than this of explaining a few rules for diet; and it will be seen that some old popular sayings, resulting from experience, are based on truth—*e.g.* "Feed a cold, and starve a fever." It will be found, generally speaking, that it is not necessary to *starve* a fever; one of the first evidences of fever, however slight, being want of appetite (anorexia). Natural instincts are too often thwarted; it is much too common to put patients empirically on low diet; and patients of the higher classes, the better educated, very often put themselves on low diet unnecessarily. How frequently have we been consulted by persons for aggravated catarrh, which, they said, was "getting worse and worse, though they had been living low, drinking slops, and no wine," and perhaps taking opening medicine! The nerves and capillaries, which would have recovered their tone under the ordinary diet, were thus kept debilitated by the unnecessary sedative treatment.

The cases just described are curable in a few hours by animal food, a glass of wine or other fermented liquor, and a dose or two of any opiate, unless, perhaps, the outraged stomach have lost its appetite, in which case a few days' tonic treatment will be required to undo the mischief. Thus, so far as we may take natural instinct for a guide, we may assert, that when a patient *can* eat, he may be allowed to do so; for if he have even a slight degree of fever, he *cannot* eat. This will also direct

us in the use of wine, &c.; the loss of appetite, showing feverishness, requires that stimulants should be withheld, except that, in chronic cases and convalescence, delicate persons require a little stimulus to the stomach to induce them to begin to take food. Again, so long as the appetite continues good, fermented liquors may be used; but as no rule is without exceptions, so there are of course many both medical and surgical cases of inflammation, in which, though the appetite have not failed, it is necessary to forbid stimulants.

These instances of simple local disease hitherto adduced depend upon one morbid change, viz. hyperæmia, an enlarged state of the capillary arteries of the part, from their tone being diminished, either from the vessels themselves being injured, as by a blow, or by their nerves suffering injury from excess of cold or heat, or acrid matter applied to them.

In the examples given, the parts generally recover of themselves gradually, the vessels contracting to their natural size; or, if they do not, mere local means will be sufficient to restore them to a healthy state, such as the application of cold and astringent lotions, with abstraction of blood by leeches, to unload the vessels; warm stimulating liquids or astringents internally, warm fomentations externally, acting through the medium of the nerves; and thus either the inflammation is cured, or it subsides without remedies, by what is called RESOLUTION.

If the absorbents cannot take up matter which is organised, it may be asked how they remove tumours. The organisation of a tumour is but imperfect, and it is a burden on the previously

existing arteries, in addition to their originally allotted task: if these arteries have been enlarged in size (for we know arteries can grow larger) in consequence of the inflammation which gave rise to the tumour, they will go on to support it; at other times, and most frequently, when the inflammation subsides, they resume their natural size, and starve the tumour, the constituents of which will, when thus deprived of support, become unorganised, and thus amenable to the absorbents: on the other hand, the tumour may have been too well organised to give way, and may so continue a comparatively *indolent* life, after all inflammation has subsided, but producing neither pain nor inconvenience, unless a blow or other cause renew inflammation. Now, if the efforts of nature do not remove the tumour, we may diminish it by the following remedial means.

1. The first and simplest remedy is pressure upon the part, by which nourishment is prevented from entering its vessels,* as when a piece of sheet-lead, or Arnott's air-bag, or other substance, is bound upon it, &c.

2. Cold, which will cause vessels to shrink, as cold lotions constantly applied, where pressure could not be borne on account of its producing pain.

* It is by the operation of pressure that a tooth may be made to change its place, as when children's distorted teeth are made even by the dentist, by apparatus pushing them in the right direction, and which has been asserted to be directly effected by the absorbents. The pressure of the tooth on the vessels on one side of the socket disorganises it; the absorbents may then take up the inorganic particles, and the vessels on the other side of the socket fill up the space left (see pp. 7, 8).

3. Daily, or at least often-repeated, abstraction of blood by leeches, &c. from the part, with care not to undermine the constitution by taking too much.

4. Artificial discharge, with counter-irritation, as by issues, blisters, tartarised antimony or iodine ointment, &c.

Medicines, such as mercury, antimony, iodine, &c., which have either a direct effect on the arteries themselves, or act indirectly through their nerves, so as to make the inflamed capillaries contract independently of the *vis à tergo* (state of the heart's action), or of the quantity of circulating fluid. This contraction of capillaries is necessary even when the circulation is very weak; for in some cases inflammation coexists with a most debilitated constitution and weak pulse:* it is only the debility approaching to a dying state that will prevent a blister from rising, when the poison of cantharides has relaxed the vessels to the degree permitting extravasation of their contents: hence it is plain, that an enormous loss of blood would be requisite to prevent a blister from rising; which shows that the proximate cause of inflammation is in the vessels of the part, and not in the injecting force ("vis à tergo"), nor in the total quantity of blood contained in the system ("plethora"). This will explain to the beginner, who may have seen how much venesection has re-

* This is by some called passive inflammation, in contradistinction to that which occurs in a strong constitution; but *inflammation* is always the *same—debility* of capillaries. Let us call things by their own names, and speak of the active or passive state of the constitution as indicating remedies.

lieved inflammation from fractured ribs, that he cannot always "knock down"* inflammation by

* I consider the opinion which Dr. Marshall Hall gives in allusion to certain cases of inflammation from accidents which terminated fatally under the treatment of other practitioners to be wrong. He says that, had they been real inflammation, they would have borne the depletion (see his lecture, *Lancet*, Nov. 4, 1837, p. 186). Now, I think they would not; for I am convinced that, where cases of inflammation, whether idiopathic or from accident, will not yield to bleeding, within rational bounds, assisted by antiphlogistic medicines, they must terminate fatally, either by the violence of the disease, or by the unavoidable extent of the depletion. I must also observe, that though he, being experienced, might know when to stop, I should fear his pupils might be led, in pleurisy, &c., to carry bleeding to dangerous lengths; as I was once called to see a medical pupil just before his dissolution, who, having severe pain in the abdomen,—most likely chill,—after hearing the lectures of a popular teacher (Armstrong) on the subject of "knocking down" enteritis by depletion, had made his fellow-student bleed him till he sank never to rise, though we tried even transfusion of blood, &c. Dr. Hall says his medical friend (one of the cases he there alludes to—pleuritic inflammation produced by fractured ribs) lost about eight pints of blood within four days; and yet he declares that had it been pleurisy, he might have lost twice as much with impunity and safety. I think, however, no man could lose fifteen or sixteen pints (two gallons) of blood in three or four days with "impunity and safety." This is what he calls establishing a distinction between irritation and inflammation; truly, it is a strongly marked "distinction—without a difference;" for it was, in fact, a "mixed case." With respect to the man who died of fractured ribs with wounded lung, in Bartholomew's Hospital, quoted by him, I must express an opinion contrary to that of Dr. Hall, who brings forward the case as one of irritation, in which the man died of exhaustion from a degree of bleeding which he could have borne had the case been inflammation. I cannot acknowledge the "distinction" here made between inflammation and irritation, as I consider

venesection alone; though one free venesection in the beginning may be of the utmost consequence. For, on the contrary, though a copious bleeding at first may relieve the patient at the period when he can scarcely draw his breath; yet, subsequently,

inflammation of the pleura or lungs, though produced by broken ribs, still genuine inflammation, and not irritation, or what I call morbid sensibility. I have elsewhere exemplified when inflammation abates, and irritation (morbid sensibility) predominates. But because the last bleeding in the cases of traumatic pleurisy just noticed by Dr. Hall accelerated the fatal termination, he seems to doubt the necessity for free venesection in similar ones; as if they had been cases of "irritation" from the commencement, whereas serious inflammation really existed. "Indeed," he says (*Principles of Theory and Practice*, 1837, p. 355), "cases of fractured ribs do not bear the loss of blood like those of inflammation." Of course the mere fractured bones do not *require* it; but I contend, on the contrary, that pleurisy from broken ribs requires the same antiphlogistic treatment as idiopathic pleurisy; at the same time making due allowance for inflammation or morbid sensibility being kept up by mechanical irritation, as by fractures elsewhere. I formerly witnessed much surgical practice, and have seen patients certainly sometimes bled too freely for traumatic pleurisy; but I have known the same error committed in medical cases of idiopathic pleurisy. This, however, was not from ignorance of "diagnosis" in either; it was from want of knowing how much the powers of the constitution could bear; there was inflammation in all the cases, and "irritation" also. Much as I approve of what Dr. Hall has written on the physiology and pathology of the nervous system, on the "mimoses," "reflex function," &c., I cannot tolerate his perversion of the term "*diagnosis*," "*by blood-letting*;" for, notwithstanding the one sentence in italics placed to meet anticipated objections, that expression is calculated to puzzle, if not mislead, his junior readers. Diagnosis has always been understood to mean the *distinction made between diseases* for the very necessary purpose of *arranging the treatment*. In my opinion, before such a de-

pain, and even difficulty of breathing, will return, which cannot be relieved by repetitions of the bleeding, even if that were not inadmissible from the danger of sinking by loss of blood; and when pain and dyspnœa are urgent, we must try what can be done with opium, mercury, antimony, digitalis, &c., varied and modified according as there are more or fewer accompanying febrile symptoms. I should say, that it is seldom necessary to repeat venesection, if active medicinal treatment be adopted to coincide with the first bleeding.

We see that, applied to the surface, solutions of metallic salts, such as nitrate of silver, tartarised antimony, acetate of lead, bichloride of mercury, &c., and of many vegetables, such as mezereon, &c., act on the capillaries as astringents; but each of these, when too strong, produces a contrary effect, viz. inflammation and relaxation. We know that substances applied to the surface of the primæ viæ, or skin, are absorbed and carried into the circulation; and we judge that in this way these metallic salts, oxides, &c. are carried to the capillaries of diseased parts, so as to act as astringents, and strengthen and cure. We know, too, that they are adapted to different cases. Antimony, which produces sickness and lowers the pulse, *besides its local effect on the capillaries, as it reaches them through the*

cided step as bleeding is adopted, the physician ought to have made up his mind as to what is the nature of the disease (the diagnosis). In the previous editions of this work, I have adduced examples (which will appear in their proper places) of pure "irritation," that do not bear, or rather are not benefited by, depletion.

circulation, is suited to, and resorted to in, acute diseases, such as inflammatory fevers, whether idiopathic or from injuries, as fractured ribs; or symptomatic, as from pneumonia or pleurisy. Thus, we can account for the efficacy of antimony in such a case as scarlatina, by its diminishing inflammation in the superficial capillaries of the skin, fauces, &c., which have been relaxed by the morbid poison, and at the same time by reducing the power of the circulation when it is too strong, if administered so as to produce slight sickness or nausea: or if there be a low state of fever, not requiring reduction of the pulse, the antimony may be given in small, repeated doses, so as to circulate to the capillaries without depressing the pulse. Mercury, which has not this nauseating property, acts less on the pulse than antimony, but perhaps as much upon the capillaries, when circulated to them; hence it is oftener used in chronic cases, both syphilitic and others, besides being much employed in acute inflammation, pleurisy, peripneumony, bronchitis, peritonitis, &c. This affords a *rationale* of these remedies curing inflammations where there is no indication for depletory or common antiphlogistic means; for which mode of cure the vague term, "equalising the circulation," has been adopted; which is erroneous, as the circulation cannot be unequal: it may be irregular, stronger or weaker, quicker or slower; but in either case the blood must be sent or circulated equally to every part of the body, as it passes at first from the heart through a single canal, the aorta; as stated when speaking of what has been called *determination of blood* (p. 87).

We are by no means to draw the conclusion, that an affection is not inflammatory, merely because it does not yield to depletion. What degree of depletion would remove a node, or syphilitic iritis, without mercurial or other medicine? What would venesection do for rheumatic pains, without antimony, citric acid, colchicum, morphia, potash, quinine, mercury, or other medicines? What degree of depletion would cure a rheumatism, which gives way to doses of colchicum too small to cause any sensible evacuation? just as small doses of arsenic will cure cutaneous inflammation, that could not be affected by bleeding or other depletion.

Mercury and iodine* remove morbid growths by starving them, which they effect by contracting the capillaries, and not by increasing absorption, as is a commonly received opinion. It may be said, that the swelling of the gums and fauces from mercury is a contradiction of this; but in many of

* Iodine is very similar to mercury in its effect on the animal economy, and the hydriodate of potash is a very manageable and good preparation of it. Like mercury, its effects are very variable on different constitutions. Some persons cannot bear much more than two or three grains of this salt three times a day without inconvenience. It produces a perception of fœtor of the breath, and sometimes soreness in the mouth and fauces, and great languor. The mode in which it mostly disagrees is by irritating the stomach. Sometimes, the salt meeting with an acid in the stomach, the iodine is set free; and being acrid, irritates or inflames the membrane. I have been called in to cases where, in imprudent doses, it had produced gastritis, like arsenic, but which were soon relieved by leeches and opiates. The bichloride of mercury, or liq. arsenicalis, which are so useful in small doses, would do the same in excess. The abuse of a remedy is no argument against its use.

our medical explanations we appear to "blow hot and cold." Mercury arrests inflammation in the same manner in one case that it produces it in another—it contracts the capillaries; so that a healthy part is inflamed and even ulcerated by what contracts its nutrient capillaries from a natural state; an unhealthy ulcer is stopped by what contracts its relaxed capillaries *to* a natural state. *Contraction of the vessels*, however, does not express the immediate cause of the sponginess of the gums; there is, on the contrary, inflammation, *relaxation*, which is the *secondary* result of the contraction. The excessive contraction occasions the loss of contractility, that is, over-action causing at last a loss of power; as cold, which at first contracts, will at last destroy the power of the capillaries, so that relaxation, amounting to inflammation (chilblain), takes place upon the accession of even a moderate degree of warmth, even by the natural heat of the blood returning into the benumbed parts. This will take place more certainly if the hands or feet be held to the fire, the common exciting cause of chilblain. If, on the contrary, the precaution were taken to wash the hands in cold water, and dry them without artificial heat, chilblain would often be escaped. The soreness* of the membrane of the mouth in incipient ptyalism is analogous to chilblain, the cold air, saliva, &c., acting upon a membrane whose vessels are in a state of extra contractility; moderate cold, when extra contractility exists, producing the effect

* There are persons, as is well known, whose mouths are so susceptible to mercury, that they cannot, in the ordinary way, take it long enough to cure the diseased capillaries in other parts.

of intense cold with ordinary contractility. Under these circumstances, when the mouth is kept closed, as during sleep, the natural temperature is too high for the capillaries. It is thus that we have, in the *rationale* of medical phenomena, to refer constantly to the variation of the proportions of the components of a sum,—*i.e.* the two things which contribute to a phenomenon. Thus a cold lotion may relieve a chilblain, which is inflammation produced by cold, as cool air relieves ptyalism.

We see, in a variety of instances, that a remedial agent, too long or too powerfully applied, becomes noxious, by exhausting the vitality—in fact, wearing out or straining the machinery of the organ, so that it can no longer answer to the nervous influence, whether the organ be capillary tube or any other structure; and sometimes it remains for us still to investigate what part of the machinery has been injured—the contractile or the nervous tissue.

It was long before I could account for the so-called *specific* effects of such remedies as mercury, arsenic, or colchicum. We can understand thus far, that those membranes, areolar tissue, skin, and parts which are very vascular, under common inflammation run a rapid course of disease, and are relievable by active antiphlogistic means; but when parts are attacked by a *specific* inflammation, which is produced by a morbid poison, and which is slow in its progress, or when the tissue inflamed is one of dense structure with very minute capillaries, such as the fibrous tissues,—depletion, or taking off the *vis à tergo*, has little or no effect

on those capillaries, and we are obliged to resort to what have been called *specific* medicines, such as mercury, arsenic, &c., which make them contract. Here we are supplied with analogies to help us in the prosecution of the cure of diseases with other remedies, in cases when the so-called specific either fails or disagrees; which being ascertained, the specific use of the medicine ceases—it ceases, in fact, to be a specific. For instance, at one time no remedy but mercury was employed in the treatment of the chronic inflammation produced by the syphilitic poison. Now, according to my view of the proximate cause, the deduction would be, *à priori*, that iodine might cure secondary syphilis; or that rigid diet, and such remedies as mezereon, would do so, by their effect on the capillaries; which have, in fact, been *empirically* proved to be successful. But it may be said, I have advanced no further than the empiricism: on the contrary, I have no doubt that arsenic would answer; but that, again, is not a fair example, as it is already used empirically in India; but iron might do,—only, not being so powerful, it would require the inconvenient adjunct of a rigid diet, as mezereon does. Again, I have no doubt that, on principle, colchicum might be substituted for mezereon; or antimony, silver, or copper, for the other chemical remedies: gold has been tried, and found to succeed. But though it is useful to have other means, when we cannot employ the ordinary one, we need not resort to a hatchet or a penknife to cut bread, when a table-knife is at hand; nor have recourse to any thing in preference to mercury for the cure

of syphilis, from an apprehension that it may disagree, because with one in a thousand cases it is found to do so. It is better to learn to modify it, by combining opium, &c. with it, to correct any inconvenience when it occurs; and, of course, when it is necessary, to be able to bring analogical remedies into play.

The specific which puzzled me most and latest was sulphur for itch; but now the mystery is satisfactorily solved, and we see why more powerful drugs taken internally could not cure it. The cause of itch consisting in a parasitic animalcule, it is easily removed by sulphur frictions or lotions, which kill the little animal in its lair; whereas it could not be hurt by the remedies that cure those eruptions which consist in a disordered state of the capillaries, and which are easily affected by the remedies as they circulate through them. Therefore, as there are other substances which can kill the animalcule, though none so conveniently as lime and sulphur lotion (corrosive sublimate, for instance, might salivate before it could cure the itch), one more specific is struck off our list.* As for colchicum being a specific for gout or rheumatism, it is no such thing; there are several equally and even more efficacious means of treating either. Again, there is no single specific for tic douloureux—inflammation of the nerve: cases have been cured with liq. arsenicalis, in which iron had failed, and *vice versâ;* and I have cured a case,

* It has been recommended to burn the clothes worn by a patient who has had itch; but as the animalcule cannot live above forty hours in the clothes when it has left the skin, this is an unnecessary extravagance.

which I was told had held out against all the usual modes of treatment, with carbonate of iron, combined with galvanism.* Tic douloureux may also be sometimes cured better by quinine, or opium with quinine, than by the old remedy (iron), or any other medicine; sometimes mercury, &c. &c. are necessary. Quinine is not the exclusive specific for ague; we can cure it with arsenic, and other remedies that cure neuralgia and the neuroses in general, with which ague has the strongest affinity.

In considering at the outset examples of simple *local* inflammation, I have made no mention of *constitutional symptoms*. In simple local inflammation, the nervous system, the brain, spinal cord, and ganglionic nerves, are not sympathetically affected; the heart's action, as measured by the pulse, is unaltered; the digestive system is unimpaired; the appetite, and the functions of the intestines and kidneys, go on as before.

As a *second* stage of disease, let us investigate a greater degree of local injury, where the minute arteries have suffered so much that they cannot recover of themselves, nor even with the aid of mere local applications. Then the first symptoms of super-

* Carbonate of iron had, of course, been already employed to a large amount; but the disease was kept up evidently by a torpid state of the liver, which had resisted mercury and other medicines. The cautious repeated application of galvanism to the organ, in about a week, produced an abundant secretion of good bile and improved the digestion; after which, perseverance for some time with the iron cured the neuralgia,—the iron and galvanism together having an effect similar to arsenic.

added *constitutional disturbance* arise, viz. restlessness, or a general sense of uneasiness, and increased action of the heart; showing that the nervous system is partaking of the morbid sensibility of the nerves of the inflamed part, and that the irritability of the heart is increased, rendering it more excitable by its ordinary stimulus,—the nervous centre whence its nerves are derived being more susceptible. A very common effect of the derangement of the nervous system in this stage is a diminution of sleep, which is sometimes attributed to pain, but which really depends more on the degree to which the nervous system is affected; for persons will sleep at one time with much more severe pain than that which will at another banish rest. In the present instance, however, in addition to the local disease, which exists as in the first case, the most marked symptom is the increased force and frequency of the pulse; and as this increase of force in the injecting action of the heart tends to keep up and aggravate the disease, it is necessary to diminish its action and guard against renewal. To diminish this *vis à tergo*, we may put on a greater number of leeches than in the former case, and we may lower the pulse at the same time that we relieve local fulness: having thus lowered the pulse, we are to avoid every thing that might raise it again; and as exercise and generous diet do this, rest and low diet are essential parts of the anti-inflammatory, or antiphlogistic, treatment, provided the patient be in good health, and not feeble.*

* But when an accident or other cause of inflammation occurs to a weak, or emaciated, or cachectic individual, wine is

In addition to rest and low diet, we possess other means of lowering the pulse besides abstraction of blood; that is to say, by sedatives and by drugs of the emetic and purgative kind, both of which, by diminishing the action of the nervous system, in addition to their ordinary evacuant effect, have a tendency to produce temporary faintness and weak pulse. This sedative effect usually constitutes their utility in inflammatory disease, rather than the mere emptying of the stomach and bowels: and we administer antimonials, mercurials, neutral salts, &c. in frequent small doses, which do not cause vomiting or purging, under circumstances where it is not necessary either to take away blood or to exhibit cathartics or emetics, in full evacuant (sedative) doses. Digitalis has a power of controlling the action of the heart; but, though it has its advantages, its influence is not so certain and manageable as to make it a substitute for blood-letting, the relief from which is usually instantaneous: whereas some hours at least are necessary for digitalis to produce its effect; and when, if rapidly introduced into the system, it begins to lower the pulse, it must be closely watched, lest it produce too great depression.* Where this is likely to occur, as in debilitated constitutions, morphia will be much preferable, as shown farther on; and, in fact, it has (with or

often the most powerful antiphlogistic, by supporting the power of the capillaries through the nerves.

* In this paragraph we are discussing exclusively the *vis à tergo*, but in practice we must never neglect the consideration of the effects of these medicines on the capillaries when conveyed to them through the circulation.

without antimony) superseded both bleeding and digitalis.

The statements hitherto made will account for the great benefit of opium (morphia) during or after inflammation, when morbid sensibility remains sufficient to wear out and destroy the patient, though the inflammation be past, or stopped by remedies. Opium, which used to be considered inadmissible during inflammation, until depletion had been employed, is of advantage in supporting the system under injury during the restorative process. The use of opium has been pointed out by the best authorities, in pleurisy, peritonitis, peripneumonia, &c., or during the reparation of injured parts. In the cases alluded to, it is given immediately after free depletion, which checks the inflammation, whilst the opium removes the morbid sensibility. On any relapse of the inflammation, evinced by the skin becoming hot and dry, the opium must be combined with renewed antiphlogistic remedies. The case must be closely watched for febrile symptoms, lest the anodyne, by allaying pain, should deceive the practitioner (of which there is great danger in inexperienced hands), and the inflammation should be relighted, as it will, unless antiphlogistic medicines, such as antimony, digitalis, neutral salts, &c. be administered to keep it in check, in graduated, but by no means full, doses,—though those were necessary at first.

Opium (morphia) has commonly been used empirically with antiphlogistic remedies to relieve pain; but it is, in many instances, itself antiphlogistic; for by allaying morbid sensibility, it quiets the inordinate

action of the heart characteristic of inflammation, and thus keeps the pulse from becoming hard. Nay, more; morphia, in particular cases, proves powerfully antiphlogistic—even sedative, secondarily; repressing the action of the heart by diminishing innervation. In fact, morphia, freely used in combination with mercury, antimony, colchicum, &c. at the onset of inflammation, as in visceral inflammation, or acute rheumatism, supersedes depletion, particularly in feeble constitutions, in which, after loss of blood, a tedious convalescence might be expected. The debility produced by morphia, mercury, antimony, &c., when not the result of any evacuant effect of these remedies, is indirect and easily recovered from. Patients sometimes become so weak under the influence of repeated doses of morphia, especially when it diminishes the appetite, as to require extra wine.

We may, I think, account for the diversity of reports made as to the ill effects of "opium-eating" on the constitution, by considering the various circumstances, as to diet, exercise, &c., under which this vice is indulged in. The indolent Asiatics, who take their dose and sit still, indulging their reveries, either neglect taking food, or the appetite and digestion become impaired, so that the frame is destroyed, as has been usually described; but in our country this is not always the case, except with the rich, and, above all, the indolent. Many of the lower classes, with whom the practice may be considered as an almost virtuous substitute for the common vice of spirit-drinking, are not permitted, by the necessity of daily labour, to neglect exercise;

and thus retaining their appetite for food, they suffer little or nothing from the opium. In the higher classes, who live well, unless indolence be combined, the opium does not prove always destructive of the constitution. A celebrated physician, a *bon vivant*, and a friend of the author's at the commencement of this century, was a confirmed opium-taker—that is, he carried one-grain opium-pills loose in his waist-coat-pocket, and took them, as people do lozenges, every now and then during the day, whenever he felt inclined; yet he continued in robust health to the age of eighty. But then he had a good appetite, and consumed daily a large supply of wine and punch.

Notwithstanding what was formerly said of *sedatives diminishing* the *drowsiness* of plethora, it is nevertheless true that *digitalis* will *procure sleep* where excitement and wakefulness have been kept up by inflammation of the brain or other part, congestion of the lungs, &c., with a full, hard pulse, such as we often feel with hypertrophy of the heart,—and which hardness may be safely combated by digitalis. This disease of the heart being organic (structural), no amount of antiphlogistic treatment could remove it; but the symptoms may be relieved by digitalis, hydrocyanic acid, &c., without depletion: under most of these circumstances, however, morphia will be found a good ally, even if it does not supersede digitalis.

It is needless, however, for me to multiply examples; the student must apply the rules at the bed-side; and the memory of any man of experience who reads this will supply him with illustrations: but this organic cause of hard pulse is worth mentioning, as it is a source of embarrassment to young practitioners.

This affords another instance of remedies belonging to a certain class acting, under peculiar circumstances, after the manner of those of a different class; for, although venesection or digitalis might procure sleep by their sedative influence in lowering the force of the circulation, as described, neither of them is a narcotic, and they do not always relieve by lowering the activity of the circulation, or injecting power; on the contrary, we have before alluded to their raising the pulse (p. 124), in opposition to their properties as sedatives. This fact shows the necessity of referring to the proximate cause of inflammation—the state of the capillaries; for in many cases the cure of the inflammation is effected by the operation of the remedies on the capillaries as well as on the heart; depletion relieving the capillaries mechanically by diminishing the quantity of blood—the medicines, by their constringent property, increasing also the contractile action of the vessels.

Hydrocyanic acid is a valuable sedative in such cases as whooping-cough, phrenitis, &c. It may be used as a sedative when digitalis disagrees with the stomach or head; thus we may sometimes relieve the excessive action in hypertrophy of the heart by hydrocyanic acid, and at the same time improve the digestion by it, after having been obliged to forego the digitalis, on account of its producing nausea and cardialgia, although it had reduced the pulsation. Hydrocyanic acid is a useful remedy for that dyspepsia which is caused by hyperæmia of the primæ viæ; and it may here be observed, that if more attention were paid to the discovery of the

proximate cause of individual cases of dyspepsia, the disease would not be found so difficult to cure. The depressing effect of digitalis on the spirits and appetite is frequently a serious objection to its use, notwithstanding its great value as a sedative remedy. And where there is morbid sensibility with debility, as in many hysterical cases, producing palpitation, digitalis would be too lowering, and so not adapted to diminishing the frequency of the pulse. Besides hydrocyanic acid, as before mentioned, morphia, a narcotic which is secondarily sedative, may generally be substituted for digitalis; nevertheless, there are many cases in which the experienced practitioner will use digitalis with much more effect than either of those remedies.

In the first and second degrees of inflammation, hitherto considered, we have had the same structures under consideration as the subjects of local disease produced by injury of some kind, viz. the eye, the skin, the mucous membranes of the chest or abdomen,—as affected with slight ophthalmia, erysipelas, bronchitis, catarrh, and diarrhœa; but curable before having gone the length of producing what is called constitutional disturbance, except raising the pulse: and but few remedial agents have been mentioned, nothing having been said of blisters and other counter-irritants, or of the warm bath, &c., but merely what is judged sufficient for a brief illustration of the subject.

The raising of the pulse we have traced to morbid sensibility, "irritation," propagated from an inflamed part. Before proceeding further, it is necessary to

consider more particularly this morbid state of the nerves, whether partial or general, to which the word "irritation" has been usually applied, but for which I would substitute the term MORBID SENSIBILITY. Morbid sensibility is that state of the nerves or central organs which renders them more susceptible to impressions than is natural. And in order to explain the occurrence of morbid sensibility in its various forms in different organs, we must assume that the nerves of proper sensation, the organic and the incident filaments, as anatomically demonstrated by Grainger in support of the truth of the reflex theory, may all evince or be affected with morbid sensibility, either in the periphery, or at their origins.

I consider that *sensibility* is a characteristic property of nerve, and that there is no such thing as the "organic sensibility" of Bichât independent of the nerves. If, therefore, certain diseased states, unaccompanied by pain, termed "irritation," exist in a part, of which the spinal cord takes cognisance, as indicated by subsequent production of abnormal direct or reflex muscular contractions in distant parts of the body, as in tetanus, epilepsy, hysteria, intestinal worms, &c., it follows, that the spinal cord has *become sensible* of that diseased state, that is, has participated in the morbid sensibility, although the *brain* has not been informed of it; and, therefore, as I know no other term than morbid *sensibility* (*susceptibility* to impression, *impressibility*), equally intelligible and applicable, to designate the morbid *state* of the brain, of the spinal cord, or of the sensitive, organic, or incident nerves, which has been mis-

called "irritation," I do not hesitate to employ it.

If the nerves of *sensation* be rendered morbidly sensitive, pain is produced by common occurrences which ought not to affect them, such as pressure either from external things, or even of the surrounding parts. This morbid sensibility of nerves of *sensation* is not always confined to the nerves of the inflamed part, but often spreads to the branches of nerves which communicate with them *directly*, or through the nervous centres, thereby producing *sympathetic* morbid sensibility, and pain or tenderness on pressure, &c. It appears to be opposed to our knowledge of the anatomy of the arrangement of the nervous fibrils,—of which there is no anastomosis (as in the arteries), but merely a juxtaposition of cylindrical tubes, as the pipes of an organ,—as well as contrary to the laws which regulate the transmission of impressions (which is generally considered to be only *centripetal* in the sensitive nerves, *i. e. from* the periphery of the body and various internal surfaces and parts *to* the brain),—to assert that sympathetic pains are produced by any influence spreading or being communicated directly from one branch of a nerve of sensation to other branches of the same nerve, or to different nerves in the same neighbourhood. Nevertheless, our experience in the observation of disease appears to indicate that the communication does actually take place ; for instance, sometimes disease of one tooth, irritating or disturbing the state of one filament of the superior maxillary nerve, induces pain, not merely in some other, or all the dental nerves, and

the cutaneous twigs of the cheek of the same side, but also in the corresponding frontal branch of the fifth,—as from tooth-ache, tenderness on pressure is felt in the temple; and, what is still more extraordinary, pain in the dental branches of the opposite side of the jaw, or even of the inferior maxilla.

These morbid sympathies take place *without inflammation* being communicated to the sympathising part, although sometimes the inflammation does spread: as the cheek will swell and inflame during tooth-ache; the inguinal glands from the urethra being inflamed, &c.

True indisputably as is the axiom in physiology, that each filament of a sensitive nerve preserves its individuality throughout, and that its peripheral extremity corresponds to a particular part of the cerebrum, which it painfully or pleasurably affects whenever it is impressed,—as any given wire of a piano, or the air in the pipe of an organ, is set into vibration when the particular key it responds to is touched,—it still appears incontrovertible, that the mass of filaments in a nerve, or nerves, which arise in the central organ near to one another, or even in those not neighbours at their origin, are influenced, to a certain extent, by one another. To account for this: the diseased state of the nerve is communicated to that part of the brain where it arises; and this morbid state, spreading to the nucleus of another nerve, whether near or distant, causes pain to the individual, which, though felt *in* the brain, is referred of course by him to the part in which the last-mentioned nerve ramifies (as pain is referred to a paralytic hand, which is caused by

lesion in the brain at the root of the nerves of the hand). This is illustrated by what we have said of the concomitant affections of the different nerves of the trigeminus. In like manner, impressions conveyed by nerves from distant parts to the spinal cord affect certain motor filaments therein, and thus produce involuntary reflex muscular contractions, twitching or convulsions of more or less degree.

Sometimes the part in which the *morbid sensibility* originates may not even be perceptibly in pain, and in such cases the irradiations or transfers of morbid sensibility take place from parts supplied chiefly by the sympathetic nerve, to parts in which the cerebro-spinal nerves ramify; as in uterine affections we have tenderness on pressure over the abdomen, pain of the left side, palpitations, globus hystericus, clavus hystericus, or convulsions, &c.; or in disease of the liver, nausea, or pain about the right shoulder; or from worms in the intestines which are not felt, convulsions. Here the morbid sensibility can only have been communicated *viâ* the sympathetic, or the spinal cord, to the brain.

Morbid sensibility, as just mentioned, often exists, producing *sympathetic* pain in another part, though none is felt in the seat of inflammation, if that be not pressed or moved,—as in hysteria, and other morbid states of the uterus. Whilst the person is at rest, no pain is felt in the uterus, it being so situated as not to be annoyed, though its tender state is evinced by the slightest touch, or even by the pressure on the perinæum in sitting down. In many cases, certain nerves, which communicate, whether through the central organs or

otherwise, with those of the uterus, being implicated, the parts in which they ramify are rendered tender on pressure or painful on motion. Thus the sensitive, irritable uterus being quiet and protected, its nerves are not disturbed, and no pain is felt in it; though, owing to the sympathetically affected nerves of the intestines becoming morbidly sensible to the impressions generated by their contents and to the peristaltic motions, there are constant colicky pains. For the same reason, there are hysteric pains in the loins from the least movement, or in the hip, simulating sciatica, and producing apprehensions of hip-joint disease; or the parietes of the abdomen do not bear motion or the slightest pressure, so that peritonitis is simulated. The sympathetic morbid sensibility in the respiratory apparatus produces cough, and, through the mechanical irritation of the latter, even spitting of blood, and thus occasions apprehension of consumption; and the motion of the heart is accompanied with pain in the *left side*, which is the most frequent and tormenting of the painful sympathies of hysteria. The stomach also is morbidly sensitive in these cases,* just as during utero-gestation, so as sometimes to be affected with pain after eating, sometimes nausea or sickness. Sympathetic morbid sensibility of the nerves of the head induces clavus hystericus. In like manner, in

* The term hysteria is applicable, not merely to those aggravated cases which are accompanied with fits, &c., which cannot be mistaken; but to those slighter cases also in which the derangement in the uterus is latent, although it induces urgent symptoms elsewhere; and in some cases the uterus is not even tender except at the period of dysmenorrhœa.

some stages of inflammation of the liver, that organ lying quiet and protected, no pain is felt in it unless it be pressed upon; but the patient is annoyed through the morbid sensibility communicated to other parts: as, for instance, to the stomach, which, being a complex mobile organ, evinces the morbid sensibility communicated to it by the uneasiness called nausea; or there is sympathetic dry cough,* as in hysteria; or pain of the shoulder, head, &c. Inflammation of the kidney produces sympathetic sickness, &c. in the same way; and inexperienced persons do not suspect, or cannot find out, which is the affected organ, when nausea or cardialgia is the most troublesome symptom (page 2, *note*). This will show how most diseases disturb the stomach, and consequently the digestion; but in how few cases of indigestion is the stomach itself first diseased, though dyspepsia is a most convenient word, and the poor stomach is blamed for faults not its own! Nor is it clear that the digestive powers were primarily out of order because blue pill cured the disease which had produced sympathetic morbid sensibility of the stomach, nor that the action of the blue pill was particularly on the stomach; for blue pill introduced into that receptacle will, of course, find its way into the circulation, and thus to whatever organ is diseased,—which will account for the innumerable cases to which it is applicable.

* Or even from continued irritation of the tracheæ and bronchi, considerable expectoration, eventually giving symptoms of lung-disease. The author has been very frequently consulted as to the "nature of the disease of the chest," when it was quite sound, the liver being the seat of serious disease.

If the morbid sensibility be propagated from an organ supplied by the sympathetic to a viscus dependent upon the same nerve, the explanation of the transfer has been considered at all times easy, owing to the erratic course and connection of every part of that nerve.

I agree, however, in the opinion of Müller, that the so-called *sympathetic* nerve alone, with respect to the sympathies, explains nothing; and that, as the *ganglionic nerve, viewed apart from the sensitive and motor twigs* which accompany it in its wanderings, it has nothing to do with sensation or voluntary muscular action; and that it is only the nerve of vegetative or organic life, presiding over the functions of nutrition, secretion, &c. performed by the capillaries (which he expresses by the words "chemische Processe" and "Stoffwechsel" —*Handbuch*, p. 648 *et seq.*)—that it is, in fact, *the true nerve of the capillaries.* It remains to be investigated how far the true ganglionic nerve depends upon the ganglia as its source of energy, and for the constant gradual (galvanoid) action which it keeps up in the capillaries in every part of the frame, and whether there be not communications in it throughout equivalent to the anastomoses of arteries, unlike the cerebro-spinal nerves.

The statement of Müller, that the cineritious ganglions are the source of the nervous influence of this nerve, and that it has intermixed with it throughout sensitive and motor filaments from the cerebro-spinal nerves, just as it gives also twigs from itself to accompany them, appears to be cor-

roborated by the microscopical observations of Ehrenberg and others.

Notwithstanding what has been said of the dissemination of morbid sensibility from the brain and spinal cord (after it has been propagated to them from any part of the body, or has arisen from derangement of those central organs themselves), it is but an indication by the nerves of its existence there—at their roots; as we cannot suppose the nervous centres to be in a state of morbid sensibility without some of the nerves informing us of it: the sensitive nerves by pain; the organic, by excited or disturbed function of the organs supplied by these peculiar nerves; and the motor, by partial or general inordinate muscular action. In other words, when the pulse is quickened, the heart itself is not primarily affected, but merely the nervous centres, and the roots of the nerves which go thence to the heart.

Enough, however, has been here stated to account for the symptoms both of pain* and of inordinate action taking place sympathetically, as it is called, without the sympathising organ being diseased; as we see it, for instance, occur with the

* The well-known fact, that years after an amputation of the leg, there is a false idea of pain felt in the toes, from morbid sensibility in the nerves in the stump, illustrates this still more strongly, as the apparently sympathising organ does not even exist.

The dependence of pain on disease at the root of a nerve is too often overlooked, and pains of the extremities are treated as rheumatism or neuralgia of the part, which are, in fact, caused by disease of the brain or spinal cord, as subsequently evinced by the occurrence of paralysis.

colon, kidneys, and heart,* in hysteria and dyspepsia; with the stomach in nephritis, hepatitis, &c.; with the calf of the leg in diarrhœa; with the other muscles in tetanus; and in numerous other instances familiar to all practitioners, and in which diseases, if recent, we apply the remedies to the primarily affected organ; whereas in old cases, where the spinal cord has actually become diseased secondarily, besides the requisite medicines, we are obliged to apply leeches, counter-irritants, &c. over the vertebræ. I have taken part in many consultations, in which discussions have occurred as to whether, in cases of distal pains and visceral disturbances which had indisputably originated from disorder of the uterus, the malady at that period were in the spine or not; the tenderness on pressure and percussion over the vertebræ showed plainly enough that the spinal cord was physically affected, although at first it had been only sympathetically, *i. e.* functionally. In these cases, the symptoms, or sympathies, arising from disease of the spinal cord itself, have been removed by applications to the spine; but if care have not been taken to cure the latent and deceptive disease of the uterus, the morbid sympathies

* The heart above all, through the connection of the solar plexus of nerves with every part of the frame. Hence it is that, from the earliest periods of our art, the pulse has always been felt, to know whether the malady, be it a whitlow of a finger or disease of an organ of importance, has affected the constitution; and we are often anxiously asked by patients if the heart is not diseased, on account of pain and beating of the organ from mere sympathy, especially in hysteria and nervous disease.

have soon returned, unless, as sometimes occurred, the treatment adopted cured both spinal cord and uterus simultaneously.

Nothing can be more faulty than the term (local) "stimulant" applied to rubefacients, such as cantharides, capsicum, croton oil, &c., unless it be the application of the term "increased action of vessels" to the state of inflammation. The former error arose from the latter: for it having been assumed that inflammation was *increased action*, those substances which produced the phenomena were called *stimulants;* whereas, it being proved that inflammation depends upon a diminished action of the capillaries, it is evident that they are *relaxants*, either directly or secondarily, and that the real local *augmenters of capillary action* are cold, astringents, salines, &c., which are also sedatives to the general circulation. The terms *stimulant* and *sedative* should not be used in relation to the local operation of agents upon the capillaries, but as regards their constitutional or general effects, viz. upon the heart and nervous centres; and in speaking of local effects on capillaries, the terms *relaxant* and *constringent* are preferable, as the substances which are stimulant to the heart *relax* the capillaries when circulated to them, and consequently are not local stimulants; and, *vice versâ*, those which contract the capillaries diminish the action of the heart. Referring, therefore, to my former proposition, that the nature of inflammation is intelligible only by considering that the heart and arterial capillaries are acting in opposition to each other, it follows that whatever increases the action of the one must

tend to counteract that of the other. One of the great errors in practice has been that of not attending sufficiently to whether the indication of cure was general—upon the circulation; or local—upon the capillaries. Thus persons have been bled to death for some severe inflammation by those who had their whole attention turned to diminishing the *vis à tergo;* whereas, by sending a certain quantity of a local constringent, such as antimonial, mercurial, neutral, and other salts, combined with colchicum, digitalis, and other vegetable medicines, through the circulation, the capillaries would have been contracted, and inflammation stopped thereby, without shedding so much blood. Besides which, it has already been shown that these means, beyond their local effect, actually diminish the *vis à tergo.*

We have another circumstance also to take into consideration, viz. that the *direct local relaxants* of the capillaries ("rubefacients," "local stimulants"), become so only from intense action; for in a diluted state they are constringent. Weak solutions of capsicum and mustard, or oil of turpentine, are constringents; but when concentrated or too long applied, they rapidly produce the secondary relaxation or inflammation, being, in fact, least "stimulant" when they have been thought to be most so.

There is nothing contradictory in these different phenomena being produced on different structures or organs by the same agents, through the medium of the same influence of the nerves.

The action of muscles and of capillary arteries is produced by the influence of their nerves, but in a

very different manner in each: the muscle is made to contract suddenly by the cerebro-spinal nerves, analogous to the effect of a shock of electricity;* on the other hand, the contraction of the capillaries is constant, from a constant operation of their ganglionic nerves, analogous to continued galvanic action. In electric and galvanic phenomena, the agent is the same, yet how different both in the action and in the mode of production or distribution. The one is sudden, and requires a freedom from damp; the other needs moisture for its production;—the galvanoid action of the capillaries is increased by sedatives,—antimony, colchicum, digitalis, cold, &c., —agents which will stop and destroy the action of the heart and other muscles. And, *vice versâ*, substances which increase the electroid action of muscles, and are hence named stimulants,—alcohol, electricity, caloric,—weaken, and even annihilate, the galvanoid action of the capillaries.

It will now be seen why the stimulants which increase the electroid power of the heart stop the galvanoid power of the capillaries of the brain. Feel the strong, bumping pulse of a half-drunken man, whose brain is in a state of childish weakness from the relaxant effect of the alcohol upon the capillary congeries composing the cineritious substance:†—see how much less intoxicating the same

* At p. 72, I used the term "discharged into them," to suggest an intelligible analogy; it remains to be proved, however, whether, after the shock, the organ be left plus or minus—that is, whether the nervous apparatus has conducted something into or something out of it: the decision will not affect the above explanation, as the *rationale* remains the same.

† The operation of alcohol, electricity, and caloric, on the

quantity of alcohol is in wine, especially red wines (the astringent circulating to the brain with it), than brandy and water of exactly the same strength, and consequently how much less injurious to the health—excepting in a few cases, where wine disagrees with the digestive organs. May not the advantages of most wines over spirits be attributed to the astringent matters which enter into their composition? Observe the effect of the constringent sedative green tea on the galvanoid capillary action of the brain, when, either from stimulants or fatigue, the latter has become relaxed, and the individual drowsy; the pulse is weakened, whilst the energy of the mind is restored, and continues until, if in excess, the astringent—which had at first contracted the capillaries to a normal state—reduces them below that, and the weakness (delirium) of

organised union of capillary and nervous tissues, still requires much patient investigation. Electricity and galvanism, which have been alluded to more than once as curative agents, require great caution in their application, lest, by the rapid expenditure of nervous influence, relaxation, instead of action, be induced. The application of caloric even at the present time may be said to be empirical; and as to alcohol, how few years have elapsed since it was discovered to be the remedy for the very disease (delirium tremens) which it induces! When I speak of alcohol, I mean, of course, not in its pure concentrated state, but as it exists in fermented liquors, as brandy, or diluted with water. The operation of these agents on the nerves is transitory, so that any momentary excitement is soon succeeded by the relaxation of exhaustion, unless, as explained formerly, the cautious exhibition of either be modified into a tonic operation. Their action on the capillary organisation is temporarily stimulant, and consequently exhausting. Sensorial actions are electroid—volition, &c.; so are the sympathies from mental emotions—blushing; those of the sphincters from terror, and the like.

inanition ensues; just as delirium tremens occurs in drunkards, when the fermented liquor, which the brain had been so long accustomed to, being insufficient or left off, the pulse becomes weak, the capillaries contract too much; through which the delirium (tremens) of inanition takes place, which may be removed by the administration of stimulants to relax (redistend) them to their normal state.

We have uniformly seen that the operation of sedatives is to constringe the capillaries, and in the first instance, independently of their effect upon the *vis à tergo*, to diminish inflammation; so that, however necessary to attend to the heart's action as influencing the pulse,* we must continually refer

* From what has been above stated, we may understand an apparent anomaly in the effect of digitalis as a diuretic, which was remarked by Withering and others,—that though its effect is to lower the pulse, it failed as a diuretic with patients in dropsy, who had the most strength of pulse and constitution, and acted with those who, from the weakness of their pulse, did not seem to require digitalis. The cause of this is, that the local constringent action of a given quantity of the sedative on the weak capillaries of the kidneys would, of course, be most efficacious when there was the least injecting force of pulse to counteract it; and what has been here advanced will render it evident why, when diuretics fail alone, bleeding, or even active purging, especially with elaterium, will assist them in producing an effect.

Several times, when at first physician to the London Hospital, the author requested Mr. Headington, his surgical colleague, to tap a patient labouring under ascites, with scanty urine, unaffected by diuretics; but as he, though a surgeon, had an intense dislike to operating, he always proposed that leeches should be first applied, under the plea that it tended to guard against peritonitis from the operation. In almost every instance, the effect was to produce a freer action of the kidneys, and so far to tend to render the operation unnecessary.

I may make another observation upon astringents as diu-

to the local action of remedies on the capillary and nervous systems when circulated to them. Hence mercury, antimony in small doses, acids, and salines, which affect the pulse but little, have a powerful influence on the capillaries of the mucous membranes, secreting organs, &c.

We must bear in mind, also, that morbid sensibility accompanies opposite states of the capillaries —either that of over-distension from inflammation, produced by rubefacient relaxants, such as fire, cantharides, or capsicum, or by other causes; or that state of excessive contraction caused by sedatives, such as cold, astringents, &c. This will lead us to the explanation of the "tolerance" of sedative treatment when there is inflammation and fever.

When the nervous influence is deficient in consequence of debility, or of the injury to the nervous system which occurs during the symptomatic fever of local inflammation, or during fever from morbid or malarial poison, a greater quantity of any sedative agent than is in health capable of inducing contractile action of the capillaries is required, either to reduce them to their natural standard and diminish

retics. It is well known that uva ursi and tinctura ferri muriatis are useful for this purpose, when there is gravel in the ducts of the kidneys and ureters, causing, by the irritation of its presence, a congested, inflamed, and consequently swollen state of the membrane, by which the tube is narrowed. The gravel causes bloody urine; here an astringent, uva ursi, or the tincture of sesquichloride of iron, contracts the vessels of the inflamed membrane, whereby, the swelling being reduced, the tube of the duct is enlarged, the sand or gravel is allowed to pass off, and the blood and mucus are diminished.

inflammation, or to bring them below it in sound parts; as, for example, when we wish to produce, with therapeutic intentions, extra sensibility and increased contractility of the intestines or stomach, by emetics and purgatives,—indicated by the desired increase of the peristaltic action, or griping, or vomiting.

But when the nervous influence is abundant, as in health, a smaller quantity of sedative will produce that effect upon the capillaries which induces contraction. There is, therefore, less "tolerance" of medicines in health than in the state of disease for which they are indicated, which will explain an error into which many have fallen, of over-estimating the powers of new medicines:* for instance, a small dose of colchicum given, by way of trial, to a stout, healthy person, will produce a depression far greater than if given to a weak patient labouring under rheumatism or inflammation. This was exemplified in the case of a stout, healthy porter, upon whom one of our best pharmaceutical chemists tried the effect of only five drops of his new tincture of colchicum, which produced most alarming symptoms of sickness, purging, cold sweat, and collapse. A healthy individual will be purged by touching the tongue with the cork of a croton-oil bottle, not swallowing half a drop; whereas it will take, perhaps, two or three drops to purge a person who is

* It must not be supposed that I consider either croton oil or colchicum really "new under the sun." We have an accurate account of the croton oil in Murray's Apparatus Medicaminum; it was only out of fashion for about a hundred years; and colchicum was described by Dioscorides as a remedy for gout.

feverish. This is the case with sedatives, stimulants, and narcotics, where they are indicated to counteract disease. It is universally known how large doses of tartar emetic may be tolerated in inflammatory and febrile diseases, and how little in health, or in chronic affections; as well as the large quantities of opium and brandy which are required to produce an effect in delirium tremens, gout in the stomach,* &c. &c.

The griping of purgatives is accompanied by languor, the over-sedatived state of the capillaries producing morbid sensibility, but not inflammation or pyrexia. No doubt, the excessive application of a sedative, as cold, by debilitating the nerves, produces inflammation (chilblain); tartarised antimony does the same externally; and so might *excessive* quantities of drastic purgatives internally. Still, however, danger from ordinary purgatives, which the Broussaians apprehended, does not exist, as the peristaltic motion of the intestines prevents the continued application of the sedative to any one part.† If one grain of cayenne pepper moistened were applied for some time on the back of the hand, it would produce inflammation; whereas ten times as much is taken by some persons into the stomach with impunity, on account of its being mixed with the

* Which is pain in the nerves, not inflammation in the capillaries.

† Exceptions, however, to this occur: thus, in one of the numerous *post-mortem* examinations which have taken place in consequence of the exhibition of quack medicines, lumps of half-softened drastic-purgative pills were found collected in considerable quantity in the intestine (colon), where they had produced fatal ulceration of the surfaces on which they had lodged.

ingesta, and not applied permanently to any one spot of the epithelial membrane. It is the same with croton oil, mustard, colchicum, squill, tartar emetic, &c.

I feel satisfied that Hamilton's work upon purgative medicines was of infinite use, by removing prejudices which had been inculcated by some of the ancients; and that though it led to a somewhat indiscriminate use of purgative medicine, this has been, in the hands of ignorant persons, an error on the safe side, instead of their resorting perpetually to opiates, which was the empirical mode of giving relief formerly, and by which many inflammations were increased—not by the opiate, but because the deceitful ease obtained caused neglect of antiphlogistic remedies, and thus allowed the inflammation to gain ground. One abuse is too serious, however, to omit mention of it; which is, an ill-judged administration of purgatives to puerperal females. The uterus, though not in a state of inflammation after natural labour, is of course in a state of morbid sensibility, and the effect of lowering the female by purging is in many instances to make her hysterical; there are then induced sympathetic pains of the abdomen, with tenderness on pressure, flushed skin, restlessness, &c. The inexperienced or ignorant attendant, mistaking these inconveniences from morbid sensibility for symptoms of inflammation, resorts to the lancet, and other depletion, instead of an anodyne; and the woman becomes more hysterical, with increased pain, debility, jactitation, &c. &c., occasioning serious embarrassment to the practitioner, even if nothing

worse result. Similar evils frequently arise from the injudicious administration of cathartics and sedatives to hysterical unmarried females.

Persons who are in the habit of taking opening medicines without advice upon every trifling occasion, find that a teaspoonful of salts acts freely; but we know that, when feverish, it will require four times as much, combined also with senna, &c., to open the bowels. For the same reason, a very small dose of calomel will nauseate a healthy person; so that those who dose themselves unnecessarily, and have found calomel "disagree with them excessively" when they were in reality well, will often beg of their medical adviser not to prescribe it for them when ill. The practitioner will hence perceive the propriety of not attending to such requests, when his judgment tells him what is necessary.

Delicate people, on the contrary, whose nervous systems are weak, often exhibit great tolerance of purgative medicines, and constantly resort to them; but a free exhibition of tonics, by strengthening the nervous system, and thereby the peristaltic action, will be a much better and more certain mode of keeping the bowels in order. Stimulants will have the same beneficial tendency, provided no feverishness exists. The subject of the administration of tonics is very interesting, as relating to every-day complaints, such as acidity of the stomach, and habitual costiveness. Every one knows that an alkali (as soda), or absorbent (as magnesia or chalk is called), will neutralise acid when it has been generated in the stomach, and give relief for the

time; but the way to cure is to *prevent* the formation of the acid by tonics, and by nothing better than an *acid*, such as the diluted sulphuric, nitric, or other acid, three times a day, either alone or with quinine or other tonics; and habitual costiveness may be cured by similar means; for instance, by small doses of quinine or of iron with myrrh three times a day.

It appears to me that there has been much error with respect to the management of the diet of dyspeptics. Practitioners often restrain them, or they debar themselves from food which they consider very liable to ferment, such as fruit, vegetables, wine, and beer. The stomach should be cured by tonics, and compelled to digest such food as is fitted for and presented to it by bountiful Nature. It is true, that stomachs which have been debilitated, whether by disease or by their natural powers having been exhausted by over-feeding, and especially by indulgence in the stronger wines and spirituous drinks, will permit the development of acid from such food; but this is of little consequence, for by perseverance in the use of proper tonics, such as bismuth, silver, iron, the sulphuric, nitric, and hydrocyanic acids, gentian, cascarilla, myrrh (as in pil. ferri co.), balsams (as in tinct. benzoes co.), quinine, &c., the most censured articles of food above mentioned will be found useful as affording the lightest nourishment. Persons who seek to prevent acidity by introducing into the stomach merely plain meat and bread, and drinking dry wines only, do not succeed; for in a short time even these wines, whether port, sherry, or madeira,

occasion the formation of acid; brandy and water is then tried, but to no purpose, as these, with the other materials, will turn intensely sour in the stomach. Moreover, nothing is more injurious than this "regularity" of diet, for the sameness of food ("*toujours perdrix*") produces sluggishness of the bowels, for which the best remedy is variation of diet. Every change of food, sometimes the use of vegetables, sometimes their omission, sometimes wine, sometimes beer, or any other drinks, will prove a fresh stimulus to the peristaltic motion, which languishes when there is no variety. Ripe fruits and lemonade do not produce acidity, but rather refresh and strengthen the stomach. It should be observed, that lemon, though sour, is a ripe fruit, and does not disagree, like sour oranges, or other unripe fruit. I differed from many practitioners formerly in allowing ripe fruit and lemonade to persons suffering from thirst in rheumatic, gouty, and calculous diseases. Thirst originates in indigestion; and as vegetables and ripe fruit promote digestion and allay febrile heat, they rather assist than retard the cure, besides the refreshment they afford the patient. And now lemon acid is getting into common use as a remedy in these diseases.

From physiological and pathological observation we may deduce, that the nervous influence produces the three phenomena, muscular contraction (voluntary and involuntary), sensation, and capillary contraction. We have seen that some of these phenomena predominate alternately in dif-

ferent parts in the natural routine of life, and under the control of medicinal and other agents. We likewise uniformly see, that when *capillary action* is *arrested* or *diminished*, a simultaneous alteration in the state of the sensitive twigs which accompany the organic nerves of the capillaries is evinced by pain, soreness, itching, &c. Capillary action is stopped in two ways (independently of *mechanical*, *chemical*, or other *destructive* injury); viz. either by depriving the nerves, and consequently the capillaries, of influence, as by extra heat, or electricity; or by rubefacients, relaxants (called local stimulants), such as cantharides, mustard, capsicum, &c. in a concentrated form, which expend it: or, on the other hand, by over-increasing capillary contraction by astringents, cold, &c. This second cessation of capillary action arises, not directly from the contraction arriving at its utmost; but inasmuch as the capillary action goes on only whilst there is blood in the capillaries, we may infer that, when they have emptied themselves of the stimuli to contraction, the power of contracting also ceases. Excessive action, therefore, produces loss of power, and inflammation *may* result; consequently, after tenderness, which is the first step, we should have redness, distension, loss of power,—congestion. But if the constitution, &c. be in a good state, the temporary suspension of function of the capillaries does not necessarily produce inflammation, whether the suspension of function arise from the application of considerable heat, or a mustard-poultice, on the one hand, or from cold, on the other, as we may sometimes see the fingers white and dead, as it is

called, from cold, and yet not subsequently inflame, though sometimes they do, producing chilblains. We can understand the *rationale* of all the modifications of sensations which arise—the gentle warmth accompanying blushing—the itching of diminished capillary action in the fingers when chilblain is threatened, or in the skin or other part under various circumstances, with congestion or commencing inflammation, increased to pain upon still further diminution of capillary action; each degree depending upon the accompanying impression on the nerves of sensation.

A reference to the direct or sympathetic operation of the nerves upon the capillaries will guide the surgeon in the application of cold or heat, and explain why excess of cold occasionally does mischief, instead of putting back a tumour when applied for that purpose. If inflammation exist, as after an accident, in a healthy person, or if, whilst the reparatory process is going on, the injecting force of the heart, though natural, be too great for the weakened state of the injured vessels of the part, cold usually gives relief, by constringing the vessels and diminishing the sensibility of the nerves. If, on the other hand, from the constitution being unsound, or from other causes, there be diminished vitality in the part, or a weak, nervous system, warmth will generally relieve, by assisting the weak nerves of the capillaries to keep up the animal heat. Goulard is sometimes too sedative. Tincture of opium, combined with astringents, is useful as a collyrium, in cases where belladonna would be too sedative. The latter has been prescribed in cases

of deficient nervous energy, where, of course, it produced an increase of the debility, which was subsequently relieved by the more stimulant application. The counter-irritant agents, commonly called local stimulants, have an effect analogous to heat; for though in excess they expend the nervous influence too rapidly, so as to produce inflammation of a previously sound part,—in moderation, they are highly useful in some cases of local inflammation, where the nerves are languid; while general (diffusible) stimuli, which, taken internally, produce intoxication and raise the pulse, would be injurious; as we see exemplified in the effect of infusion of capsicum, a favourite remedy with some practitioners in quinsy and scarlatina, in which it is highly beneficial to the mucous membrane as a gargle, or swallowed, when wine would aggravate the accompanying fever, as well as the inflammation, by increasing the *vis à tergo*. This distinction is not in general sufficiently understood or acted upon, and is the reason why students cannot understand how cubeb pepper cures leucorrhœa, gonorrhœa, &c., in which the capillaries of the part are in a state of relaxation. From this misunderstanding, pepper is frequently forbidden as a condiment in various cases where it would be useful in promoting digestion and preventing flatulence. In order to show that pepper is not injurious in discharges, I had an artificial cubebs made (combining the terebinthinate and piperine properties), of two parts of juniper-berries and one part black pepper ground together, which I prescribed with the same good effect as cubebs, and induced some other physicians

and surgeons (my colleagues) to try it also. The beneficial result in several hundred cases, a proportion of them being gonorrhœa, was the same as when cubebs had been employed. One reason why pepper has been supposed inflammatory is, that high living is so; but that is not from the pepper which is employed in the made-dishes, but from the wine taken and from over-eating. It has been long known that Ward's paste, so celebrated for relieving the inflammation of hæmorrhoids, owes its efficiency to black pepper. Many are afraid to use cubebs in gonorrhœa; many who do use it would start at the proposal to prescribe pepper as above. The quickest and best cure of that disease which I have seen was one where the patient, through a mistake as to the verbal directions given, took cubebs in table instead of teaspoonfuls, three times a day, and thus consumed two ounces of cubebs, and was perfectly cured, in forty-eight hours. This was not a chronic case, or gleet, but a recent severe one, with ardor urinæ, &c. The prejudices of education make us start at novel facts; but in public institutions, where there are opportunities of prescribing a remedy ten or twenty times per week for years, we can draw inferences which may be depended upon; and when a host of facts is brought forward in evidence, credence is given to the general principles, which would not otherwise receive attention. Ol. terebinth. in doses of from three to ten drops, in mucilage or emulsion, is analogous to cubebs in its action; and I used it for the same diseases, before cubebs was revived, as croton oil was, from the old pharmacopœias. The ol. terebinthinæ sometimes irritates the kidneys;

and though this inconvenience may be overcome by combining some opiate with it, yet, as the latter tends to confine the bowels, the cubebs, having rather a contrary effect, is preferable to the combination. Creosote much resembles ol. terebinth. in its action, and is even more antispasmodic than the terebinthinate essential oils, as we see by its efficacy in stopping hysterical and other nervous vomiting, numerous cases of which have been published.

During inflammation, we have evidence of morbid sensibility of the nervous system accompanying the cessation of capillary action, whenever a part, however minute, dies. In this instance, not merely the *function* of the nerves in this part is suspended, as above alluded to, but the *nerves themselves* die* with their capillaries, and the consequent sympathetic shock communicated to the nervous system is evinced by chilliness and shivering. Shivering, called rigor, is a most constant accompaniment of the formation of abscess, and has usually been attributed to the formation of pus; but it is the forerunner of suppuration—not depending upon it, but upon the death that precedes it; for the formation of pus is part of the process of reparation (see p. 102); though, if it be confined so that it cannot escape, and be not absorbed, it will, as it accumulates, produce by its pressure additional destruction, and, consequently, a renewal of rigor.

The progress of ABSCESS is as follows: a portion

* One of the evidences of this death is, that in the destruction of tissue produced by inflammation we find that there is an increase of phosphatic matter, doubtless resulting from the decomposed nerve-fibrils.

(below the skin) of areolar tissue, gland, or other part, inflamed to excess, becomes disorganised—dies, accompanied, as usual, by shivering; the process of reparation by granulation begins,—but as the pus from the granulations cannot run off, as when upon the surface, it accumulates, causing a tumour. If this pus be not absorbed as fast as it is secreted, distension takes place, and the pressure of the pus, in consequence of its fluid nature, will be greatest towards the point where there is the least resistance, viz. the nearest surface, modified by the bone and fascia in the parts. When the pressure towards the surface is so great as to stop the capillary action of the parts pressed upon, another layer of the soft parts dies. There is usually a renewal of shivering during this progress of the abscess to the surface, which is called pointing; and as the constitution sometimes suffers much from this repeated destruction of parts, and the accompanying hectic pyrexia, it might be thought that it would be beneficial to anticipate the natural exit of the pus by making an opening, and so it is frequently; but the objection is, that if the pus be not allowed to make its own way,—at least, till it nearly reaches the surface (during which the floor of the abscess is, under favourable circumstances, rising from the growth of granulations),—the healing will be a very tedious process, owing to the depth of the wound; though this lesser evil must be disregarded if the constitution be suffering from the renewal of rigors and accompanying hectic. Rigors, therefore, may be observed in a variety of cases of cessation of capillary action,—as when a spot of areolar tissue dies, which is always the case in the

common boil (furunculus). In carbuncle, which is but a gigantic boil, we may know when the disease is spreading or burrowing, by the patient experiencing a rigor, and on the following day it will be found that the margin has enlarged. These are the phenomena of abscess, of whatever size—whether a pustular pimple, a boil, a carbuncle, or a deep-seated abscess arising from various causes. In the commencement of erysipelas, in which there is a loss or cessation of capillary action, though the part may not die, shivering occurs before any alteration of the skin is perceptible, and the surface will thus early be found tender and painful, as in erysipelas, herpes, and shingles (herpes zoster), which begin with a burning sensation.

There is no real difference between PHLEGMONOUS and ERYSIPELATOUS *inflammation:* it is the same inflammation, in both cases; the variation is in degree or situation. The ordinary expressions bear me out in this assertion; for instance, when there is erysipelas of aggravated degree, so as to produce suppuration, it is called phlegmonous erysipelas, sometimes, if deep, ending in "diffused cellular abscess;" so that either phlegmon or erysipelas may be followed by suppuration, or by resolution and reabsorption of the effused lymph which the swelling contains. It is often remarked, that the swelling is accompanied by relief, which is the case when the inflammation (which is now over) has not been sufficient to cause the death of a portion of areolar tissue; but if it has caused the death, and a slough takes place,—whether deep-seated or superficial, called a core,—the pain will continue, more or less, from the

irritation of the core, equivalent to a foreign substance, until it is discharged.

If there be no death of part, there will be no slough, no loss to repair,—no necessity for the suppuration which accompanies granular reparation,—but merely desquamation of cuticle, or even resolution. The stages from a slight erysipelatous blush to the most violent inflammation and sudden mortification differ only in degree—analogous to the difference in degree of the action of fire, from a slight scorch to the actual cauterisation which instantly causes the death of the part: the intermediate stages resembling the action of a moxa, or German-tinder cautery, which scorches more or less, as may be desired; producing, as it were, the erysipelatous inflammation, either slight, followed by desquamation, or more severe, with immediate effusion of serum or lymph, and separation of the cuticle; and, if still more potently applied, causing a slough, as *erysipelas* sometimes becomes carbuncle; whereupon it is called *phlegmonous;* the two things which produce the sum of the phenomena being the injury and the constitution—great injury with little debility of constitution inducing the same result as less injury with greater debility. Thus we see the feeble Lascars brought into the London hospitals with limbs mortified by a degree of cold which the English bear with impunity. Again, inflammation, which would be erysipelatous and superficial in a moderately strong constitution, becomes carbunculous or phlegmonous in a debilitated one. We also find, that the various degrees of the same inflammation, which arise on the backs of persons confined to

bed ("bed-sores"), are in proportion to the debility of the nervous system. In fine, I repeat, there is but one inflammation—loss of power in the capillaries—of all grades, from mere loss of tone to actual sphacelus—decomposition—melting away. By way of analogy,—if we subject a piece of steel spring to a blow-pipe heat, or the powerful agency of a galvanic apparatus; first, its elasticity is destroyed, then it begins to give way and bend with its own weight, and lastly it melts: we have in these analogous cases a tissue and an agent, and we witness similar effects in both, from the slightest diminution of tone or tenacity to actual decomposition and melting away.

Although the application of nitrate of silver and other astringents, by contracting the capillaries, usually relieve inflamed parts, yet applied in excess they may cause morbid sensibility, evinced by pain, and an increase instead of diminution of the inflammation. The administration of sedative medicines, also, *in excess*, produces morbid sensibility; as, from their taking off the injecting force by diminishing the action of the heart, equivalent to hæmorrhage, the capillaries in the organs, generally, will contract too much, and morbid sensibility result; hence more frequent contractions of the heart; whilst at the same time, from the diminution of the circulation of blood (the appropriate stimulus), the contractions will be weaker. Thus, blood-letting often makes the pulse quicker but weaker; so do digitalis and antimony under some circumstances, where there is debility; but in the natural state of the system, their effect on an *over-acting* heart

is to make the pulse slower. The effect of a sedative or of bleeding upon the *natural pulse* is to make it at first slower; then, when morbid sensibility and debility come on, the pulse becomes quicker (flutters); and in animals bled to death, the morbid sensibility produces convulsions; as occurs also from a poisonous quantity of digitalis, or hæmorrhage from a wound, or flooding in parturition. The rapidity of pulse and convulsions from hæmorrhage are a beautiful "provision of Nature" —an evidence of the wisdom of the Maker; for thus the heart sends on what little blood reaches it, so as to sustain life to the utmost, whilst the convulsions of the frame help to propel the blood in the veins towards it.

In employing antiphlogistic remedies, it is of great consequence to know when to stop; for the period of inflammation is often very short; and unless the practitioner knows when it has ceased, he may do much mischief by interfering with the natural reparatory process. The period of inflammation of the pleura or peritoneum is often so brief, that even destruction of tissue of which a patient will inevitably die may have been effected, though the inflammation had not lasted above three or four hours, as we see occasionally in peritonitis and pleurisy, whether idiopathic or traumatic.

For example: a youth, after being exposed to severe cold, was conscious, for a few hours only, of sharp pain in the abdomen, but became feverish, with sickness and constipation. He did not apply for advice for two or three days, at which time he made no complaint of pain in the abdomen even

upon moderate pressure, except across the hypochondria, where pressure produced some uneasiness. He died in about a fortnight, though judiciously treated for peritonitis by his medical attendant. On examination, all the intestines were found glued together by coagulable lymph, and some pus was effused in the cavity of the abdomen. And I have seen other cases exactly similar.

The practitioner will do harm if he does not withhold or relax antiphlogistic treatment (not only bleeding, but such medicines as tartar emetic, purgatives, digitalis, colchicum, &c.) as soon as inflammation is subdued. I have seen a patient, with extensive pleuritic effusion in one side, whose life had been saved by active and judicious bleeding, antimony, and other antiphlogistic means; but who afterwards nearly sank in consequence of the medical attendant persevering with purgative and other antiphlogistic medicines, and low diet, after the inflammation was quite subdued. This was done on account of that uneasiness in the parts, which was only morbid sensibility (tenderness, as in a sore or bruised part), in consequence of the lesion produced by the severe inflammation, and which uneasiness necessarily remained in a certain degree even for months afterwards. This patient was becoming actually dropsical from debility, but gradually revived under a change of treatment to a moderate use of wine and quinine.

Through neglect of attention to this circumstance, I have formerly, when a student, witnessed patients, suffering from the pleuritis which attends upon fractured ribs, fatally exhausted by repeated

blood-letting. Some surgeons in those days knew less of medicine than is requisite even to treat a fractured rib; and, confounding the morbid sensibility of the injured part and neighbouring pleura with inflammation, they bled the patient at each visit, until he died. The first or second venesection only was probably demanded by the actual condition of parts.

On the other hand, in many protracted cases of disease, without much pain, when the patient feels scarcely ill enough to apply for medical advice, we find some latent inflammation, requiring active and decided antiphlogistic treatment, which may surprise the patient, but of which he soon feels the benefit.

The pain in the back or head produced by hæmorrhage, by the sedative operation of bleeding, digitalis, or antimony, is caused by morbid sensibility from over-contraction of the capillaries of the nerves, in consequence of deficient injection of arterial blood. The nausea and vomiting which follow blood-letting, or the administration of sedatives, result from morbid sensibility of the stomach produced in the same way.

This will account for cathartics being assisted by emetics. The operation of a cathartic is sedative, producing local morbid sensibility, and consequently* increased peristaltic motion; and if a little ipecacuanha or tartar emetic (which are also sedative) be added, the operation will be more certain.

* We have abundant evidence that pain, irritation, or morbid sensibility without pain, produces or increases action in the muscles (voluntary or involuntary) in its neighbourhood; for example, tic douloureux, gravel in the bladder, ipecacuanha, tartar emetic, sulphate of zinc or copper, or inflammation in the sto-

Bleeding has the same sedative effect, especially if there be hard pulse from inflammation; but, as mentioned above, it does not by itself produce morbid sensibility, until it reduces the pulse below par, though it coöperates with the medicines; and, on the other hand, if there be dysenteric diarrhœa from inflammation of the mucous membrane of the intestines, bleeding will diminish the purging by diminishing inflammation, which explains an empirical adage of Celsus, that "bleeding relieves obstinate purging as well as obstinate costiveness."

But it must at the same time be remembered, that too great a degree of sedative operation on the intestines will produce morbid sensibility and spasmodic contraction of the peristaltic muscles—so strong, in fact, as to close the tube by spasm, called colic, which we see result in the painter's colic from the sedative effect of white-lead. An unripe apple, or other fruit, produces a similar local sedative impression on a part of the colon, so that pain (griping) and spasmodic contraction result, by which the offending substances and fæces are prevented from passing. It is well known that purgatives and other sedative treatment will not cure colic; on the contrary, they increase the tormenting griping, with the misery of sickness in addition, when administered by those who think only of a "stoppage of the bowels," and use purgatives to overcome it. Stimulants, with narcotics, as the warm bath, and warm aromatic drink, with opium, especially in enema or suppository, will relax the colicky spasm of the

mach, jalap and other purgatives, or inflammation of the mucous membrane in the intestines.

intestine, and most likely produce an evacuation of the bowels; but if the latter does not occur, as soon as the spasm (of which pain is the evidence) has been perfectly quieted, a little castor oil will operate. Here, again, we have examples of the apparent contradictions which occur in medicine—bleeding both opening and quieting the bowels, allaying or inducing morbid sensibility, according to circumstances. We see the peristaltic muscular contraction, the office of which is to transmit the fæces, actually obstructing their passage, by being inordinately increased to spasm—purgatives adding to the obstinacy of constipation of the bowels—opium relaxing them: in short, the same morbid sensibility from sedatives producing the opposite effects of purging and constipation; and yet that all these contradictions may be reconciled upon rational principles.

Even in cases of obstinate constipation, practitioners have very much relinquished their efforts to overcome it by drastic purgatives, which rather prevent the passage of the fæces, by keeping up a spasmodic or crampy action of the bowel, which, on the contrary, yields to opium freely administered; and this has succeeded in many instances when no fæces have passed until after two or three weeks. Of this we may give a couple of clinical examples:

(1) The author was called out of town to consult with two medical friends,—a physician and a general practitioner,—on a case of a lady towards the fifth month of *first* pregnancy: she had six days before, from *fancying* she required it, taken two compound

colocynth pills, which acted slightly, but induced colic with the constipation. The medical attendants had given a variety of opening medicines and enemas, with no result, except aggravating the symptoms, including vomiting of every thing in the way of food; and she was then in great distress, with nausea, cold perspiration, and faintness, and unable to rise in bed. Excepting fifteen drops of laudanum, medicine was now laid aside, and a glass of champagne given, which allayed the nausea, then a teacupful of milk and brandy. She was now left to repose for about four hours,—at the end of which time, being free from nausea and cold perspiration, and feeling revived, she was able to take some animal food and a glass of wine, and was left with the inculcation to take no medicine, but to have an enema of gruel. By the next day she was in a more natural state, with only *occasional* griping, and took food; the day following this, she got up and amused herself with reading and needlework—*still no motion;* next day, the same, but *no griping:* so that there was no indication for opium;—and so she went on for twenty days from the first commencement of the attack of colic, the author pertinaciously resisting the suggestions of the physician to give opening medicine, except an occasional mild compound rhubarb pill, to content him; the enema only was repeated daily, but returned without fæces.*

* All I could make out was, that at first there had been a sense of uncomfortable fulness, which made her take the pills. It is not unlikely that retroversion of the uterus existed, pressing upon the sigmoid flexure, which was liberated as soon as the uterus in its natural progress rose above the pelvis.

At one time he made the sapient proposition, that labour should be artificially brought on; to which the author answered, "If you do, you may escape with a verdict of manslaughter; but you would deserve to be hanged." In fine, without medicine, on the twentieth day, the bowels acted naturally, and as abundantly as may be supposed from the length of time. It turned out that the expression *man*-slaughter was not inappropriate, as the lady produced a *son* and heir—which, as it happened, was of some consequence, on account of hereditary property.

(2) Sometime after this, the author had a most interesting case in consultation with his talented friend and former pupil, Dr. Stephen Ward, and his clever brother Nathaniel—"*eheu, miserande puer!*"—who lived beloved, and died regretted,—in which they not only abstained from purgatives, but gave opium freely to allay morbid sensibility, amounting to stercoraceous vomiting; and at the end of eight days, the bowels acted naturally,—the constipation having been caused by a biliary (cholesterine) calculus, one inch and a half long by one and a quarter wide, lodged, apparently, somewhere about the ileo-cæcal valve; which, however, did not make its way to the anus until three months afterwards. Did not that profound philosopher Sancho Panza, the Governor of Barataria, say, "An ounce of common sense is worth a pound of learning"? And if the two are combined, we may calculate the result.

It is, however, quite worth while to make an extract from Dr. Ward's instructive communication to the *Lancet* of Feb. 7 and 14, 1863:

"INTESTINAL OBSTRUCTION.

"CASE 1. *Intestinal obstruction from large intestinal calculus: recovery.*—A gentleman, in his sixtieth year, of bilious temperament and rather hypochondriacal tendency, on going to stool on Friday, January 2d, found that he could pass but a very little fæcal matter; and, after some straining, desisted from further effort. On the following morning, not having had any evacuation, and feeling uneasy in the bowels, he took an aperient. This, after a time, was rejected; and bilious vomiting came on, and continued at intervals through the day and ensuing night. Feeling worse on the Sunday morning, he sent for me; and on my arrival, I found him lying on the sofa, with a basin by his side, looking haggard and sallow, and constantly retching. A careful examination of the abdomen was made, and there was not found any trace of hernia, nor tenderness or undue distension. Looking at the case as possibly one merely of irritable stomach and liver, calomel and opium, and effervescing mixture with dilute hydrocyanic acid, were ordered, and the patient was directed to keep quiet in bed. On the Monday morning, the patient was more comfortable; he was free from pain, and the stomach had been quieter. Towards the evening of this day, however, the vomiting returned, and eructation of gas with strong feculent odour came on. Later, the matters vomited began to have a pea-soupy character, and distinctly feculent smell; the abdomen became somewhat tympanitic, but without tenderness; and the pulse increased in frequency, and assumed a thready character. On careful percussion and palpation of the abdomen, there was found to be dulness about the ileo-cæcal region; and as the intestinal obstruction, now evident, might have been due to fæcal accumulation in this part of the canal, it was thought desirable to make an examination, and to try the effect of a copious injection administered by the O'Beirne tube. Mr. N. Ward was accordingly requested to give his opinion upon the case, and to make an exploratory examination of the colon. He succeeded in passing the tube to a considerable extent up the colon, but could not find any cause of obstruction. The injection subsequently administered was retained for a time, and then rejected, but without any trace of fæcal matter in it.

"In the morning of Tuesday, the condition of the patient

became alarming. He was constantly vomiting matters of the consistence and appearance of pea-soup, though of brighter yellow colour, from the presence of much bile, and having a strong feculent odour; and when not vomiting, he suffered from constant distressing hiccough; the abdomen was free from tenderness, but somewhat tympanitic; the pulse about 120, and thready; the surface cold, and the features pinched and haggard. It was quite evident that unless relief were procured, the case must terminate fatally before the lapse of many hours. Some hydrocyanic acid and chloric ether were given for the relief of the hiccough and gastric symptoms, and afforded some alleviation. It was thought desirable to try the administration of opium, which drug had, in conjunction with calomel, given relief the first day or two of the attack; but it was considered better to wait the result of a consultation which had been decided upon with Dr. Billing.

"This consultation was held in the afternoon of Tuesday, and the following plan of treatment was resolved upon: To give a grain of opium every three or four hours, and to administer it in the form of powder, rubbed up with a little sugar and placed upon the back of the tongue, as being more likely in this rather than any other form to be absorbed, in the then irritable state of the stomach. The hydrocyanic acid and chloric ether mixture to be given occasionally; also brandy and Seltzer-water, and milk and lime-water in small quantities, in the way of dietetic regimen.

"Towards night, the patient seemed more comfortable; the pulse was less frequent and a little fuller, the countenance less anxious and pinched; and the vomiting was less frequent, although the matters ejected were of the same character, and there was almost continuous and distressing hiccough. He was enabled to retain the milk and lime-water, and the brandy and water. The opium was given with great regularity through the next and the following days; it afforded the patient some intervals of sleep, very materially allayed the severity of the symptoms, and did not produce any unpleasant cerebral effects.

"Through the Wednesday and Thursday there was no action of the bowels, although there was several times a sensation as if such were going to take place; but the vomiting was much less

frequent, the matters ejected less in quantity, and not so offensive, and there were considerable intervals between the attacks of hiccough. The general condition of the patient also improved, and, throughout, the abdomen was soft, and free from tenderness. There appeared, however, to be some amount of fulness and dulness on percussion about the ileo-cæcal region.

"A second consultation was held on Thursday afternoon, and it was decided to persevere with the opium, and in other respects not to alter the treatment. The patient passed through the ensuing night with comparative comfort.

"In the afternoon of Friday he felt a desire to go to stool, and, after some straining, passed a small quantity of semi-fluid fæcal matter. A few hours after, he had a tolerably copious and loose motion; but nothing could be detected in these or in subsequent evacuations that could have acted as a cause of obstruction.

"From this time the symptoms completely subsided, but for two or three days he was troubled at intervals with hiccough. The bowels continued to act once or twice a day, and, after a time, regularly every morning; but the motions remained unformed, and occupied, on and off, an hour or two in passing. They were voided in detachments, and with difficulty; and it was evident that there was some obstacle to free evacuation. A dose of decoction of aloes daily, and the use of an enema of tepid water every morning, were suggested, with a view of bringing about an effectual emptying of the bowels; and, although there was every day a full discharge of fæcal matter, still it was in the tedious and annoying manner just noticed.

"This state of things continued through February and March, until one morning towards the middle of April, when the patient felt a solid substance come down to the anus, but which he could not lay hold of with his fingers. Mr. N. Ward was accordingly requested to make an examination of the rectum. He did so, and found a large oblong mass lying in the hollow of the sacrum, between two and three inches from the outlet. By manipulation he succeeded in detaching from the nucleus a quantity of fetid old fæcal matter, which formed the outer investment of the body, and which was found to contain some earthy matter, and a considerable number of seeds. He subsequently, on two occasions, endeavoured, by means of for-

ceps and the scoop, to seize and remove the more solid nucleus, but failed, in consequence of the folds of the mucous membrane getting in front of it.

"On the morning of April 25th, however, the mass came fairly down to the anus, the narrow end first, and the patient's attendant managed to seize and extract it. On washing off the adherent fæcal matter, it was found to be cone-shaped, to measure an inch and a quarter at the base, and an inch and a half in length, to float in water, and to weigh three-quarters of an ounce. A transverse section gave a radiated, crystalline appearance; the vertical had a homogeneous, fawn-coloured aspect. The calculus was evidently of biliary character, and was found, on analysis, to consist of cholesterine, with some earthy matter, the latter being confined to the outer investment, which was denser than the internal portion. After voiding it, the patient passed normal, well-formed evacuations, and felt well.

"*Remarks.*—There was no history, in the above case, of paroxysmal pain, such as would have attended the passage of a gall-stone of large size, and such as attended, in an excruciating degree, the passage of a far smaller gall-stone, in a lady upon whom I was called in to consult. There is, therefore, but little doubt that this calculus, formed in the gall-bladder, had found its way, by adhesive and ulcerative action, into the duodenum. From this point it had gradually drifted down until it arrived at the point, probably high up in the small intestine, at which the formidable symptoms of obstruction ensued. Under the sedative and relaxing influence of opium, it passed this point, and then without difficulty drifted along the large intestine to the rectum.

"Obstructions from impacted solitary gall-stones would seem to form but a very small per-centage of obstructions from all causes. Writers on the subject refer to cases, but cite either none, or but one or two, as having occurred under their observation. Frerichs cites two cases which were under his care, of which one recovered, the other being fatal. Three or four cases are recorded in the *Transactions* of the Pathological, and one or two in those of the Medico-Chirurgical Society.

"As regards the site of impaction of these solitary gall-stones, the jejunum stands first, then the ileum; the large intestine offering obstacle only in the sphincter.

"I have already alluded to the mode in which these large stones get into the bowel—namely, by adhesion of contiguous walls of the gall-bladder and duodenum, and ulceration through them; such process being in general gradual, and unattended with marked pain. The inflammation in such cases is localised and slight, and the first intimation given of it is either discharge of a large stone from the bowels, or symptoms of obstruction.

* * * * * *

"Opium is, of all drugs, the one best calculated to carry out the principle of treatment enunciated by modern writers upon the subject under consideration, viz. to gain as much extension of life as possible, in order that any curative efforts of Nature may have time for their operation. While opium fulfils this indication, it also calms pain, and, by relieving muscular spasm, may directly remove one cause of obstruction. It should be given frequently, and in large doses; and, where there is irritability of stomach, should be placed dry on the back of the tongue. It is remarkable how well this drug, given every few hours, day after day, for two or three weeks in succession, is tolerated; and how rarely it produces any characteristic cerebral symptoms.

"Enemata of three different kinds may be given—1. Large, bulky injections of gruel or warm water, introduced by the O'Beirne tube, and administered with some amount of force, with a view of removing the obstruction by mere mechanical action; judgment must be exhibited in their use, as they are as likely to do harm as good. 2. Enemata of opium, or belladonna, or tobacco, repeated at intervals, with a view of relieving pain and relaxing spasm. Frerichs thinks that the removal of obstruction from an impacted gall-stone, in one of his cases, was coincident with the specific action upon the pupil of belladonna given by injection. 3. Enemata of a nutrient and stimulating character, as of beef-tea, with port wine or brandy, small in bulk, given cautiously and at moderate intervals, are of service where there is great irritability of stomach. There can be no doubt but that some of the nourishment thus administered is absorbed, and serves materially to prolong life.

"A single effective purgative may be given, perhaps, at the outset of some cases of obstruction; but the perseverance in the

use of purgatives, in such cases, cannot be too emphatically condemned. Nature is already, as shown by writhing peristaltic action, doing all she can to remove the obstacle, and purgatives can only increase the tendency to inflammation, and add to pain and vomiting.

"Of the good effects of manipulation, I have not any experience, and artificial anus and gastrotomy fall within the province of the surgeon. I can, however, scarcely conceive any case in which the latter operation would be justifiable.

* * * * * *

"Case 2. *Stricture from typhoid (?) ulcer: forty-two days' duration of obstruction; death.*—An Irishman, aged twenty-one, of lymphatic temperament, was admitted into the *Dreadnought* on Feb. 8th, 1862, under the care of Dr. Ward. The patient had just arrived in a ship from Boston, and for eight days had not had any action of the bowels. No history of any very distinct previous illness could be elicited. On admission, the symptoms were—obstinate constipation, frequent vomiting, furred tongue, and coldness of skin. There was not any abdominal tenderness. He was ordered milk and beef-tea, a large common enema, and a grain of opium with two of calomel every four hours. The injection was returned after a time, but without any fæcal discharge.

"On the morning of February 9th, he was ordered a turpentine enema. This brought away a small quantity of fæcal matter, which had probably been lodged in the colon. The tongue was still furred; but there had not been any vomiting since yesterday.

"10*th*. There was frequent vomiting of a dark-greenish fluid, and the common enema was repeated, but without effect.

"11*th*. He was ordered a grain of opium every four hours, and the effervescing mixture, with three drops of dilute hydrocyanic acid, every four hours.

"13*th*. Vomiting still troublesome. Ordered an injection of beef-tea and brandy, with thirty drops of laudanum, to be repeated at intervals.

"14*th*. The first injection had been retained; the second passed after an hour, unaltered. The O'Beirne tube was passed yesterday, and about two pints of water with some salt were thrown up. The tube, on being withdrawn, was found to be

smeared with some fæcal matter, and some fæces were passed with the injection, which was retained for one hour. Subsequently vomiting of stercoraceous matter set in.

"15*th*. He was ordered a grain of opium, with two of sugar, to be placed on the back of the tongue, and given every four hours, and some ice to suck; beef-tea injections to be persevered with.

"17*th*. The O'Beirne tube was again used, and three pints of barley-water, with salt and castor oil, were thrown up. This enema was soon ejected, without any fæcal matter; the stercoraceous vomiting continued.

"18*th*. Abdomen intensely tympanitic; the tympanitis being limited apparently to the small intestine, the convolutions of which, and, at times, the peristaltic action, could be traced through the parietes. The colon, on careful palpation, seemed to be collapsed, and to be overlaid by small intestine.

"During the nights of the 19th and 20th, he had several times had vomiting of stercoraceous matter; had also had straining frequently, but it appeared to be in part voluntary; tongue dry and brownish; little or no pain, but at times a sense of bursting.

"23*d*. Little or no vomiting, and not much pain. All the beef-tea and brandy injections had been retained.

"24*th*. Vomited about a pint and a half of stercoraceous matter; the last beef-tea injection was not retained. Has slight hiccough, and is very listless.

"26*th*. Stercoraceous vomiting continues, but only about once or twice a day, and he is able to keep down some light food in the intervals. The abdomen is somewhat shrunken. What is passed by stool, although, for the most part, resembling the injections, has a slight fæcal odour.

"*March* 1*st*. Yesterday galvanism was applied for about twenty minutes, and caused the expulsion of some flatus, but no stool. The injections had been retained. Tongue more coated; pulse quick, small, and weak; is very listless and depressed. He vomited yesterday, but not during the night.

"From the 1st until the 9th he remained in much the same state; there was not any fæcal evacuation; the *débris* of the beef-tea injections being all that was discharged from the bowels. The stercoraceous vomiting occurred about once in

twenty-four hours, and in the interval the patient was enabled to retain beef-tea, milk and lime-water, and brandy and water, if administered in moderate quantity. He, however, became gradually more emaciated—the powers flagged—and the pulse became more frequent and weaker. The intellect was unaffected throughout.

"On the 11th he was evidently getting worse, and a fatal issue appeared inevitable. It was determined, therefore, to give him the chance of removal of the obstruction by one more bulky injection by the O'Beirne tube, preceded by a dose of croton oil. This treatment was not attended with any good effect. He sank exhausted on the 13th, the forty-second day from the commencement of the obstruction.

"*Inspection.*—Some fæcal matter was found about the anus, and some more, of semi-solid character, higher up in the colon. The large intestine was collapsed through its entire length ; the small intestines were intensely distended, and of purplish colour. The seat of obstruction was at the ileo-cæcal valve; the mucous membrane at this point being extensively ulcerated, and so thickened as almost completely to occlude the passage. The remainder of the intestines and the other viscera were quite healthy. The ulceration was on the iliac side of the valve, and was such as might have been produced by the typhoid process ; but there were not any other ulcers, nor any appearance of affection of Peyer's or solitary glands higher up in the intestine.

"*Remarks.*—The obstruction in the above case was all but absolute, although on one occasion a slight fæcal discharge had followed the action of the injection, and the forcing effect of the croton oil had driven a small quantity of fæces into and along the colon just before death. *If any curative action could have been established, Nature would have had a very good chance of effecting it under the length of time afforded by the opium plan of treatment.* The case is interesting as showing for how long a period life may be extended under almost complete intestinal obstruction, and also how effectively, within certain limits, either end of the intestinal canal may perform the double function of ingestion and egestion. In other recorded cases there has been greater prolongation of life than in the above, but in them the obstruction had been brought about more

slowly ; there had been, in fact, attacks of constipation, increasing in duration, but with intervals of comparatively healthy action. The subject of the present case appeared to have been in good health, doing his work as usual, and performing the functions of the body healthily, but a short time before the fatal attack. Defecation by the stomach, where the system has had time to accommodate itself to the change, may go on for a very considerable period. Dr. Crampton, as quoted by Dr. Wood, relates the case of a young woman who for seven years had had stercoraceous vomiting, with obstinate constipation ; having had stools at distant intervals—only two or three in one year, and none for eight months preceding the report. Dr. Bache has also reported a case (see Wood) which continued for ten months, during which period there was at times an absence of stool for more than twenty days, and once for eighty-seven days, and yet the patient recovered. *These cases point strongly, I think, to one imperative indication in the way of treatment, viz. to extend life to the utmost limit—seeing that we are in the dark as to the cause of the obstruction, and also as to the curative process that may be going on to remove it.* The long duration of the attack alone is almost sufficient to distinguish obstruction by stricture from that produced by other causes ; but in the earlier stage of the attack there are features in common with obstruction from peritoneal band or adhesion, and the surgeon might be tempted to propose to himself the question of gastrotomy. *Looking at the unsatisfactory results of this operation, the cases appear to me to be very few in which it should even be thought of.*"

As a third case or degree of disease, let us now consider local affections, whether surgical or medical, such as inflammations of the eye, tonsils, lungs, or bowels, wounds, or other accidental injuries, &c., when they are either too great to yield to the remedies applied, or when they have been neglected, still keeping up the morbid sensibility (see pp. 178, 185) of the nervous system; so that, in addition to the increase of pulse, we have other evidence of disturbance in the functions of the

nervous system itself, and in the digesting system, &c., through it. Hence, pains in the head, back, and limbs, with lassitude, or a feeling of weakness, above all, chilliness, showing that the nerves of voluntary action and sensation are affected; alteration of temper; despondency, anxiety, or irritability; hurry of thought, not indeed amounting to delirium, yet enough to show disturbance of the functions of the brain; want of sleep; wrong perceptions—such as fancying disagreeable smells; morbidly increased heat,* with dryness, of the skin, showing want of tone from deficient nervous energy, —for as long as the vessels of the skin are kept in order by the nerves, the secretion of insensible perspiration preserves it cool and soft. The digestive system is now also deranged,—the ganglionic sympathetic nerves partaking of the morbid sensibility, as well as the cerebral and spinal nerves, and, of course, the organs supplied by them; there is thirst

* I have here said, "increased heat," which is the rule; and though there are numerous exceptions, there are no exceptions to the original rule given by Galen—"increased heat," leaving out the word "skin;" for it has long been known, and incontestably proved, that there is a morbidly increased thermometrical heat of the body in all pyrexia and fever; and that when the skin feels cold during the shivering or rigors of fever or ague, a thermometer introduced into the internal parts, or even placed in the axilla, the arm being kept close upon it, exhibits an increase of temperature of several degrees above the natural standard of 98°. With this unnatural increase of caloric is connected the uniform symptom of wasting whenever pyrexia exists; as certainly as fever exists, whether symptomatic or idiopathic, so certainly will the patient weigh less than before he began to suffer from it, for the loss of nervous power diminishes the usual nutritive metamorphoses.

and loss of appetite, with imperfect secretions in the primæ viæ, causing, frequently, nausea and deranged functions of the intestines—constipation, or diarrhœa. The kidneys also evince a loss of power, their secretion becoming dark, reddish, and scanty, as before explained.

The combination of symptoms here enumerated constitutes what is called *constitutional disturbance* (*pyrexia*), SYMPTOMATIC FEVER, from *local inflammation:* and we have traced them successively from the local injury to the constitutional affection; we have observed a part, which we have known to be inflamed, deranging the functions of the brain and the spinal and ganglionic nervous system, and consequently the functions of the various organs—the skin, heart, stomach, bowels, kidneys, &c. The symptomatic inflammatory fever is the same assemblage of symptoms which forms the *idiopathic* fever, viz. "chilliness, heat increased, pulse frequent, urine red, the sensorial and other functions disturbed, and the power of voluntary motion diminished" (Cullen). The idiopathic fever sets in "without primary (or preceding) local disease;" that is to say, these symptoms of lesion of the nervous system are not preceded by any hurt, or local inflammation, or pain, external or internal; but, observe, the lesion of the nervous system itself is, in fact, in idiopathic fever, the local disease. It is the nervous system which, being injured, produces the phenomena of idiopathic continued fever, as it arises in hot climates, and in this country in the height of summer, in labourers exposed to work under the sun; or sometimes from the

opposite cause of excessive cold, combined with deprivations, excesses, depressing passions, bad air or exhalations, or other causes of injury to the nervous system; or by infection or epidemic influence, as is the case in our continued fevers.

The treatment in both these fevers, the symptomatic and the idiopathic, is, generally speaking, the same. If the inflammatory fever have arisen from an inflammation which has been brought on by a blow or other injury (as a fractured rib, limb, or skull, &c.); or from an inflamed tumour in the mamma or groin; or from an inflamed arm and axilla after a puncture of a finger; or from inflammation in the chest or abdomen,—in addition to medicine, we must use leeches, fomentation, blisters, poultices, &c. If the inflammation be in the form of erysipelas in the integuments of the face and head, lotions, or other applications, and blisters, or nitrate of silver, &c., may be applied close to the part. If it be *idiopathic* continued fever, still, along with general remedies, we should have recourse to local applications—cold lotions applied to the head, with leeches, if necessary, to relieve the inflamed brain or meninges, if the head-symptoms predominate; or to the chest or abdomen, according to circumstances. Sponging the skin with water, either tepid or cold, also produces a sedative impression on the circulation, by cooling the blood, and by its tonic constringing effect upon the capillaries.

In the instances hitherto adduced, the practice is straightforward (what is called direct), and the indications of cure evident, viz. to use local applications, to correct disordered functions, and to lower the force of the circulation, so as to diminish the

current of the blood into the inflamed part by sedatives,* &c.; the necessity of which is agreed upon by those who regard the throbbing of the arteries as an evidence of increased arterial action, as well as by those who concur in my opinion, that it is only an evidence of increased action in the heart, and that there is not increased arterial action in inflammation, whether the pulse be strong or weak (p. 78).

Slight pyrexia (feverishness) will arise from local causes, which must be treated without too much attention to the pyrexia, as general remedies would exhaust and weaken without affecting the local disease; for instance, that from hæmorrhoids, teething, intestinal worms, hysteria† (chronic hysteritis), &c.

Up to this point, blood drawn does not exhibit a trace of alteration. So far, then, there is no "blood disease."

We now come to consider a fourth stage or degree of disease, when, after the foregoing state has existed for some time, the power of the nervous system becomes exhausted by morbid sensibility, want of nutrition, &c.; and when the heart, though

* It must not be forgotten that the sedative medicines, antimonials, mercurials, salines, &c., also reach the inflamed capillaries themselves through the circulation (p. 151), producing an astringent tonic effect upon them.

† I consider the cause of hysterical symptoms to be (when not neuralgia) chronic hysteritis, yet by no means frequently requiring the sedative antiphlogistic treatment; most commonly the tonic antiphlogistic, though often the stimulant antiphlogistic (pp. 162, 165, &c.). From not referring to these sources, the notions entertained of hysteria have been very vague.

still under the influence of sympathetic morbid sensibility, deriving less energy from the debilitated nervous system, and being also less nourished, has less power to contract, and really becomes weaker; the pulse, therefore, is rendered weaker also, though still perhaps hard—"wiry." Sometimes the brain, from the same causes, becoming inflamed, or at least congested, has its functions more impaired, and the thoughts become more confused, until actual stupor, or delirium, succeeds; and then the pulse, losing even its hardness, becomes soft and weak. The heart being now unable to empty itself, the circulation through the lungs is retarded, and there is a tendency to congestion, from their capillaries being also deficient in power: the blood, therefore, not being purified, causes still greater stupor, and the prostrated patient is said to be in a state of low fever; instances of which may be seen in local inflammations from disease or injury, as when there is inflammation in the chest or abdomen, or after wounds or operations, where the sympathetic or symptomatic fever becomes *low*, like typhus, or "typhoid"—typhose. But if the brain does not become inflamed or congested, the patient may die from mere exhaustion and *hectic* fever, with all the senses perfect.

Thus we may trace the progress from smaller injuries and their consequences to greater; a slight inflammation with morbid sensibility, as a single inflamed hæmorrhoid, produces shivering and heat of the skin, *feverishness* (*pyrexia*); the spreading of this inflammation to a greater portion of the intestine produces *symptomatic inflammatory fever*; and a

still further extension of the mischief to general inflammation of the bowels will bring on a prostrate, *low* state of *fever*, with oppression of the sensorium.

We may see a patient with the symptomatic fever, *low* typh*oid* (*like typhus*), from the commencement, without having had any previous strength of pulse, and with a cool skin, as from local injury; when, for instance, with the injury, the nervous system has received a *shock*, as in the case of a severe accident or of an operation, followed by prostration of body and mind.

Having now used this word *typhoid* for the last time in its true and original acceptation, it is necessary here to explain what was the meaning of typhoid and typhus, when the earlier editions of this work were published.

The continued fevers of this climate were denominated by Cullen, and by the rest of the profession, *synocha* and *synochus—continued*—συνεχὴς (in contradistinction to *intermitting ague*), embracing both typhoid and typhus, at that time undistinguished, though now as much so as measles and scarlatina; and they were called typhus only when accompanied by marked symptoms of prostration, but not until then: which was a cause of embarrassment, since it appeared as if a continued fever might be typhus or not, just as it turned out: in the words of Cullen, "commencing synocha, ending typhus."* It was remarked, also, that the bad, *low* cases usually showed an eruption of purple ecchymoses, specks, called petechiæ; it did not escape observation, however, that

* Armstrong, however, pointed out that there were mild cases (*ab initio*) of typhus.

many cases (and some of them fatal, too) had spots, though not so dark: but it was the *purple-coloured petechiæ* which always caused alarm, as being connected with that *low*, collapsing state considered the essence of *typhus;* for, as remarked above, the question always arose, whether the fever could be typhus if it were not very bad, and tending to collapse.

The term became appropriated to surgical nomenclature; and whenever the sympathetic fever from accidents, wounds, or after operation became low or collapsing, it was said to be typh*oid*,* typhus-*like* (the only legitimate use of oid [οιδ] since Greek was a language),—words then as fixed and as well understood by the profession as the noun *spot*, or the adjective *dark*.

In the year 1831, the author, finding a great peculiarity in the epidemic fever of the year, and having heard of a great many cases of death where the rash was not purple but pink, after referring to the records of the venerable Sydenham (see p. 254), instituted, in his turn of clinique at the London Hospital, a strict investigation of the disease, both as to diagnosis and treatment; the result of which is reported from his Clinical Lectures in the volumes of the *Lancet* for that year. We may quote

* *Typhus* (τύφος) has no reference to the state of the pulse, but merely to that of the sensorium. Hippocrates applied it to a stupid or comatose state, in which the patient stares without answering, like a person who is haughty or proud, which is the meaning of τύφος: the other possible derivation, τύφω or τύφομαι, having reference to a half-kindled smoking or smothered fire, which could only allude to the depressed temperature of low nervous or typhous fever, in opposition to the "calor mordax" of inflammatory or other fevers.

here some passages illustrative of the subject, from vol. i. p. 233, &c., of that journal:

In commencing my Clinical Lectures this session, Gentlemen, I feel called upon to make some observations to you respecting the school which either your friends have selected for you, or yourselves have been "entrapped" into, in answer to statements in the weekly periodicals which pass through our hands, under the heads of "advice to students," and lectures,—statements which might lead you to suppose that there were deficiencies here and superior advantages elsewhere, which in reality do not exist, and never have existed.

Now, though, were I to make a written communication, I could not subscribe myself "a *constant* reader," yet I have frequently handled the *Lancet*, and yet have never been pricked by it but once. The wound, though slight, festered, and at last I am tempted to try and let out the offending matter by the self-same instrument. In the *Lancet*, Sept. 25th, 1830, you will find these words: "We believe that Dr. Elliotson, Dr. Watson, Mr. C. Bell, Mr. Brodie, and Mr. Earle, are the only physicians and surgeons who regularly deliver clinical lectures in London."* I acquit the editor of any intention to withhold the truth for the purpose of injuring us; on the contrary, the forbearance evinced by the "Notices to anonymous Correspondents," respecting the London Hospital, at various times, has not escaped my observation.

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In June 1822, I was elected physician to this Hospital, and

* This unfounded assertion was the proximate cause of these lectures being sent to the *Lancet*. My affectionate friend and physician, Dr. Daldy, was then my clinical clerk. He felt rather hurt by the misstatement; and, as he took down lectures in shorthand for his own use, suggested to me the expediency of sending some to the *Lancet*, not as an advertisement of either school or self, but simply as an antidote to the poison. The lectures, such as they are, were purely extempore; for, so far from preparing them beforehand, and afterwards fitting the cases to them as they occurred, as some did, I was in the habit of laying the Clinical Journal on the table, and asking the class what cases they preferred: the most intelligent pupils had always some one, some another, which they selected: and I had given it as my opinion that a clinical lecture ought to be equivalent to a consultation, where the most experienced gave his *rationale* of symptoms and treatment to his juniors.

in the following October commenced clinical lectures, with a Clinical Journal, on a plan the best I could frame from what I had seen in the schools of Edinburgh, Dublin, Paris, Italy, and Vienna. Any extra trouble that I have had, has been amply repaid by the pleasure of knowing that they have been of use to those who have been attentive, and especially to the excellent clinical clerks by whom I have had the good fortune to be assisted.

* * * * * *

Now, as to "regular clinical lectures," they have been kept up here regularly for ten years, without any extra expense to the pupils. My example obliged my colleague Dr. Robinson to give clinical lectures the year following, and it forced the other schools to add clinical lectures to their bills of fare. At least, waiving the question of whether it was *post hoc* or *propter hoc*, I claim the credit of having begun the now established system of clinical lectures. The Apothecaries' Company or Society—which has done every thing in its power to raise the profession (mainly by the instrumentality of the late respected Dr. George Mann Burrows) since 1815, when it was intrusted with the administration of the "Apothecaries' Act" of Parliament—could not, in its perpetually improving curriculum, include clinical lectures, when there were none given in London. In 1806, Dr. Hamilton, a first-rate physician, educated in Edinburgh and the continental schools, had given a course of clinical lectures at the London Hospital; but as no *certificate* was necessary or demanded for them by any of the corporate bodies for examination, very few of the boys knew their own interest enough to accept his valuable gratuitous invitation, and he never repeated them after the one season. Dr. Marcet made a similar attempt some years afterwards in the Borough Hospital, but dropped them from the same cause.

But a couple of years after that clinical lectures were forced into the schools, and advertised by them; the Apothecaries seized the opportunity, and, by inserting them in their curriculum, gave them a "local habitation and a name," in the even then superficial and imperfect London schools.*

* * * * * *

* These schools have been worked up since by the regulations of the University of London, much to the disgust of many of the old routine

Having prefaced so much, I must not allow even the first lecture to pass without entering on the business of the course; and, first, I will explain my method and, how I think you may best follow it up. Each case on admission is entered in the journal, in the first page of which is placed a scale of written directions for the clinical clerk, as to how to question the patient, that disease not complained of may not be omitted; as, for instance, the *complaint* may be chiefly of *nausea* at the stomach when the *kidney* is *diseased*, of *headache* when the *heart*, of the *heart* when the *uterus*, or of a variety of anomalous symptoms, as when the disease is *latent ague*, curable by quinine, and so on. At the next visit in the ward, when this statement, with an account of remedies ordered, is read to the class by the clinical clerk at the bedside, I dictate a report of progress, and any additional remedy or alteration necessary, and then, moving out of hearing of the patient, mention to you my reasons, and make observations on the case. This is a clinical or bedside lecture, and you may wish to know why I trouble you and myself with a lecture once a week in the theatre. In the first place, it affords a useful recapitulation; some gentlemen, from being called away or not hearing, may miss the observations made in the wards; but chiefly this gives an opportunity of speaking of and showing specimens and drawings of pathological anatomy, some perhaps obtained during the week (as that before you now), illustrating the diseases under treatment, or the nature of past cases.

I advise you not to take notes, during the visit, of the reports which I dictate, as you have the Clinical Journal from which to copy whatever cases you may wish to preserve, and you may employ eyes and hands better in examining the countenance, tongue, and pulse of the patient. My avocations do not allow me to be daily amongst the pupils, as I was ten years ago; but this is unnecessary, since we have had assistants;

professors; who, as long as they could or dared, ignored the University, and even now do not all insert its curriculum in their prospectuses. This useful information was withheld in such a manner that, after the University had been in full play for ten or fifteen years, youths from the provinces did not become acquainted with the existence of its degrees until they had been, perhaps, two years attending classes, when it was almost too late for them to matriculate; for, if they wished to graduate, they had lost two years—which some of them, who could afford it, have submitted to. Could they not recover damages from their *teachers?*

and there is not now a moment during the daylight that you have not some one or other of the medical officers to refer to for information.

Pathological Demonstration.—Effects of Ossification of the Valves of the Aorta.

You see here a specimen of *disease of the valves in the commencement of the aorta,* which is so frequent a cause of enlargement of the heart, and dropsy, of which the patient died. The only unusual thing in this case is the early age at which ossification of the valves had taken place, the man being only thirty. In this glass you see a healthy heart well displayed, and now observe the contrast; first, instead of the three free transparent valves, you see that in the morbid specimen they are thickened, the edges rough with projecting vegetations, and in various points containing granular portions of white, hard bone-earth; and that, in consequence of the puckering of the edges, and its having given way in one place, the structure of the valve is imperfect,—so that, instead of keeping the blood in the aorta, it allowed it to regurgitate into the left ventricle of the heart. You have here an explanation of the symptoms produced; "harassing cough, asthmatic breathing, streaks of blood in expectoration, blood in the urine, dropsical swellings." The left ventricle, in consequence of regurgitation, not being empty to receive the blood from the left auricle, retarded the blood in the lungs, the consequent congestion causing distress, difficulty of breathing, and cough. This congestion in the lungs preventing the right ventricle from emptying itself, and thus keeping back the blood in the venous system, caused congestion in the capillaries, from which arose oozing of blood, as seen in the urine and expectoration; and oozing of serum into the cellular tissue and cavities, called dropsy.

By comparison with the sound heart, you can perceive that the left ventricle is enlarged and thickened, dilated by the constant distension from the regurgitation, thickened by perpetual over-action to get rid of the load; this increase of size and strength (dilatation with hypertrophy) causing the impulsion communicated by the stethoscope, especially over the left ventricle. You find that the left ventricle had its muscular fibres increased, as those of the legs of a dancer, or the arm of a smith,

because it had free action, being able to empty itself, though dilated by regurgitation; but the right ventricle is simply dilated, not having free action, as the congestion of the lungs prevented its emptying itself. The *bruit de soufflet* heard was caused by the ripple in the blood, from the inequalities of the valves, and takes place whenever inequalities, as in this case, or in aneurisms, or even agitation (as Laennec mentions in hysteria), produce a ripple in the stream of blood.

* * * * * *

Simple Fever.

I have now to point out to you three well-characterised cases of diseases differing from each other, which may prove instructive by being thus grouped and compared, as when affections of the same kind are brought together; but we have not always this opportunity. One is a case of simple fever; another, simple inflammation of the lungs; the third, a case of fever complicated with inflammation of the lungs.

The first case is an example of mild typhus—for there are instances of mild typhus fever, as well as of mild small-pox; this is one of those cases which confirm the words of Armstrong, that typhus is not merely an aggravated degree of fever, but that it is typhus *ab initio*.* I recommend you to study Armstrong's writings on fevers; and though I differ from him on some subjects, I like to give honour where it is due, and to point out now, as I did whilst he was living, that he was the first, in this country, to introduce the proper mode of lecturing on the practice of medicine,—demonstrating the pathology by specimens and drawings.†

CASE 1. F—— H——, ætat. 22, sugar-baker's labourer. Febris.

Oct. 27th. His friends state that he has been ill seven days, after, as they say, catching cold; that he complained first of pain in his chest and limbs, and afterwards of his head; *he lies*

* This was in 1831, before Jenner had established the distinction between typhus and typhoid fevers.

† The author's lectures on the Practice of Physic were also, *tant soit peu*, clinical, as he frequently had an opportunity, when lecturing on paralysis, peripneumony, hepatitis, dysentery, hysteria, &c., of referring the class to some case or cases in the wards.

supine, and presents a marked appearance of *sensorial oppression*, stupor, not coma nor drowsiness, and is rather deaf; *eyes* sunk and *dull;* complains now only of pains in his limbs, and weakness; skin dry; pulse 80, weak; tongue dry; thirst; no appetite; *says* that his bowels were opened about four times a day since 24th, on which day he had a dose of salts.

Capt. magnesiæ sulph. ℥j;
Ex inf. rosæ comp. ℥iss, ter die.
Milk diet.

The disease here was fully formed; he had complained of his chest at first, but you must recollect that there is another organ there besides the lungs; he has had no cough; the uneasiness was in the præcordia—the febrile "anxietas," the distress about the heart which our poor Irish* patients complain of so constantly in acute diseases; it is the labouring heart which in vain seeks rest, "otium divos rogat," whilst the poison of the fever is in the nervous system. When once the morbid poison of fever has injured the nervous system, time must be allowed for it to recover its energy, by means of the blood circulated through it; you cannot stop the disease at once, you cannot make the patient take up his bed and walk; your duty is to relieve or assist the natural operations of repair, and, if any organ be overloaded, to deplete,—but to mind that you do not *waste* that blood which is to nourish and restore; and, on the other hand, to remember that if there be too much of it, in proportion to the strength of the languid heart, it cannot be sent to the parts requiring it, nor through the lungs to be purified; and that, in such circumstances, it will be better by venesection to send a scanty supply than none.

There was no indication for active treatment here. The *magnesiæ sulph.* was given in just sufficient doses to keep up slight action of the bowels; and, like the other salines, it promotes the secretion of the kidneys and skin. The vehicle chosen was the *inf. rosæ co.*, containing ℥vi *acidi sulph. dil.* in the ℥j, which acts as the mildest possible tonic on the relaxed vessels of the mucous membranes, and diminishes thirst.

* Vernacular peculiarities: the Scotch peasant says, "he has gotten a sair heed;" the Irish, that "he has a smotherin' at the heart;" the English, "that he can't eat."

28*th*. Feels no better, but answers more readily; eyes rather more suffused; headache; had some sleep; skin warm, dry; pulse 74 (94 ?), soft; tongue moister, and furred; thirst.

Lotio frigida capillitio abraso.
Hirud. viij temporibus vespere si opus fuerit.

The only indication here was, to relieve the distended vessels of the head by the astringent action of cold, or, if that should fail, by emptying the vessels by leeches; but the latter was left conditional for the decision of the apothecary, because, though, as you may have seen, I do not hesitate to abstract xx or xxx℥ at once, if plainly requisite, I never willingly waste a drop of blood.

29*th*. Feels better; less headache (leeches not required); eyes less suffused; pulse 96, soft; tongue inclined to dryness; bowels open twice.

30*th*. Thinks himself better; tongue moist; pulse 90, full and soft; bowels open twice; less deaf.

31*st*. Is out of bed; slept well; pulse 90, weak; skin soft; some appetite.

Nov. 1*st*. Much better; no thirst, appetite improving; pulse 90, soft; tongue clean; bowels free.

2*d*. Convalescent.

8*th*. Discharged.

Pleuro-Peripneumony.

Case 2. G—— H——, ætat. 16, labourer.

Nov. 8*th*. (Extra case, 2 p.m.) Says he was seized five days ago with pain of right side of chest, "of a pricking character, and as if there was a hole in his side," with dyspnœa and cough; he passed a restless night, from pain, and next morning began to expectorate, as he still does, but scantily; crepitation extensively in right side; respiration puerile in the left; headache; complexion livid; skin cool, from exposure to weather, being ill clothed; pulse 120, weak; tongue nearly natural; thirst; no appetite.

To be placed in a warm bed; V. S. ad ℥xiv circiter.
Capt. antim. tartariz. gr. ¼, ex aq. ℥j, omni horâ.
Milk diet.

This is one of the numerous cases which show you the advantages of auscultation, even without which it was clear enough

that pleurisy existed; but the puerile respiration on the sound side, and crepitation on the affected side, told us that the substance also of the lung was in a state of engouement, approaching to hepatisation, such as you see in these specimens. Contrast the "sensorii functiones plurimum turbatæ," of Cullen, the stupor of the last case, idiopathic fever, with the unembarrassed intellect of symptomatic fever (pyrexia) here, though so much injury existed, and of so important an organ as the lungs.

The indications of cure here were, to equalise the circulation by warming the skin and extremities, which were shrunk with cold; to relieve the lungs of part of their load by venesection; and, this done, to promote the secretions and excretions, by repeated small doses of antim. tartariz., which also has the effect of preventing the pulse from getting hard.

9*th*. At midnight he was very sick, had rejected much greenish matter; and the antim. tartariz. was suspended by the assistant.

Nine a.m. Felt comfortable, having slept several hours; respiration easy; less cough; less pain in side.

Two p.m. Not so well; dyspnœa and pain in side increased; pulse 130, full; bowels confined; *has not resumed* his medicine.

> Capt. haustum cathart. statim.
> Hirudines xx lateri qua dolet.
> Contin. antim. tartar. sicut antea.

On the first day I thought the venesection would afford more immediate relief, and be less fatiguing in the state in which he presented himself. The pleuritic affection required leeching on this day, but in such a case a few leeches would make very little impression.

10*th*. Much better, only weak; no pain, but cough troublesome; expectoration more free; pulse 90, soft; tongue clean; bowels open; skin soft.

11*th*. Much better; pulse 84; skin natural; expectoration free; tongue nearly clean; crepitation has ceased, but there is slight bronchial respiration; complains of want of appetite.

> Omitt. mist. antim. tartar.
> Capt. magnesiæ sulph. ʒj;
> Antim. tartar. gr. $\frac{1}{8}$, ex aquæ ʒiss, ter die.

By referring again to these *pathological specimens*, you can better understand the nature of the *stethoscopic signs*; the crepitation has ceased, because, the inflammation being subdued, the inflammatory thickening of the bronchi has subsided; for the crepitation is produced by just so much congestion as, without excluding the air from the cells, closes the entrance to them, so that the air, in forcing a passage, makes a slight click; and this takes place in other states besides peripneumony, as where dropsical fluid obstructs the lung without inflammation; also when tubercles, having increased from the miliary size, are enlarged and ripening, their presence becomes a source of irritation, producing bronchial congestion around them, and crepitation is heard.

But in this case, though the inflammation is removed, the effect of it is not; the bronchial respiration indicates that part of the lung continues in the solidified (hepatised) state, such as you see in that specimen, on the table, of *hepatised pleuro-peripneumony*, and conducts the sound, making you hear the passage of the air in the deep-seated bronchial tubes, which you do not in the natural state of the lung. Now, there are different gradations of this hepatisation: some so firm, that the lung never recovers its natural state; in others, the extravasated lymph, &c., are gradually absorbed, and the spongy texture is restored. As soon as a little air begins to get into the cells, crepitation is heard again (rhonchus crepitans redux); so that here, if we find in a little time that there is crepitation, you must not mistake it for renewal of inflammation, if unaccompanied by other symptoms.

Now, as to the treatment. He is well as to pulse, tongue, skin, &c., but he is very weak; his lungs are not in active inflammation, but in the state of a healing sore—and you have plenty of opportunities, in your surgical practice, of seeing that a sore does not heal well when the constitution is in a state of too great debility. Hence I do not apply more leeches to the side; but as his appetite is evidently deficient now, not from febrile anorexia, but on account of the tartar emetic, I have left it off, and hope that he will gain some strength in a few days by mild nourishment, being at the same time kept perfectly quiet; and then we may attempt to assist nature in unloading the vessels, and the nerves will help us if we support them a little. To

promote the secretions and excretions, he is to take just enough of medicine to be a substitute for exercise, which he must not enjoy at present.

* * * * * *

15*th.* Feels much better; appetite increased; very little cough, but it still gives him slight pain; pulse 90; complexion improved; absence of respiratory murmur, and dulness on percussion, which produces pain on the right side posteriorly; bronchial respiration below the axilla (same side), puerile in front; one motion daily; tongue perfectly clean.

Hirudines vi lateri qua dolet, alternis diebus.
Rice pudding.

The observations made at my last lecture explain the symptoms, and the *rationale* of treatment was anticipated thus far.

18*th.* Feels better; was relieved by the leeches; tongue a little white; skin rather hot; tendency to perspire; a little expectoration, but not quite free; sleeps better; three or four motions in the twenty-four hours, with some griping; respiratory murmur returning, with some "redux" crepitation; appetite good.

Contin. hirudines.
Capt. decoct. senegæ,
Aquæ menthæ, āā 3vi, ter die.
Omitt. mist. cathart. antim.

The progress is very satisfactory; the rhonchus crepitans redux being a clear evidence of improvement; the medicine appearing to act too much on the bowels, was changed for senega, which has the expectorant effect of ipecacuanha, and is much less nauseating.

* * * * * *

26*th.* G. H. is convalescent, but gains strength very slowly, partly in consequence of his having suffered deprivations before his illness. He has not kept his bed since the 21st; his appetite and digestion are good; and he feels such marked relief from each application of the leeches, that, as he positively gains strength, we must continue them; the site of the inflammation is still tender on deep inspiration, and on slight percussion or pressure between the ribs; at the same time, the rhonchus crepitans redux is nearly gone, and the respiratory murmur is regaining its natural force; his pulse, you may ob-

serve, is quick, ranging from 96 to 108,—but this is because he is out of bed: the pulse of weak convalescents is quickened by the erect position, independently of disease.

* * * * * *

Dec. 10th. G. H. continued to be sensible of pain on percussion of the side, and upon full inspiration; and the respiratory murmur was duller than natural, with the pulse at 100, which induced me, in addition to the other treatment, to give him gr. j calomel every night, as mercury has a powerful tonic effect upon the relaxed vessels of inflamed parts, and as the mere unloading them by leeches did not seem sufficient. In two or three days, however, the respiratory murmur became quite natural by repeating the leeches daily, before the calomel had time to produce any effect on the mouth, and at the same time the pain on inspiration disappeared. I then soon left off the calomel, considering that, if continued so as to affect his mouth unnecessarily, it would rather weaken and retard him than otherwise. After this, even when he felt well, as the side was tender on percussion, the leeches were repeated occasionally: and a blister seems to have removed any remaining tenderness from the pleura; he feels and looks strong and healthy, and will go home next week. Cured.

* * * * * *

Fever complicated with Peripneumony.

In the next case, you have an example of idiopathic fever, complicated with visceral inflammation, as you find it described by authors. By some the fever would be considered as entirely symptomatic, or secondary to the inflammation.*

Case 3. J—— G——, ætat. 16, sailor. (Extra case, 3 p.m.)

Nov. 1st. Has been ill three days with headache, pain in loins, and weakness, also pain in his side, and limbs; pulse weak, frequent; skin dry (cool at present from exposure to the atmosphere); eyes very dull and heavy; complexion purplish brown; bowels confined; tongue furred; no appetite; thirst.

* But there were, at the time, several other cases of the epidemic fever in the hospital (see p. 254). Jenner had not, at that date (1831), taught us to look so sharply after rose or mulberry rashes.

Balne. calid. statim ; dein pulv. emet.
Hirud. x temporibus.
Antim. tartar. gr. ¼, ex aquæ ℥ss, 4tis horis.
Milk diet.

You observe that we were here, again, obliged to use artificial heat to the surface, on account of the patient being chilled; but you will find this circumstance often necessary to attend to in private cases also, when the surface is in a state of collapse. The tartar emetic was here given for the same reason as in the preceding case; but as the patient appeared in too great a state of collapse for V.S., I gave an emetic of pulv. ipecac. ℈j, antim. tartar. gr. j ; and the solution of antimony only every four hours, and to be administered more or less frequently, according to circumstances, as might seem fit upon his being visited in the evening by the apothecary. The leeches were applied to the head on account of the predominance of the symptoms of febrile sensorial oppression ; but this would tend to relieve the lungs also.

2*d*. Feels worse, though headache gone; more pain in loins, and in the right side of chest, increased by coughing ; chest oppressed ; has expectorated a little yellowish-gray mucus mixed with pituita ; rhonchus crepitans at the back of the chest, and in right side near axilla ; skin hot and dry ; pulse 108, fuller, and soft; tongue dry and brown ; anorexia ; thirst ; urine high-coloured ; bowels relieved.

Has been directed by the apothecary to take the mixture every two hours, and have a blister between the shoulders. Though his headache was gone, he "felt" worse, because, in fact, he felt or perceived his illness more clearly on account of the relief of the sensorium; it is a bad symptom when the patient is so typhoid* as to make no complaint, and not even to be sensible of thirst.

I must remind you that the whole of the rhonchus crepitans was not from inflammation, that sound being produced also by the congestive state, which takes place in the back of the lungs in fever, when the patient lies supine, as you will find described by Laennec. Had there been double peripneumony, to the amount which the single symptom of crepitation appeared to show, it must soon have proved fatal; the right side of the chest is the seat of the inflammation.

* At that date (1831) well understood to mean, tending to collapse.

You must not rely much on the expectoration for negative signs; the mucous appearance this day would have led to a supposition that there was more resolution of the inflammation than was actually the case; *tough*, pituitous expectoration is a tolerably certain sign of positive inflammation.

3*d*. Feels no better; pain on inspiration and coughing; 50 respirations per minute; cough troublesome at times, and he cannot expectorate much; expectoration pituitous, tough; crepitation in right lung, and dulness; answers sluggishly, and articulation indistinct; sordes on teeth; eyes dull; skin warm and dry; pulse 120, soft; tongue dry and brown; thirst; only one motion since admission.

Capt. hydrarg. submur. gr. iij;
Pulv. jalapæ, gr. x;
Pulv. zingiberis, gr. j, statim.
Applicentur hirudines xii lateri.

On this day there appears to have been an aggravation of both local and febrile symptoms. Circumstances occurred to prevent my seeing him on these two days, but the treatment appears to have been very orthodox.

4*th*, two p.m. Feels better; complains of being purged, and of troublesome cough; pain across chest; respiration frequent; expectoration, brownish mucus, scanty, and some pituita; crepitation continues near right axilla, and posteriorly on both sides; eyes less dull; skin on trunk warm and dry, but natural on extremities.

Hirudines xij lateri statim.
V. S. vespere si opus fuerit.

Seven p.m. Pain, cough, and dyspnœa continuing, Mr. Williams had him bled, but only to ℥vi, as syncope came on.

You see here again the fever relieved without influencing the peripneumony, which was even worse until further depletion was resorted to; the decline of the fever, however, placing the patient in much more favourable circumstances.

5*th*. Feels a little better; very weak; less pain in the chest; respiration more free; more cough in the night, but looser, and expectoration more copious; skin natural; pulse 100, weak;

tongue more moist, still furred, brownish; less thirst; more appetite; bowels open once.

Cont. mist. ant. tart.

This day the state of skin and return of appetite show him to be more free from fever; the chest also is much relieved, but still requires the continuance of the medicine; you may remark that the cough, though more frequent, is less troublesome, on account of the free expectoration.

The reports on the 6th and 7th continue favourable.

8th. Better; eyes and lips natural; tongue clean; pulse 84, very soft; bowels free; slight crepitation in right axilla, with bronchial respiration; puerile respiration in left lung; some pain in right side still.

Contin. mist. ant. tartar. 4tis horis.
Emplast. rubefaciens lateri dextro.

10th. Convalescent; up and dressed; pulse 96.

This youth is difficult of restraint, and his mother brought him articles of food which are improper for him, so that I feared a relapse some time ago; the erect position quickens the pulse.

11th. Pulse 96, weak; tongue clean, but too smooth and dry in the middle; bowels free.

Capt. magnesiæ sulph. 3j;
Antim. tart. gr. $\frac{1}{8}$, ex aquæ ℥iss, ter die.

The tongue has the appearance which is so common after fever, looking as if it had been deprived of the papillæ; but they will gradually rise up again. It is unnecessary for me to repeat the observations made upon the pulmonary symptoms and treatment in the last case, which apply to this.

* * * * * *

15th. Feels well, except slight giddiness in the head occasionally, which he has had previous to this illness; respiration free on the left side, dull on the right, but respiratory murmur throughout; slight pain on the right side still when he coughs, which is but seldom, and without expectoration. Middle diet.

18th. Coughs a little in the day-time; some pain still in the right side on coughing, and on deep inspiration; respiratory murmur faint in the right side, without crepitation; puerile on

the left; very slight percussion gives pain; pulse 96, soft; tongue clean; bowels free.

Hirudines vi alt. diebus lateri dextro

The tenderness upon percussion on the right side requires leeching, notwithstanding his gradual improvement; and I must here again call your attention to the disproportion, in this case, of the febrile to the inflammatory symptoms, compared with the preceding case of G. H., in which there was more organic injury, so far as we can judge by auscultatory symptoms, though less fever.

* * * * * *

Hepatised Lung.

Nov. 26th. Since my last lecture, I have obtained some interesting recent pathological specimens to show you; the first is the inflamed lung of a patient who died of extensive pleuro-peripneumony: he was not under my care, but I have had a clear account of the symptoms from Mr. Williams. The patient was a foreign sailor, brought to the hospital in a moribund state; he had cough, pain in the chest, pituitous, difficult expectoration, and extensive rhonchus crepitans in both sides of the chest. Various active and judicious remedies were applied, but in vain, which the high degree of inflammation, shown in this specimen, will account for. You see here what might have been the result of those cases of G. H. and J. G., if they had not been brought to the hospital in an earlier stage of the disease. When speaking of their cases, I showed you some specimens out of the museum, but those now before you are more satisfactory, as you can feel the state produced by the inflammation, as well as see it. In the first place, there is the thick deposit of yellowish-white coagulable lymph (like the buff of the blood) on the surface of the pleura, constituting false membrane, and which, had he lived, would have become firm and organised, producing adhesions. You can feel one part of the lung as solid as a piece of liver, from which it is called *hepatised;* there is another part which also feels solid, having no air in it, but not so firm, being only in the state of engouement, or inflammatory congestion, and of swelling of the parts; there is another portion in that state of engouement which does not entirely exclude air from

the cells; in which part, during life, you could have heard rhonchus crepitans: and by pressing it in the hand now, held close to the ear, you may study the exact sound of crepitation. There is not any part of this lung that might not have become permeable to air again, in which case the rhonchus crepitans redux would have been heard; but in the highest degree of hepatisation, a kind of adhesive inflammation takes place, and the part remains solid, and in time becomes a pale, firm mass, as it is found after death, like the specimens in the museum; there is also permanent bronchial respiration in the part during life,—some cases of which, in that state, I have had under my observation for many years.

* * * * * *

J. G. still requires the application of leeches to the side of his chest, but has scarcely any cough. He has a tendency to headache, and I have given him gr. j sulphate of quinine with ʒj magnesiæ sulph. ter die; besides which, his bowels require the compound rhubarb and calomel powder every other day.

* * * * * *

J. G. is perfectly convalescent, and will leave the hospital in a few days.

With these two last patients you have seen the advantage of Laennec's mode of investigating the state of the chest, for, without resorting to auscultation and percussion, we might have relaxed in our treatment, and allowed the patients to resume their employments too soon, which would have led, perhaps, to relapse, or to such a slow convalescence as would be incompatible with their earning their bread. Cured.

* * * * * *

New Fever: Synocha Petechialis.

I wish, gentlemen, to-day to call your attention to a subject of considerable interest—the *new fever;* not that I mean to assert that there is any thing new under the sun, or that I have made any discovery,—but I feel satisfied that the peculiarity of the present epidemic has not been pointed out to you, nor will you find it in Cullen's *Nosology*—at least, it is not recognisable from any of his definitions; but, so far as I can judge from observation and comparison, it was described by Sydenham 150 years ago, and I shall now lay before you the result of my investiga-

tion. Last year, before it came to my turn* to take up the clinical business in May, I had heard much of the fever in the hospital, and had sent in a few cases which occurred among the out-patients; and several absurd reports were circulated out-of-doors, in consequence of the timidity and gossip of the nurses and others. I was told, at the west end of the town, that we had got the plague, or a plaguey typhus, at least, in the London Hospital, and that there was a black flag hoisted; and I had almost as many questions put to me then about the London-Hospital fever, as lately (1831) about the cholera. Upon inquiry, I found, in fact, that there had been a rather greater number than usual of febrile cases, and that, most injudiciously, they had been all crammed into one ward; so that, by concentrating the emanations, it was rendered noxious in the proportion of four or five to one. In consequence of new building going on, one half of the ward (Harrison's) had been dismantled, and the two open doorways of communication between the two parallel halves, which ordinarily contribute so much to ventilation, had been boarded up. Mr. Williams, whom I had taken with me to show me the cases in question, pointed out four fevers in one corner of Harrison's ward: when I remarked to him the impropriety and danger of this arrangement, and how close and unusually foul the air of the ward was, he pointed to the boarding, and said that he had had a plank removed from each place for ventilation, but that the chaplain had ordered them immediately to be nailed up again: he was afraid to visit the sick if labouring under fever, and therefore had turned Harrison's ward into a kind of lazaretto; hence arose the reports and alarm. One nurse, it was said, had died of fever, another of fright; any patient who could not help himself, ran the risk of being without drink, whether fevered or not; and I saw that one of the under-nurses, whom I ordered to give a drink to one of the patients, was much alarmed at the supposed risk she ran, but did not disobey. Nay, the ward got such a bad name, that a month after, when I desired one of my convalescent patients in George's ward to be removed into Harrison's, he begged to be allowed to leave the hospital instantly, at any inconvenience, in preference.

* During part of the year, Dr. Billing exchanges clinical duty with his assistant, and prescribes for the out-patients.—*Rep.*

In a few days after this visit, I resumed duty in the wards, and, in the first place, put every fever which came to me into George's ward, until the number in the other was reduced to its fair proportion; and, in the next place, I took care that no fever should be in a corner, nor within five or six beds of another. No person took fever from any of my cases, and the alarm died away.

I knew from experience the propriety of this arrangement; in one hospital, which I attended for three years, we had always several cases of fever, and for two years no communication of it; in the third, however, the directors thought fit to appropriate one ward as a fever-ward, when, in consequence of the concentration of the effluvia, the fever was communicated to some of the attendants; and a patient, convalescent from rheumatism, who came into the ward, was attacked with fever.

I had heard that the cases had been typhus, but I found those which came to me were not so; for though they had petechiæ, the pulse was not weak and small, nor the delirium low and muttering, but rather talkative, though not phrenitic, and some of the patients were inclined to get out of bed, instead of lying prostrate, as in typhus. There have been occasional cases of typhus also, and I have had opportunity of proving to the class that fevers are curable without either wine or mercury. Wine, you know, I do not prescribe in typhus, except on very extraordinary occasions, and late in the disease. Even if I should fail to convince you of the impropriety of using wine early in true typhus, let me teach you to distinguish synocha when so masked as to appear typhus. I say synocha, as I do not use the term synochus; yet, though I do not use the term synochus, I recommend you to study the chapter so designated, as well as the whole of Dr. Southwood Smith's book upon fevers, which is, in my opinion, the best and most practical work on the subject; and observe, that where he recommends stimulants, it is not until the disease has been conquered by remedies, or has come to that state of approaching collapse which the ancients designated by the term crisis, and the Italian school calls a "change of diathesis."

Mercury is used indiscriminately in fever by some practitioners, and, provided antiphlogistic treatment be not neglected, does no harm; and calomel as a purgative, improving the secretions and excretions, does good. But I have shown you, and

will do so still, that antiphlogistic treatment, without salivation, is sufficient; and it is no joke to loosen a man's teeth unnecessarily. But there is a still stronger reason. If the antiphlogistic means are not sufficient, the business will be over *before there is time* for mercury to affect the system; so that if you depend on the mercury alone, you will lose your patient; and if the antiphlogistic treatment in the early stage, and quinine, with stimulants when required, in the after stages, can effect a cure, *why* put the patient to the inconvenience, if no worse, of *salivation?* My opinion is, that some good practitioners use mercury unnecessarily, and that some who fear to employ evacuants deceive themselves in their reliance upon mercury without them. To confirm this to you, though I employ calomel so frequently as a purgative in general, yet, to avoid any equivoque, I prescribe other aperients instead of it in the cases of fever, that you may have no suspicion of mercurial influence. It is in chronic or lingering diseases that we find it of use to affect the mouth by mercury, and we then have time for its employment.

Cullen calls the eruptive fever of small-pox, of measles, and of scarlet fever, synocha, though each of them occasionally becomes typhoid (typhose). Why, then, use the term synochus? It may be said that it is a mixed fever—that is my objection; mixture is jumble, and jumble confusion—and though we cannot always escape it, let us endeavour to do so; and in the hospital at this present time, during this epidemic, you have much better opportunity than in private practice of seeing how patients (from want of remedies, or injudicious administration of stimulants by their friends, and fatigue in being brought here, often on foot, and exposed to the inclemency of the weather) appear typhoid (typhose) when they present themselves, though labouring under this epidemic, which is synocha—that is, inflammatory fever—that is, complicated fever; for I acknowledge no simple fever but typhus,* or, if idiopathic, com-

* "Quo semel est imbuta recens!" and the author confesses it. When this was written, he was deeply imbued with Cullenism; he adhered, however, still to the assertion, only inclining to have *no simple fever* at all, and to put *typhus into the "exanthemata;"* as also the epidemic in question, *synocha petechialis* (Sydenham's "new fever"), under the name of *pink fever*, but by no means typhoid: and then *typhus*, as an *exanthem*, might be called *mulberry fever*. As, however, the terms typhus and

plicated with inflammation of viscera or meninges, causing that hardness or strength of pulse which does not exist in typhus; which typhus is disease of the cineritious part of the nervous system, of the brain* and spinal cord.

You have violent synocha with phrenitis, whether that be idiopathic, or from a blow on the head, which free bleeding will cut short; you see the synocha of the exanthemata often stop when the eruption is perfected. Who can cut short typhus in this manner, or has seen genuine typhus spontaneously and suddenly stop? The most violent synocha, then, I say, may have less of the essence of fever than a mild typhus; there is plenty of pyrexia, but pyrexia is only a part of fever—disturbance of functions; the most violent disturbance of cerebral functions in synocha is but pyrexia, and may pass off as quickly as intoxication from fermented liquors. Not so typhomania, which is analogous to concussion, and requires a long time to recover; but you may have concussion and meningitis from the same accident or accidents, and then you have a mixed case or cases, showing all gradations, from much stupor with little inflammatory fever, to little stupor with much inflammatory fever, analogous to the gradations of typhus with complications to synocha. The cases of synocha are liable to put on a deceptive appearance† of typhus, from a variety of circumstances, and occasionally from oppression of the lungs, when that is the complication, as is the case in the present epidemic.

I shall now give you Sydenham's account of the mode in which this kind of fever was first observed by him, and which made him denominate it the *New Fever*, divesting the account of his hypotheses, and preserving the valuable practical parts.

After agues had been very prevalent for some years, so as to be considered epidemic, there occurred a very severe frost in the year 1683: the following winter was not much milder; and, on the breaking up of the frost in the month of February 1685,

typhoid are now pretty well established in the new sense, it would be a pity to disturb them.

* This, in fact, still holds good. In typhus, as shown by Clutterbuck and Tweedie, the brain is the viscus; in typhoid, the intestines or lungs—the former most frequently.

† According to our present knowledge (1867), the colour of the rash furnishes a diagnostic symptom.

arose that fever which he, with all his experience, considered as a new species, or at least as undescribed. At first, he says, he considered it a peripneumonia notha, or bastard peripneumonia, only milder than usual in its symptoms; but he afterwards found he was mistaken. He also institutes a comparison between the new fever and measles; he says, petechiæ often break out, and sometimes eruptions which are called miliary, not much unlike measles, except that they are more red,* and do not leave the branny scales of measles.

The symptoms he gives are these: "First, alternations of flushes and chills, pains of head and limbs, pulse not differing much from the healthy standard, blood taken from a vein generally like that of pleuritic patients, for the most part cough, sometimes pain in the neck and fauces in the beginning of the complaint, but less than in quinsy; the fever of the continued character, though frequently with evening exacerbations, like a double tertian, or quotidian; a strong tendency to delirium, but the patient does not become frantic, as sometimes in variola and other fevers, being rather tranquil, though incoherent in what he says; the tongue, when dry, is brownish in the middle, with a white margin—but when moist, covered all over with a white furred pellicle. And when the pulse becomes irregular, with subsultus tendinum, death soon follows."

Now, compare this statement with what has occurred to us. Agues have been notoriously, for several years, unusually prevalent in this neighbourhood. The winter before last we had much severe frost, last winter not so much; and in the month of February last (1831), the cases of "new fever," synocha petechialis, as we may denominate it to distinguish it from typhus, became so frequent as to attract observation; they were numerous until the middle of summer, when the epidemic remitted, but did not cease altogether; and the cases have now begun to show themselves in greater numbers again. It is of great consequence to distinguish those cases from typhus, because the petechiæ, which occur almost uniformly,† have been too generally thought diagnostic of typhus, and this opinion might deter you from using

* The "rose rash."

† Notwithstanding that these petechiæ had been observed, they were ignored; as it was considered that, unless they became dark-coloured, they did not indicate the danger attached to typhus.

the only means on which the safety of the patient depends, as you have seen demonstrated at the bedside; and you will no doubt have many more opportunities of judging of what I may here advance. After this general statement of the nature of the disease, let us consider the particular cases entered in the journal.

Cases.

CASE 1. F—— W——, æt. 20. Febris.

Dec. 8th. Complains of pain at the scrobiculus cordis, pains in the limbs, and weakness; has been ill since the 4th inst. Was attacked first with loss of appetite, weakness, giddiness, pain in the back and head, with stiffness, and soreness of the eyes. Has some tightness across the chest, and a very little cough; some rhonchus sonorus and sibilans on right side; is rather deaf; face flushed, eyes suffused, forehead hot; pulse 120, hard; papillæ of tongue white and inclined to dryness; much thirst; no appetite; bowels open freely since 3d, when he *took medicine;* skin hot and dry; gives perfectly correct answers; respiration rather short; urine free, high-coloured; little sleep and some delirium at night; is dirty in his person.

Baln. tepid. ad 98° statim.
Hirud. xij scrob. cordis.
Antim. tart. g. ¼,
Ex aquæ ℥ss, 2is horis.

This man came in earlier in the disease than we usually see in hospitals, as in general they arrive after delirium is established, and frequently with the petechiæ on them; in this case delirium was only commencing at night, as it does usually at first in febrile complaints.

10th. The next day the pulse was 96, full, rather jerking, but not strong; the chest relieved, but more fever; the tongue dryer, and more delirium.

Lotio frigida capiti.

For a few days the fever continued; the tongue dry, skin hot and dry; and he was more delirious, and inclined to get out of bed at night, for which he had the head shaved, and some leeches applied to his temples; and as he complained of *diarrhœa,* the antimony was changed for inf. rosæ comp.

13th. It was not until the 13th inst., the ninth day of the

disease, that there was a report of *spots like freckles* coming out over the skin; still some *cough*, and rhonchus sonorus gravis and sibilans, which, with the previous reports of the state of the chest and eyes, confirm Sydenham's analogy to measles, the difference being in date and colour of the eruption; for the word freckles here used by the clinical clerk shows that they were remarked not to be of the purplish colour of measles, and not elevated.

16*th*. On the 16th, the spots, which had become redder, were still out; his pulse was 72, soft; the tongue moister, with a white coating; the skin warm and soft; he had slept well, was nearly free from delirium, and had a strong desire for animal food, which is an unequivocal sign of convalescence in fever; no alteration was made, except adding ʒj magnesiæ sulph. to each dose of his medicine, as the bowels were becoming *sluggish*.

17*th*. To-day the eruption is fading; he still coughs; pulse 90, soft and full; he is now quite free from delirium, but is still deaf, as occurs in several of these cases.

20*th*. Convalescent. Cured.

Case 2. J—— G——, ætat. 24 (extra case). Febris.

Nov. 21*st*. Admitted in a state of collapse from fatigue of coming to the hospital; ill clothed and squalid, *incoherent*, and when questioned complains only of pains in his limbs and body, and chilliness. Pulse weak; tongue furred; skin dry, but cool, from exposure to atmosphere; he *reported* his *bowels* to be confined. He was admitted by Dr. Macbraire, who ordered him the only safe stimulant, the warm bath, to restore the circulation to the surface.

Bal. tep. 98° statim.
Pulv. cal. c. jal. co. ℈j, statim.
Antim. tart. g. ¼,
Ex aquæ ʒss, ter die.

According to the report of this case, the synocha wore the mask of typhus.

22*d*. Complains of the pains in his limbs and trunk, and also of his *chest*, and of troublesome short cough; *rhonchus sonorus* in different parts of the chest; pulse 120, full and jerking; tongue has a thick white fur; bowels free; face flushed; head-

ache; sensorium oppressed; thirst. I did not repeat the calomel, for the reasons I have already stated; but, as every symptom called for antiphlogistic treatment, I ordered him—

Antim. tart. g. $\frac{1}{8}$;
Magnesiæ sulph. 3j,
Ex aquæ ℥iss, 6tis horis.
V. S. ad ℥xvj.

23*d.* The report at nine a.m., taken by Mr. Williams, was—passed a bad night, was delirious, and could scarcely be kept in bed; tongue dry and brown; skin hot and dry; eyes suffused; pulse 120, and full; fæces passed involuntarily.

At three p.m. the tongue had become moister, and the skin moist and warm, and sprinkled with brownish petechiæ; the left tonsil was slightly tender on pressure externally; no redness in fauces. *Perstet.*

The state of the eyes, as well as the slight affection of the tonsil, as alluded to by Sydenham, forms a connecting link with scarlatina, as well as measles, though the disease is different from both; the spots are distinct, scattered; occasionally one as large as a split pea in diameter. The uniformity of the chest-affection and petechiæ in all the cases forms the character of an exanthematous disease; and there is generally an alleviation of symptoms when they appear, unlike typhus. The eruptive fever is synocha; the pulse is, as Sydenham says, in many cases little different from natural, but always harder or stronger; and, particularly during convalescence, it often happens that the pulse is even stronger than in health, unlike typhus. The delirium is not typhoid, for the patient answers you in general so directly, if not deaf, that you sometimes will scarcely detect his incoherence at first.

After this, the fever continued, with skin hot and dry, for some days; but the symptoms gradually declined. He had leeches applied for *tenderness of the abdomen*, his bowels were regulated by *saline* or antimonial medicines, and he has become robust without any tonic medicine. Cured.

Case 3. J—— T——, ætat. 35 (extra case). Febris.

Dec. 13*th.* Five p.m. Admitted in a state of collapse, incoherent; pulse very feeble; cold extremities; says he has been

six days ill. He was met in the street in this state, and conducted to the hospital. Mr. Williams ordered him—

Balm. tepid. statim ; et postea pulv. doveri, gr. x.
Vesicatorium nuchæ ;

and next morning, as he had *no motion*,

Pulv. cal. c. jal. co. ℈j.

14*th*. Makes no complaint ; delirious ; nurse says he had very little sleep in the night ; pulse rather weak and slow, but irregular in frequency and strength, occasionally a full beat. Has difficulty in opening his mouth ; tongue clammy ; bowels *not open yet ;* no urine ; skin cool ; subsultus tendinum ; cough ; rhonchus sonorus.

Ol. terebinth. ℥ij ;
Magnesiæ sulph. ℨj ;
Olei ricini, ℨss ;
Decoct. hordei, ʒvj. Ft. enema.

Notwithstanding all the symptoms of debility, from the occasional single full throb of the pulse, I suspected the lurking synocha, and therefore endeavoured to relieve the brain and chest by an active enema, which would move the bowels with the least possible expenditure of strength. Observe, the period for bleeding was past ; the collapse was permanent : for even after the warm bath, when he was in bed, and warmth was applied to the feet, no reaction, as it is called, took place ; the skin continued cool. He presented the appearance of a person who is labouring under arachnitis, after the acute stage is past, when pain is gone, in which case the patient says he feels very well ; the brain, at the same time, evidently being what is called muddled. The ol. terebinth. was added for its antispasmodic property, which was indicated by the subsultus tendinum, and also on account of the deficiency of urine, which might be attributable to the blister.

The enema produced several motions, passed involuntarily ; but as there was no urine passed even then, Mr. Williams, whose attention to these poor patients is unremitting, had the catheter introduced, and drew off a large quantity : showing you an example of what I have elsewhere inculcated—the necessity of not merely asking the attendants (who may be deceived by the liquid state of the fæces) whether urine is passed, but also of

feeling the hypogastric region, in case the bladder should be distended. As the *cough* continued troublesome, and the fauces and tongue dry, he had the oily emulsion, with ℥v tinct. opii, occasionally.

Yesterday, 16th, the disease showed itself; the eyes became red; and the *red* petechiæ came out all over the face, trunk, and limbs. Tongue coated white; pulse at rate of 84, irregular still, but not weak; skin warm and natural; respiration free; less delirium, spoke more distinctly, and subsultus diminished; several involuntary motions; the urine free, and not involuntary. One peculiarity of this complaint is, that the *mucous membrane* of the *intestines* as well as of the bronchi* is inclined to inflammation, as evinced by the occasional tendency to diarrhœa; for though the patient at first does not evacuate the bowels (apparently from insensibility to the call), yet, as soon as they are set going, either by medicine, or even by an enema, they continue purging, and even involuntarily, from the same insensibility; but unless you do relieve the bowels, you will have the head much worse. Previous to the eruption, bleeding, antimony, and *salines* are necessary; the antimony without the salines, if the bowels be free, whilst the skin is hot and dry. When the eruption comes out, there is generally an alleviation, and then quinine or decoct. cinchonæ is most useful in supporting the nervous system, for the disease lasts many days longer; if, however, after the eruption appears, you find the skin keep hot and dry, you may suspect that inflammation is going on in the *bronchial or intestinal* mucous membrane, as often happens in measles; if in the chest, you have rhonchus sibilans, &c., with the cough; if in the abdomen, tenderness on pressure, and griping, as the patient will now most likely begin to recover sensibility enough to make complaints, though still more or less delirious. According to the circumstances of the strength of the patient, you may then resort to leeches or blisters; and, as medicine, at the same time (or if the diarrhœa tends to become chronic), decoction of hæmatoxylum is more efficacious than catechu or other more astringent substances.

Another distinction between this epidemic and typhus is, the length of time the patient will go about, if not restrained by

* This peculiarity of "typhoid" did not escape us.

advice. This J. T., who is by no means a pauper, was trying to pursue his business, when found and conducted to the hospital, not being able to tell where he lived. A gentleman, a patient of mine, went about trying to attend to business, and walked to a friend's house to dine, on the eighth day of the fever; and though he had complained of headache at first, yet on the ninth day, when the eruption was out, he said he was quite well: but his incoherence made his friends send for me.

17*th*. To-day, J. T. is quite sensible; skin temperate; tongue moist; bowels quiet; pulse 70, still irregular; complains of troublesome dry cough. I have ordered—

Vesicat. sterno, and
Quininæ sulph. gr. ij;
Acidi sulph. dil. ℥ij;
Ex inf. rosæ co., ter die.
Hirud. x temporibus.

And, I trust, we have saved him; though, according to the subsultus tendinum and irregular pulse, Sydenham had signed his death-warrant.

19*th*. Still cough and headache.

Adde ipecac. g. j sing. dos. misturæ.
Repet. hirudines.

21*st*. Convalescent. Cured.

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New Fever: Additional Cases of Petechial Synocha.

Since my last lecture, gentlemen, I have admitted three more cases of the petechial synocha. The two remaining of the former patients, F. W. and J. T., are now also perfectly convalescent; there is nothing worth mentioning in the reports, except that J. T. continued to have troublesome cough and headache, which were removed by a blister to the chest and leeches to the temples two or three times, and *ipecac.* gr. j, ter die, as an expectorant, added to the quinine. In those cases where you find delirium, or even headache, continue after the eruption has come out fully, you must apply leeches to the temples, or the patient will become typhose; and if you find that state commencing, the leeches will relieve the head, and make the pulse fuller.

CASE 4. J—— H——, æt. 32. Febris.

Dec. 29*th.* One p.m. Complains of headache, weakness in his limbs, and cough; rhonchus sonorus gravis and sibilans; is incoherent. His friends state that he has been ill about a week. Tongue white; thirst, anorexia; pulse 120, strong and hard; skin and forehead hot and dry; bowels confined. Had copious bleeding from the nose yesterday and the day before; he has been bled from the arm, and had some medicine; he shows great morbid anxiety, and objects to being bled.

V. S. ad ʒxvi statim.
Abraso capillitio, lotio frigida fronti.
Capt. magnes. sulph. ʒss,
Ex inf. sennæ ʒiss, statim; et postea,
Magnesiæ sulph. 3j;
Antimonii tart. g. $\frac{1}{8}$,
Ex aquæ ʒiss, 4tis horis.

Five p.m. Pulse much softer; tongue moister.

You had here an opportunity of seeing the synocha in its full character, and particularly the *sensorii functiones parum turbatæ;* for though incoherent, he was thinking anxiously about his family and himself, and was offended because I referred to his friends to confirm his statement, and particularly because I ordered him to be bled immediately afterwards, thinking it impossible I should do so had I believed his account of the quantity of blood he had already lost. You do not see this activity of mind in typhus, nor in synocha when the brain and viscera are oppressed for want of depletion; compare, for instance, the case of J. T. with this, or a case which I have next to remark upon; observe, also, the report of profuse bleeding from the nose, which kind of occurrence was one of the things that formerly gave a hint to Sydenham and others to relieve apparent debility by taking off the load from the viscera, having observed spontaneous hæmorrhage to afford relief, when they had not ventured to bleed.

30*th.* Feels much better; lies on his side; still rather confused, and his manner hurried and anxious; eyes more lively; says he does not sleep; petechiæ fading; pulse 120, soft, rather full; tongue whitish, nearly clean; thirst, but little cough; no headache; bowels opened once. *Perstet.*

31*st.* Says he is very bad, very low; feels no better, and his

head worse; hopes we are not going to bleed him again. But the *petechiæ* are gone; he slept in the night; skin temperate; is perfectly collected; pulse 94, soft; tongue clean, rather dry; he has been purged six or seven times to-day.

Habt. tinct. opii ℿxv,
Ex aq. menthæ ʒj, statim.
Capt. decocti hæmatoxyli ʒiss, ter die.
Omitt. cætera.

You have in this day's report, gentlemen, the distinction between complaint and disease; his disease is gone, but he is full of complaints. The reason is that, in the first place, besides his own feebleness, he has much cause for domestic anxiety, and his feeling of weakness makes him dread being bled again; the purging, also, though necessary, makes him feel low; and we may with safety give him the tinct. opii to soothe his nerves, which ladies take for the same purpose, very much to their detriment, when done unadvisedly. After that he requires nothing more than the *decoct. hæmatoxyli*, which will act as a mild tonic on the mucous membrane of the primæ viæ. Convalescent.

Case 5. L—— S——, æt. 22. Febris.

Dec. 29th. Has heaviness in his head, pains in his back, abdomen, and limbs, with weakness; he lies supine; has been thus affected for about a fortnight; has had several restless nights, and been delirious; is incoherent, and speaks thick; skin dry, not hot; red petechiæ; some cough, he says, at night; pulse 120, small and soft; rhonchus sonorus gravis and sibilans in various parts of chest, and crepitans posteriorly; tongue brown and dry in the centre, with a margin of moist white fur; anorexia; thirst; *bowels* quite *confined* for several days; abdomen tender on pressure; urine said to be natural.

V. S. ad ʒxvj, et capt. haust.
Inf. sennæ ʒiss c.
Magnesiæ sulph. ʒss statim; et postea,
Antim. tart. g. $\frac{1}{8}$;
Magnes. sulph. ʒj,
Ex aq. ʒiss, 4tis horis.

This man was admitted in a state of great oppression, from the duration of his disease, and its being unchecked by any remedies; the state of the pulse, &c., showed that he was begin-

ning to sink. But those who do not avail themselves of auscultation would not have been led to suspect that this proceeded from inflammation of the lungs, as he merely reported that he coughed at night, and made no complaint of pain in his chest. I should not have blamed any man much who had mistaken this case for typhus fever, if he did not understand auscultation ; but I should blame him very much for not being an auscultator in the present day. I remarked to those gentlemen who were with me at the time, that this case would teach them not to fear the bugbear debility ; and when you see what was the effect of V. S. and saline antimonial medicine, you may judge what might have been the effect of wine and brandy.

30*th*. Nine a.m. Answers distinctly, and sits up in bed ; skin hotter than natural ; bowels not relieved.

Rep. haust. cath.

Two p.m. Has relapsed into stupor since morning ; lies supine, but does not seem weak when roused ; bowels not yet opened ; abdomen tender on pressure, and much flatus in the epigastrium ; skin dry, and rather hotter than natural ; some petechiæ on the chest ; he coughs, but does not expectorate ; pulse 84, full ; tongue dry.

V. S. ad ʒxvj statim.
Rep. haust. cath. statim.
Injec. enema purg. c. ol. terebinth. ʒij statim.

I need scarcely add any observation to this report, which showed the tendency to coma, instead of typhomania, and the necessity for active depletion. The ol. terebinth. was added as a carminative on account of the flatus.

To-day (31st) he is a little relieved, but still comatose, and shows no sign of debility after a second bleeding, and being freely purged. He was delirious in the night ; he is now drowsy and inclined to snore, but when roused answers better than yesterday, and says he is thirsty, showing thereby more sensibility ; he says he has no headache, nor pain in the abdomen, except when it is pressed ; he still coughs ; the petechiæ are less abundant than in the other cases ; pulse 92, of natural force ; skin softer ; tongue still dry. I consider him going on well, and have ordered him *hirudines* x *temporibus*, and to continue the saline antimonial medicine.

Pathological Remarks.

I have now to show you a specimen of the pathological state which is indicated by the auscultatory signs in this epidemic: the lungs gorged with blood, but particularly, as you see, the mucous membrane of the trachea and bronchial tubes of a bright red tint, with a spongy or thickened state. This specimen was obtained from the body of the old woman, E. G., who died a few days after admission, though she had, in fact, less of the symptoms of fever than the others; but this congestion of the lungs, and inflammation of the bronchial tubes, required depletion, which she could not bear like the others, in consequence of the cartilaginous state of the mitral valve, and the heart and the pericardium, as you see, being loaded with fat; and she died much more from suffocation than from fever. The brain and meninges were healthy, and also the peritoneum and intestines, though the abdomen had been tender on pressure; but that is often the case from flatus and other causes besides inflammation. She had the pulse of synocha at admission, and but little delirium; she was covered with red petechiæ; she had at the same time subsultus tendinum; and upon the application of twelve leeches the pulse became irregular and weak.

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L. S., the last case, which afforded such a perfect example of fallacious symptoms of debility, has made satisfactory progress.

Jan. 1*st.* Still drowsy. Says he should feel very well, but for the cough; no crepitation; he slept in the night, but muttered constantly; he is slightly deaf, but perfectly sensible, and his eyes are lively; pulse 94, full and soft; tongue dry, not furred; bowels open once; skin soft. *Contin. mist.*

You may observe, that the leeches to the temples removed what remained of the comatose state; and as that subsided, he became sensible to, and complained of, the annoyance of the cough; but that ceased to be of consequence, as there was now no crepitation—no heat or dryness of skin; in fact, both fever and inflammation were subdued.

2*d.* Feels better; had a good night. *Perstet.*

On the 3d, as he was better in every respect,—except that the catarrhal affection of the bronchi was very troublesome, —and as his head was quite well,—I did not hesitate to give him

a small quantity of opium, in the form of *Dover's powder*, of which I ordered him gr. v, with gr. v *pil. scillæ co.*, in two pills three times in the twenty-four hours. This has nearly removed the cough, which to-day is very slight and loose, with some rhonchus mucosus; he is, in fact, convalescent, complaining only of weakness, on account of which I have left off the expectorant, which is now not only unnecessary, but tends to diminish the appetite, and I have ordered him *sulphate of quinine* instead. Cured.

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Petechial Fever.

We have two new cases of the petechial synocha this week; and in one you have had the advantage of seeing the progress of the disease from its commencement, for it occurred in a patient who was convalescent, and on the point of leaving the hospital,—that young woman whose case of severe erysipelas of the leg I explained to you at a former lecture, and who has remained some time after her general health was reëstablished, on account of a weakness of the limb, which was relieved by the support of strapping with emplast. plumbi.

Case 6. S—— J——, ætat. 19, unmarried.

Jan. 20th. She was attacked on the evening of the 17th inst. with chills and shiverings, succeeded by severe pains in the head, back, and limbs, accompanied by vertigo; skin hot and dry; face flushed; nurse said she had remarked her being languid for some days; tongue white; pulse full, strong, and frequent. Mr. Williams gave her an emetic, and afterwards some opening medicine. Yesterday, the symptoms continuing, petechiæ out, bowels open, she was bled to ℥xvi. To-day she complains of nausea; had no sleep, and felt her head confused in the night; it is clear at present, but aches; pulse 120, not strong, but hard; tongue white, furred; skin hot and dry, but perspiring at some parts; epistaxis in the night; bowels not open; abdomen rumbling—not tender on pressure; throat sore; some cough; rhonchus sibilans.

Abrad capillitium; hirud. x temporibus;
Enema cathart. statim.

In this case there was no obscurity of symptoms ; the fever is the epidemic synocha in full force, requiring the antiphlogistic treatment which was adopted. You know that I do not consider tonics stimulant ; she had been taking sulphate of quinine before this attack, and I allowed her to continue it. I have often observed to you that it has little influence in continued fever, though so efficacious in intermittent or remittent; here, fever came on whilst she was charged with it. I am satisfied it does no harm in continued fever, and that the moment the fever has turned, it sooner promotes convalescence. The head is the part most affected in this case—the chest less than in most of the others who have had this epidemic; from the rumbling state of the bowels, I have ordered only an enema, as you have seen that in several of these cases, when the bowels are set going, they run on too fast.

21*st*. I find to-day that the bowels are not open; she has had a restless night, and complains of her head,—but this you must expect whilst the fever holds, which we cannot stop, though we may control it. I have ordered—

Hirud. x temporibus ; and
Magnesiæ sulph. ℥j ;
Ant. tart. gr. $\frac{1}{8}$,
Ex aquæ ℥iss, 4tis horis dum alvus soluta fuerit.

23*d*. She was relieved so far that she was free from delirium, and got sleep in the night, but still had hot skin, headache, pulse 120, and complained of thirst, and of her throat being sore ; the bowels were too much purged, and, therefore, I left off the mixture, and ordered her—

Sulph. quininæ gr. j ;
Acidi sulph. dil. ♏j,
Ex aquæ ℥j, ter die.

On the 24th she said she felt better, her head nearly clear, and had had some sleep in the night; the skin continued hot, the pulse still harder than natural, and the tongue furred ; the bowels continued to be relaxed enough—four or five times in twenty-four hours—and, therefore, I made no alteration in the medicine, except the addition of gr. j *ipecacuan.* to each dose as an expectorant, as the cough continued ; and as there remained some tendency to flushing, and heat in the head, she had *eight*

leeches to the temples. The *ipecacuanha* produced some nausea and expectoration; her pulse fell on the 26th to 108, and soft; skin more temperate; the bowels continued relaxed. The report yesterday, the 27th, was, that she felt much better; pulse 96, soft, and full; coughs still, but expectoration easy, mucose; tongue moist to-day; she may almost be pronounced convalescent. Cured.

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The next case is more severe, as having been of longer duration without remedy; and, besides the usual affection of the head, there was considerable complication of inflammation both in chest and abdomen.

CASE 7. M. H., ætat. 15, unmarried.

Jan. 19th. One p.m. Complains of headache, *cough*, pain in the abdomen, and of its feeling hard and distended; took to her bed on the 14th inst., but was ailing some days previously with headache; only *one scanty motion since 14th;* eyes dull and rather suffused; cough frequent, dry; pulse 120, weak; tongue white; skin hot, and moist in some parts; *abdomen tender* on pressure.

V. S. ad ℥xvi. Enema cath. statim.
Antim. tart. gr. $\frac{1}{8}$;
Magnesiæ sulph. ℥j,
Ex. aq. ℥j, 4tis horis.

Seven p.m. Head relieved from pain and sense of weight by the V. S. She has had five copious motions since the enema.

20th. Feels better, head relieved, but still complains of the abdomen, which feels tumid and tender on pressure, and of the cough hurting the abdomen; *no bronchial rhonchus;* thirst, skin, and eyes as yesterday; petechiæ on the face and body; pulse 120, soft; tongue has a white fur; no motions since last evening; urine high-coloured.

Rep. enema.
Antim. tart. gr. $\frac{1}{4}$,
Ex aquæ ℥ss, alternis horis.
Hirud. xx epigastrio.

To-day the bowels are freely open, and the abdominal sensations relieved; but there is still troublesome cough, and pain in the chest, and there is an *inflammatory crepitation in the left side*

of the *chest*, for which I have ordered *ten more leeches* to be applied; the pulse is to-day of a moderate strength—that is to say, it is not so weak; for hitherto it might have passed for a typhous pulse, in consequence of the oppression of the system from the extent of inflammation of the viscera, both pleuro-peripneumony and enteritis, complicated with the epidemic fever, of which the reddish-brown petechiæ which showed themselves yesterday are diagnostic. I say peripneumony, not catarrh, as there was crepitation, not catarrhal rhonchus, and the costiveness was indicative of enteritis, not catarrh of the mucous membranes of the bowels. I consider her still very seriously ill, notwithstanding the diminution of symptoms; the most favourable circumstance I consider the rising of the pulse under the treatment of bleeding, antimony, and opening enemata.

I must call your attention once more to the analogy which this epidemic has with the exanthemata. This is the seventh or eighth case you have seen amongst my patients, independent of others which have occurred; and on referring to the journal, you will see that they have points of resemblance with measles, scarlatina, and variola—that is, fever, with eruption of spots, some sore throat, more or less cough, sometimes tenderness in the epigastrium, irregular sweating, and, just as you have in the exanthemata, a good full synochal pulse, except when there is so much mischief in the viscera as to cause a sinking of the system; and these cases will encourage you to adopt antiphlogistic treatment in bad cases of the exanthemata.

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28*th*. M. H. continued to suffer from pectoral and gastric inflammation, notwithstanding the active and antiphlogistic measures adopted; on the 22d, she had *six more leeches* applied to the *sternum*, which removed the pain, but the dyspnœa and cough continued. On the 23d she had less fever, little or no headache, and the skin soft; she was very much purged, but no involuntary motions, and I *omitted the antimonial mixture*, and gave her the *emulsio oleosa* for her cough. On the 23d, nine p.m., as the purging continued, Mr. Williams thought it necessary to give ℥x *tinct. opii post sing. sedes liq.* After the second dose she fell asleep, and on the 24th she felt better in the morning in consequence of having had rest, but

in the afternoon became worse, the crepitation continuing, with dyspnœa, and the cough sounding wheezy. She had *decoct. hæmatoxyli* for the bowels, with gr. ij *ipecacuan.* as an expectorant, 6*tis horis; eight leeches* and a *blister to the chest;* next day she felt better; and on the 26th also, though she had been delirious in the night, and her breathing was oppressed at times, the respiratory murmur was better. On the 27th, yesterday, she was much worse again; she had been delirious and restless in the night—getting out of bed; she was at two p.m. incoherent, talking anxiously about members of her family; the respiratory murmur became weaker again on the left side, with crepitation, and respirations more frequent, besides which she now and then gave a very faint suppressed cry, as if something gave her pain, though she was too confused to give any account of what it was; but there could be no doubt from the symptoms that there was a renewal of pleurisy, or rather pleuro-peripneumony. Under these circumstances, though she was much reduced, and the pulse was becoming weak, it was necessary to *take some blood* from her, which we did to the amount of ℥xvij, upon which the pulse became rather fuller, and she less restless. I directed her to have the *head shaved,* and ordered her *decocti cinchonæ* ℥j, *ter die,* for her skin was temperate; and though the vessels required unloading, the constitution needed support, and she was constantly supplied with *milk.* To-day the report is very favourable, though she can scarcely be said to be out of danger; she was very restless in the early part of the night, but slept afterwards, and is drowsy to-day; not comatose, being collected when awakened. Says she feels hot all over; pulse 108, not weak; tongue moist on the edges; bowels free; urine natural; skin temperate; does not cough frequently as before.

If she has no return or exacerbation of pleuro-peripneumony, she may do very well, as the fever is gone.* I must again impress upon you the necessity for giving nourishment, and not merely contenting yourselves with prescribing medicines in fever, when patients are in a state of insensibility—at which time they are not conscious of thirst, though standing much in

* From this day she continued to get better. On the 31st the cough was "slight and loose," and she quickly recovered her strength. There was no alteration of her medicine after the 27th.—*Rep.*

need of the support of drink, of which you will be convinced by seeing the greedy thirst of patients just recovering their sensibility in fever. If you do not insist upon the attendants giving supplies of liquid at this stage, they will, perhaps, let the patient sink, from their not merely not asking for, but refusing it, and you must watch your opportunity to get them to take a sufficient quantity at a time,—from a quarter to half a pint,—as during a period of insensibility it is difficult to get them to swallow; and, besides, you must caution attendants against putting liquid into the mouth of a patient lying down insensible, as I have no doubt in this way medicine or nutriment has occasionally become the cause of death-rattle, by getting into the trachea. When attendants tell you patients will not, or cannot, swallow a spoonful, you may, nevertheless, get them to drink a teacupful, by setting them upright, and rousing them a little,—which, though not desirable so far as the fever is concerned, must be done to prevent inanition. Whilst the fever lasts, I never wish my patient to drink any thing but spring water or milk, and you will find these most uniformly grateful; water for thirst, milk for nourishment. Most generally the smell of food—particularly meat—is nauseous to fevered patients; and hence, I do not order beef-tea or broth: milk is at the same time the simplest and best nourishment for all ages.

* * * * * *

Concluding Remarks to the Course.

I have now, gentlemen, come to the conclusion of my three months of clinical lectures; but although I vacate the chair, I shall continue to give you less formal, though, perhaps, not less useful, instruction, both in the wards and in pathological examinations, when opportunities occur. Indeed, part of the clinical lecture must necessarily be a recapitulation of peripatetic observations; but those observations are sometimes not heard. I recommend you carefully to attend to the practice of the other physicians, as well as to the constitutional treatment adopted by the surgeons. I can assure you, that you will glean something from the practice of each and every one, and it is only thus that you can learn to be what is of so much consequence —unprejudiced. I have heard teachers recommend pupils not to wander from one professor to another, for that thus their

notions would be unsettled, and not regulated by any system. But as no system which is the work of man can be perfect, I advise you to learn from one professor to correct the system of another, and, so far as you have time and means, to visit other schools, both in this country and abroad.

You will do well to attend constantly to the treatment of the out-patients, as you can thereby learn the nature of many chronic diseases, especially those of the eye and skin, which are of much consequence, though not generally requiring admission into the wards. As far as our time would allow, I have shown and explained to you our new* and inestimable mode of diagnosis by auscultation. I feel that to the practical physician it is like the acquisition of a new sense; but this you must yourselves constantly practise, in order to render perception clear. Let me, however, remind you, that its value is in distinguishing the disease; and that though, according to the proverb, the knowledge of the disease is half the cure, it is only half; for if you keep your ear to the stethoscope for a week, it cannot whisper to you what remedies to resort to; therefore, practise auscultation and morbid anatomy to ascertain the nature of diseases; but withal, watch well the effects of remedies in order to cure them. I have endeavoured to teach you the true value of morbid anatomy,—to show you that, though some diseases are incurable, you may yet prolong life, and that you will do so more certainly by knowing that the disease can only be palliated, than if, from not being assured of that, you should attempt impossibilities; and this applies more especially to organic alteration of the heart.

There are some men who, through ignorance, from want of being better taught, underrate morbid anatomy; I say through ignorance, for I hope there is not any medical man so devoid of principle as to neglect it, if he knew the value of it as much as we do. It is true that there are some diseases connected with a derangement of the nervous system, the immediate cause of which has not yet been satisfactorily detected by dissection; but we shall succeed in time, I believe; and the phrenological mode of unravelling the brain must at length lead to discoveries of the nature of several obscure diseases. It is of the greatest consequence to you, in order to gain confidence and steadiness

* In 1831.

in the application of remedies, to lose no opportunity of *post-mortem* examinations, and especially in acute diseases,—such as fevers and inflammation of the viscera. A knowledge of the true nature of diseases, gained by morbid anatomy, will give you confidence to adopt decided pratice; knowing that if the disease be within the power of remedies, you will cure,—and if the disease be mortal, you will not hasten death a moment; on the contrary, perhaps, time may be gained for the sufferer to settle his affairs, which is often of the utmost consequence to a family.

In order to instruct you in morbid anatomy, I have not confined myself to the specimens obtained actually from our own clinical patients during the session, but have also resorted to the museum for exemplification, and have brought forward specimens obtained out-of-doors, with which I have been favoured by friends, including former pupils, to whom I feel much obliged. Whenever I receive any specimen, or letter communicating medical facts, from a former pupil, it is a source of gratification, as a proof of that good understanding and friendship which ought to exist when each party does his duty; I receive it as a proof of conviction that what is thus communicated will not be thrown away, and that there is a feeling of agreeable recollection of our school, and that my old pupil wishes to help me in instructing my new ones,—that he does not consider me in his debt, or that I had broken faith with him in any way,—but that, on the contrary, I had given him value for what he paid, according to the custom of the school,—that he has that feeling which makes him wish us prosperity, as I do most cordially to all of you, gentlemen, in taking leave of this class for the present.

The author has here dared to offer to the present generation a candid exposition of what was orthodox and successful practice thirty-five years ago. At the present time, there is a great improvement, in respect of being able in most cases to dispense with the abstraction of blood; the most efficient substitutes being morphia, antimony, and salines, which enable us to steer between Scylla (the brandy-bottle) and

Charybdis (the lancet). Nevertheless, there are cases (as at pp. 68-70, *note*, and some of those just quoted) of emergency, in which the author does not possess sufficient *sang-froid* to risk not succeeding with medicine, when he is certain that he can do so by bleeding. The *use* of stimulants is now better understood, thanks to Todd; and the Brunonian *abuse* of them is generally avoided.

The continued fever, now called typhoid* (named febris nova by Sydenham; synochus, or synocha petechialis, suggested by the author in 1831; denominated typhoide by Louis, and established as typhoid by Jenner), had been discussed by Broussais (as gastro-enteritis), and by other continental writers, all through this century. The author had seen the epidemic raging in Rome in 1817, and from thence it travelled *westward, as all epidemics do*, through Germany, France, England, and Ireland, to America. When Broussais wrote about it, the *accompanying complication* was abdominal; and when the author visited some of the hospitals in Dublin, in 1818, he observed that the physicians examined each fresh case in the region of the cæcum for gastro-enteritis; Dr. W. Stack and others called it gastric typhus, whereas, in 1685, Sydenham recorded that the visceral complication of the epidemic was chiefly thoracic, as it was in the above-quoted cases, when first observed by the author, in London, in 1831.

We may have *idiopathic* fever *inflammatory* (synocha), as of measles, typhoid, or scarlatina, according to the description, p. 233; or we may have *idiopathic* fever *low* (*olim* typhus), without any pre-

* Typh*oid*, because not like typhus; as "lucus a non lucendo."

vious stage of excitement, and with the surface temperature, from the beginning, even below the natural standard; as when the brain and nervous system are poisoned by contagion, or by concentrated foul human effluvia,* as seen in gaols, transport or slave ships, &c., either with or without predisposing circumstances of over-fatigue of body or mind.

With a boil, carbuncle, or burn, contusion or fracture, gun-shot or other wound, there is pyrexia; with "catching cold" by reduced temperature, as cold air or cold to feet, the pharynx, larynx, tonsils, nostrils, or bronchi are inflamed with pyrexia, or symptomatic fever. Or pyrexia may spring from the intestinal mucous membrane with diarrhœa or dysentery; or the kidneys, or bladder, with strangury; or the side of the face (erysipelas); or the eye, or the ear, or the serous membrane, pleurisy, or peritonitis, or pericarditis, or the synovial membrane, or fibrous tissue of the joints, or tendons of muscles (rheumatism). Now, any of these may be so slight

* This has always been the published opinion of the author —that typhus, or "gaol-fever" of old authors, has its source in human miasma or effluvia; typhoid, in epidemic terrene malaria, as in the Campagna di Roma and elsewhere. He has lately received a strong corroborative testimony from a competent judge,—Dr. S. Ward, of the hospital-ship *Dreadnought*,—who reports that the cases of typhus brought in from the ships in the river are uniformly after long voyages, where the typhus has arisen during the voyage in crowded, ill-ventilated craft; and that the cases of typhoid are brought from ships not particularly crowded or ill-ventilated, after short voyages, from ports where it may or must be supposed that the fever arose from endemic or epidemic influence. They are both infectious, communicable from one person to another; but, according to the author's experience, typhus the more so.

as to resolve of themselves by rest in bed, or with only the aid of a little warmth of fomentation, or bath, or hot air or vapour; or, on the other hand, they may be so severe with pyrexia as to require treatment for days or weeks; or even more severe still, so as to cause death.

The fever in these cases is tolerably uniform; but the tendency is to augment in the afternoon and night. However, whether the sleep be natural or artificially procured towards morning, the repose of the nervous system causes a diminution of fever in the early part of the day, unless the case be so severe that the fever persists through the night, so as to keep up a constantly dry skin; for, in that case, sleep does not refresh the system: and both sleep and perspiration may be forced without relief, if the disease be not alleviated by appropriate treatment.

It had, of course, been remarked that the remission of fever towards morning was usually accompanied by perspiration, which was merely an effect, not a cause; and consequently it used to be constantly the practice to try to produce perspiration by extra bed-clothes and stimulants, which often aggravated the disease, and made the skin drier and hotter; whereas, cooling acid drinks, antimony, and other antiphlogistic means, produce the desired effect, by diminishing the inflammatory source of the fever.

Typhus and typhus-like disease were generally considered more difficult to treat than other fevers; the indications of cure are more complicated, if not contradictory; and medical practitioners were more at variance in their mode of attempting to remove the symptoms. Here, however, as in the former in-

stance, attention must be paid to the local affection; but, above all, in the idiopathic typhus, lotions to the head, to constringe and give tone to the vessels of the brain, and leeches to relieve the congestion, are the essential local applications, and the most unequivocal remedies in our power. Besides local applications, due attention must be paid to the alvine and renal secretions. But the most important question is, as to the administration of stimulants, or of sedatives and depletion; and it is only by careful observation of actual disease at the bed-side, that we can arrive at the knowledge necessary to guide us.*

* The above-mentioned cases of fever, published in the *Lancet* (1831), show the benefit (or, at least, safety) of antiphlogistic treatment in fever. Amongst these cases, besides some which corresponded exactly with Cullen's definition of typhus, there were cases of the common continued fever, with red rash, first called typhoide by Louis, which has always existed more or less in London, and indeed throughout the world, though not distinguished until noticed under the name of febris nova, by Sydenham, in 1685, as especially complicated with inflamed lungs. That modification of symptoms is merely one of those changes in the "constitution of an epidemic" which have been so well and so frequently described by Sydenham. In the numerous cases which occurred during 1837, the "constitution of the epidemic" had again changed, there being, as when Broussais wrote, a greater preponderance of gastric than of thoracic symptoms. This fever, with red rash, was not distinguished by practitioners before Sydenham's time, nor since, except by the author in 1831, and by Jenner, who established its speciality; though the rash is different from typhous petechiæ, approaching more to the colour of measles. The analogy of treatment holds good also, as the bronchial and pulmonary affection, when accompanying it, are benefited by antimony and other sedative treatment, as in measles.

Those (the Brunonians) who looked upon the typhous state as one of debility (which it really is), but considered *only* the effect which stimulants would have on the healthy frame, and knowing that they are often useful and necessary in surgical and other cases where there is much debility, resorted to wine and tincture of opium in typhus fever, not considering that the disease always included a diseased state of the brain and nervous system, and that though, in some instances, the stimulant might be borne with impunity, yet that, by increasing the action of the heart, the vessels of the brain, spinal cord, &c., would be still more injected, independently of the specifically injurious effect of the stimulant on the capillaries of the cineritious substance. In fact, experience proves that cold to the head, with moderate saline and other sedative medicine, will cure typhus, or prevent the typhose (low, *olim* typhoid) state from occurring in fever; whereas, when wine, with or without opiates, is employed, the disease frequently proves fatal. I had one very useful opportunity of seeing the contrast of the different modes of practice, during the fever which prevailed in Italy in 1817; the proportionate mortality being very much greater in an hospital where the stimulant practice prevailed, than in that under the direction of Dr. Aglietti, in Venice, who called his manner of practice the English method, consisting of antimony, salines, purgatives, &c. internally, with the external application of cold water* and free ventilation. But though the British may have commenced a simi-

* As in Edinburgh in 1815 (see p. 91, *note*).

lar practice at the same time, the adoption of the sedative ("contra-stimulant") treatment of typhus was not introduced into Italy by them, but by Rasori;* and that, too, in opposition to the stimulant Brunonian practice which he had learned in Britain.

We may understand the risk of stimulating a typhose patient, by supposing that when an important organ, such as the lungs or brain, is inflamed or even congested, the weak pulse of the typhous state of collapse during peripneumonia or typhus may be one of the provisions of nature to allow the parts to recover, as they would during the collapse of syncope produced by bleeding; and, of course, when so important an organ as the brain itself is diseased (as incontrovertibly it is in the typhous state), we should be careful how we set the heart pumping more forcibly than necessary. The opposite extreme should not, however, be adopted, and the patient be permitted to die for want of a spoonful, or even a bottle, of wine or† brandy (for the quantity must be relative, depending on the effect), if there be real danger of sinking at an advanced

* He had been a student in Edinburgh, and spoke and wrote English perfectly. His own statement was, that when he returned to Milan, and became physician to the large hospital, his fever-patients, under the stimulant treatment, died like "sheep with the rot"—an English phrase which he had learned. He considered that he could not do worse if he reversed it; so he adopted antimony, and sulphate of magnesia—called, by the Italians, "English salts;" and then his patients recovered.

† This opinion was advanced in the first edition (1831), without any collusion with Dr. Todd.

period of the disease; and when the rallying-point is gained, caution is necessary not to push stimulants too far. There is languor and lassitude in all fevers; but the symptoms of sinking, requiring stimulants, are—fluttering, weak, soft pulse; cold sweat; lying on the back; respiration oppressed; involuntary dejections. Wine, on the other hand, will not agree whilst the pulse is hard or sharp, and the skin decidedly dry, even when there is subsultus tendinum and prostration. Ammonia should be tried before resorting to wine.*

* I have not mentioned ammonia as a part of the treatment of the Brunonians, though it was used by them along with wine, ether, and tincture of opium; because ammonia is *not*, like these, a diffusible stimulant. In the first place, ammonia is used empirically by the most able of the profession, in cases where they know from experience that they must not employ wine. This alone shows that it is not really a diffusible stimulant—it is a local one to the stomach; and as such, through the medium of the solar plexus, excites the heart momentarily, though not injuriously, and does not affect the brain. Again, so far from being a diffusible stimulus, it immediately unites with animal acids, and then circulates or is *diffused*, not as a stimulant, but as a *sedative* saline; so as to perform the double operation of a *temporary local stimulant to the stomach and heart*, and a *sedative* astringent to inflamed capillaries elsewhere,—although the latter indication has not been generally contemplated in its administration.

We find that many intelligent practitioners highly recommend ammonia as a stimulant substitute for wine, in those cases in which the author deprecates wine, a real stimulant, and does not object to ammonia, as it is not a stimulant. Moreover, we find carbonate of ammonia recommended with ample testimony in scarlatina, in which, in fact, it acts merely as other saline substances used in febrile complaints; and the inferences *post hoc* as to the treatment of scarlatina are fallacious, when we consider that, notwithstanding the frightful and fatal results of

The functions of the primæ viæ are so uniformly disturbed in fever (symptomatic or idiopathic), especially typhoid, that it is not surprising that Broussais, an accurate observer, should have fixed upon the mucous membrane of the stomach and bowels as the seat of the immediate cause of idiopathic fever; but I think it has been satisfactorily shown that fever is lesion of the nervous system—if commencing there, from malaria, contagion, &c., idiopathic; if induced there by inflammation of other organs, symptomatic. Some inflammations of the viscera arise during fever, and are very truly said to be produced by the fever; that is, the *organ having been predisposed** to disease, when robbed of its due supply of nervous energy by the derangement of the functions of the nervous centres, its vessels fall into the congested or inflammatory state; and when the cerebral symptoms diminish, if not before, it is observed to be affected. This is the case most frequently with the mucous membranes of the intestines and lungs in temperate climates, and with the intestines and liver in hot climates; so that many doubt whether the fever produce the hepatitis, or the hepatitis the fever; or whether the inflammation of the mucous membrane induce the fever, or the fever the inflammation of the mucous membrane, as in acute dysentery or gastro-enterite, as Broussais thought. Sometimes the disease in the first instance is the

a few cases, the experienced Cullen declares that it is a disease free from danger—"*nisi ex nimiâ curâ medici*"—and, in nine cases out of ten, will run its course harmlessly.

* As is almost uniformly the case with the liver in hot climates.

fever; but even then the brain has been rendered more susceptible of the exciting causes of fever by the previously debilitated state of the organs—the liver, the bowels, or the brain itself; and the moment the fever begins, the inflammatory or congested state of the organ is aggravated and rendered evident, though previously latent.

From the very nature of FEVER, which I have described as a disease essentially affecting the ganglia of the whole nervous system, it follows that the functions of the viscera must be disturbed; and though, as just pointed out, sometimes disease of one organ predominates, sometimes of another, yet *every organ* suffers more or less congestion in *every fever* from the loss of nervous influence. Hence those who are advocates for fever being a something that pervades the whole system, say, you cannot refer it uniformly to any one fixed seat; and, on the other hand, those who have taken up the notion of fever being located either in one organ or in another, seldom, if ever, fail, in *post-mortem* examinations, to find proofs of their own opinions; for, as no organ escapes disease, that which is sought for will be found, whether the opinion of the author lead him to anticipate "cerebritis," "gastro-enteritis," or "pulmonic congestion." The temporary congestion of organs during the febrile state affords an explanation of the obstinacy of some agues: in quinine and arsenic we possess certain remedies for the poison of simple ague; but when cases resist these means, practitioners resort with success, one to the lancet, another to mercurials, a third to leeching the epigastrium, &c. in addition. The

cause which prevents the cure of the ague is visceral disease, which may either have existed before the intermittent, or have arisen during its continuance. The ague and visceral disease, whether of bowels, liver, lungs, or spleen, &c., act reciprocally as cause and effect—the ague aggravating the visceral disease by causing congestion during each paroxysm; the visceral disease, by keeping up morbid sensibility during the intermission (or even a pyrexial state between the paroxysms, when the disease is named *re*mittent), which prevents the cure; but if, by mercury, or other means,—I dare not mention leeches,—the visceral disease be removed, the cinchona, quinine, or arsenic exercises its influence on the nervous system, and finally arrests the disease.

We can understand the origin of the old unjust prejudice against cinchona bark—now quinine. Physicians found that visceral disease sometimes remained after ague was cured, which was attributed to the bark "causing obstructions;" and it must have often been fortunate for a person suffering under a combination of visceral disease and ague, that, from the bark failing, recourse was had to mercurials, or to those remedies which cured the visceral disease, but which many called helping the bark. In this manner, arsenic often acts as equivalent to a union of bark and mercury; for arsenic, besides its tonic effect on the nervous system, increases the secretion of bile, and otherwise acts on the liver: it possesses also the power, like mercury, of curing chronic inflammations; and even further resembles it in occasionally, though seldom, producing the inconvenience of a degree of salivation.

Considering disease, then, as depending on the conjoint affection of vessels and nerves, and knowing what agents will influence their actions, we may in our practice always have a reason for the application of remedies, and be able to combat such cases as we may not before have seen or even heard described. Acute diseases are those in which the feverish or other constitutional symptoms are the most urgent, threatening life. Chronic diseases prove fatal only when the gradual alteration of some organ undermines the constitution by interrupting some of the nutrient processes—as in hectic or marasmus, from disease of the mucous membrane of the intestines, or from slow disorganisation of the lungs, liver, &c.

Men who may be considered as opposed to each other in theory, coincided nevertheless in the essential points of practice; as Sydenham, Armstrong, Broussais, Clutterbuck, Frank, Hamilton, Rasori, Stieglitz, Tommasini, and others. The object being to diminish local inflammation, congestion, or by whatever name the local disease may be called, and to counteract the derangement in the organs of circulation and digestion, all agreed upon the necessity of rest, diet, and unloading the lower intestines; I might perhaps say, that all in their time agreed upon the propriety of occasionally abstracting blood—either by leeches or otherwise: they differed as to the use of drugs. Broussais says that the others irritate the mucous membrane by emetics and cathartics, though he does not entirely neglect to empty the bowels by enemata; but as this mode of opening the bowels does not produce such a sedative controlling in-

fluence on the circulating system, &c. as the cathartic and emetic substances, he was obliged to abstract more blood by venesection or leeches. The others object that this loss of the pabulum vitæ does more harm than the drugs. One man treats fever by venesection, leeches, diet, and scarcely any medicines: another by abundant use of them (calomel, &c.), with external application of cold water, and perhaps the abstraction of little or no blood. One man deprecates blisters, because he may have seen them applied by very unskilful practitioners, and put on in pairs (a Continental practice) in cases where the patient died in consequence of other causes; but we almost all know that blisters are useful in very many cases. There are medical men in this country who appear to me almost to coincide with Broussais in his opinion as to medicines irritating the mucous membrane, and who object strongly to repeated doses of calomel and purgatives in febrile complaints, and say that "emetics act on the principle of counter-irritation"! It is interesting to observe how various writers confirm my opinion of emetics being sedatives, and the practice of the "new Italian school," which considers them to be "contra-stimulants," acting like venesection in controlling the circulation; as Clutterbuck, for instance, says, that he "found emetics have a beneficial effect, before he knew the *value of venesection* in fever."

The state of low or typhus fever being in reality debility, it is difficult for the beginner to satisfy himself of the necessity, or even the safety, of using sedative, evacuant, and diaphoretic remedies; never-

theless, all who have experience (except Brunonians, old or new) allow its expediency, in whatever way they may explain it; and it is necessary to be as well assured as possible on this point. The student can more readily be convinced of the necessity for depletion in the state of complete prostration produced by *inflammation* of the lungs or other organs; because he can understand the cause of that state to be, that the capillaries of the organ are overloaded, and that by lightening them their power of action may be restored.* But the low fever being thought to have no fixed habitation, and being considered as a something pervading the system, the *rationale* of treatment is found not so evident. Fever pervades the frame, it is true, because the nervous system, which is its seat, pervades it. The phenomena of idiopathic fever show that the nervous system is first implicated—debilitated by a morbid poison from the first: hence the necessity for relieving the debilitated, congested capillaries of the nervous centres by sedative treatment. In addition to this, as *post-mortem* examinations prove that there is uniformly more or less visceral inflammation† accompanying typhus, the expediency of an antiphlogistic treatment becomes more obvious.

Although the symptomatic fevers induced by local inflammations closely resemble the idio-

* It is only in the sudden, *intense*, overpowering congestion of the pneumonia, hepatitis, or cerebritis of hot climates that the full value of venesection can be appreciated; in the *half-and-half* cases of these temperate countries, half-and-half measures may succeed.—*Vide* Sir James Ranald Martin's Works.

† Clutterbuck adduced strong evidence that it is the brain which is chiefly affected.

pathic fevers produced by malaria or infectious effluvia, there is in the latter a more immediate impression on the nervous system, caused by the morbid poison of the infection, independently of the inflamed or congested state of the capillaries of the nervous centres, which exists alike in both symptomatic and idiopathic fever. And though symptomatic inflammatory fever may resemble idiopathic inflammatory fever as much as the inflammatory eruption produced by tartar emetic resembles the idiopathic eruption of small-pox, yet there is more lesion of the nervous system in idiopathic than in symptomatic fever; there is, as it were, some chemical or electric effect produced by the poison; and the duration of the violence of the fever appears to be in proportion to the power of the dose of poison received. We see that one morbid poison produces fever, followed by small-pox eruption; another produces fever, followed by the carbuncles and abscesses of plague; we see also that the severity of the disease is proportionate to the dose of the poison, allowing for the state of the constitution; for there is mild plague, as well as mild small-pox, or mild Asiatic cholera;—there being all degrees of those diseases, from that which kills in three or four hours, to that which never confines the patient to bed, but allows him, on the contrary, to attend to his business with a carbuncle, or inguinal or axillary abscess of plague, or a few spots of eruption of small-pox, or the diarrhœa of slight cholera. Continued fever, remittent fever, and ague, also differ in degree according to the strength and dose of the poison—from the mild ague, typhoid, or

typhus, to those severe cases which prove fatal in a few hours; from the agues and remittents of this country, to those of hot climates, which are fatal in the first, second, or third paroxysm. If the dose of poison has been too great, it will stop the machine, unless remedies can be applied to relieve the parts most oppressed, until the nervous system recovers sufficiently to renew or resecrete that influence, the power of doing which is diminished by the poison, and without which it cannot impart energy to the organs, and life must cease.

Now, we have several kinds of fevers which run courses similar to what has been described as the pyrexia or fever connected with local injury and inflammation. Those fevers which come on spontaneously, without evident local injury, are called idiopathic, *i. e.* independent or spontaneous. Of this nature are measles, small-pox, scarlatina, typhoid, and typhus. The first three were separated by nosologists, and called eruptive fevers—exanthemata—as being accompanied by rash on the skin; the two latter they called continued fevers, as distinguished from agues: but all five are decidedly continued, and also (as proved by Jenner) accompanied by rash; so that they must be included in the same group, as comprised in the description given above at p. 286, varying in the occasional proportional severity or degree of the symptoms, and exhibiting additional ones in different individuals, and at different epochs, as pointed out by Sydenham, according to the "constitution of the epidemic" in different years.

Each of these idiopathic fevers, as is well established, is complicated with a peculiar local inflam-

mation of its own: measles, with epithelial, bronchial, and slight epidermal; scarlatina, with deeper epidermal, faucial, and renal; variola, with still more severe epidermal, affecting the basement-membrane of the skin and the fauces where exposed to the air, and also the stomach, as evidenced by the gastritic symptoms of vomiting and tenderness on pressure, though the surrounding moisture prevents the pustulation which takes place in the fauces. Typhoid has the slightest degree of epidermal inflammation, sometimes epithelial of the bronchial membra; seldom faucial, ventricular, or renal: but almost as uniformly the glandulæ agminatæ and solitariæ (Peyer's glands) of the intestines are more or less inflamed, as the tonsils and fauces are affected in scarlatina.

Now, then, what is the inflammatory internal *complication* of typhus? Clutterbuck and Roupell, by careful investigation, clearly made out that it is cerebral; as Broussais and Jenner did that, of typhoid, it is intestinal. And Dr. Tweedie's report of *post-mortem* investigation in typhus confirms Clutterbuck's opinion,—though, from the difference of tissues, the traces of inflammation left are not so evident in the brain as in the intestines or lungs; but in severe cases very evident, as in the Dantzic epidemic of 1815, which is typhus, called "cerebro-spinal meningitis" in France and America—one of Sydenham's peculiar "constitutions of epidemic" (see Murchison's valuable and incontrovertible statement in the *Medical Circular*, May 10, 1865). Besides which, we know that the leading symptom of typhus fever and the typhose state in medicine or surgery is the oppression of the sensorium,—this is the marked symptom in

even mild typhus; whereas, in fatal cases of typhoid fever, or surgical disease with symptomatic fever, the mind may be clear to the last; showing that though typhous symptoms *may* come on in typhoid fever, as mentioned by Cullen, the diseases are distinct, as carefully worked out by Jenner, and that no such specific disease as Cullen's synochus exists.

One thing necessary to the recovery of the nervous system is, arterial blood: to produce this of a good quality, digestion and free respiration are requisite; yet in fever, from the loss of power in the nerves, both the process of digestion is imperfect, and the lungs become congested.

The digestion having been disturbed in the first instance, the food which was in the bowels becomes thereby spoiled, and, if there be no diarrhœa, must be removed by purgatives, as, from its undigested state, it cannot furnish good nourishment, even if it do not prove a source of irritation; it is therefore useless to supply other than fluid nutriment,* until some renewal of nervous energy takes place. This restoration of nervous energy will not be expedited merely by stimulants; for in whatever way the cineritious tissue generates nervous influence for the supply of the medullary, time is required for the process, and especially sleep. Experience teaches that stimulation, except during a state of inanition, and as required to promote digestion, only oppresses; whereas it is acknowledged that in fever the opposite state of the capillaries exists—plethora, active or passive. The

* I have found milk the best, either alone or mixed with gruel, arrowroot, or cold water, according to the taste of the patient (see p. 10).

lungs being congested, it is useful—with submission—sometimes to take away a little blood, by which the remainder is more arterialised, and is thus better adapted to the restoration of the nervous system; besides which, there is in inflammatory fever a direct indication of the necessity for bleeding by leeches, to relieve the inflamed parts, whether the brain itself or other viscera be the seat of the inflammation.

As during fever, the nervous system and the functions of digestion, secretion, circulation, and respiration being weak, *universal debility* appears to exist, great difficulty is experienced in rendering the advantage of bleeding or other sedative remedies evident. But, consider, how different is the *sudden* functional debility in fever, from that *real* debility of the frame induced by starvation, wasting disease, loss of blood from a wound, &c. Febrile debility is relative, in consequence of which the ordinary quantity of blood in the system becomes disproportionate and rather oppressive, more especially as it becomes at the same time deteriorated.

Under these circumstances, the object is to restore the strength of the nervous system; stimulants, however, cannot effect this, but, by temporary excitement, tend still further to exhaust it: a gradual supply of arterial blood, with repose, can alone suffice for its recovery. Were we even to suppose that the heart is still capable of being stimulated to increased action, it is evident that increased action would only tend to overload the congested capillaries of the brain* with blood, which, from the congested and

* Congested from febrile want of sleep; which, as Mr. Durham's experiments seem to prove, takes off congestion of the brain

adynamic state of the lungs, has been less perfectly arterialised, as is shown by the lividity of the lips, and dusky colour of the skin; oppression of the nervous system is thus increased, and matters aggravated, so that the animal powers necessarily begin to decline. But the heart is not always capable of being stimulated to increased action—it is really weak in low typhus, from deficiency of nervous influence; though stimulants may increase its sensibility to the presence of the blood, causing it to make more, though inefficient, efforts; so that it struggles against an overload, and thus only becomes more exhausted. As stimulants do not immediately give power, but only elicit that which exists, the entire system, and the heart in particular, in typhus, may be compared to a tired horse in a loaded cart, reaching the foot of

(*Guy's Hospital Reports*, 1860). At pages 115 and 130, this subject, the accumulation of brain-power (nervous influence) during sleep, was alluded to. Durham's experiments prove that during sleep the capillaries of the brain are more contracted, *i.e.* acting more strongly, than during wakefulness, when the cineritious part of the brain is in operation; the efficiency of operation, however, being most variable in degree, according to the state of health, or the influences of various medicinal or dietetic agents—stimulants, sedatives, narcotics, or tonics.

We have to guard against affirming that what is merely concomitant, is cause; or, in other words, that what is merely *post*, is *propter*.

It is tolerably evident, however, that during activity of any function, there is a necessary normal erethism of vessels, whether the organ be cerebral (sensorial), erectile, secreting, or other tissue, involving a degree of fatigue, or at least of exhaustion, requiring repose,—in which state of repose the capillaries are less injected, though still carrying on the circulation more perfectly; and it is during this state of contractile action that metamorphic repair is best carried on,—

a hill, but unable to ascend it; the stimulus of the whip may make him struggle to the attempt, but, if urged, he will at length sink: if, however, some of the load be removed, he can ascend the hill: and if some of the load of blood be withdrawn, the pulse will rise, as is well known and admitted in its sunken state in severe inflammation of the lungs or bowels, but is not so generally acknowledged in fever, where, nevertheless, bleeding was formerly sometimes resorted to (ὥσπερ εικος), either on account of the fever itself, or of some of the "complications" of local inflammation of the head, chest, or abdomen, as in cases above related. But, again, if the horse, without being either stimulated by the whip or having his load lightened, be allowed

not that it is not always going on, being necessary to life, but chiefly, from the perfect action of the capillaries, during the repose of the organ; this takes place in the brain during sleep, in the ventriculus between meals, in the heart after each contraction of its muscles. The brain, in most individuals, reposes during about one-third of the twenty-four hours. It is sometimes said that it is wonderful how the heart can go on always without rest; but this is an egregious mistake: the heart reposes for two-thirds of its time, thus: first, the muscles of the auricles contract, and then repose; secondly, the muscles of the ventricles, and then they repose: there is no action for one-third of the time of the heart's phenomena,—so that each set of muscles reposes during about two-thirds of its life. The more exact calculation is, that, dividing the whole time of the heart's rhythm into eight parts, the contraction of the auricle occupies two-eighths, the contraction of the ventricle three-eighths, and the repose three-eighths.

From the above considerations of the cineritious parts of the nervous centres, we may deduce that those remedies which induce contractile action in the capillaries are the best calculated to counteract the congestion of fever and inflammation, sedatives of various kinds being the suitable remedies.

to rest, he will be able to ascend; and thus often, by patience, sedatives (antimony), and salines (carbonate of ammonia, for instance), without either stimulating on the one hand, or venesection on the other, the heart will recover, and the pulse will rise.

This leads to the explanation of the manner in which saline, antimonial, and other sedative or antiphlogistic medicines and means, such as cold externally, and leeches, are beneficial in fevers, both where the pulse is *too strong* and where it is *too weak and rapid.* In both cases, sedatives, by repressing the expenditure of nervous influence, cause the heart to struggle less, and take repose. The action of the capillaries throughout the frame being increased at the same time by the constringing property* of the sedative circulated to them, the nervous

* The tonic operation of mercury in chronic diseases has been already mentioned; its antiphlogistic property in acute inflammation is also universally acknowledged, which antiphlogistic property is sedative; and as a sedative it is *by many* considered most valuable—nay, *indispensable*—in bad fever. It is highly valuable, but not so much so as antimony and the neutral salts, and certainly it is *not indispensable.* To prove this to my pupils, as some were to practise in the naval or military service abroad, and might have the misfortune to be left without calomel, I undertook to show them how to cure fever without its assistance, and took the next dozen of cases as they occurred—some very bad, some middling, and some slight. We lost but one, an old person, who had very mild fever, but died of a previously diseased state of the lungs, as we ascertained by *post-mortem* examination. This was no experiment, but a demonstration of the truth of principles well established. The remedies employed in these cases were, in some bleeding, in all tartar emetic, with sulphate of magnesia, and senna in addition,

system recovers power. Thus febrifuge sedatives diminish the coma of plethora which exists in typhus, and which results, not from over-power of

when required. We commonly use calomel with the other medicines in fever, when indicated as already explained in various passages; but one medicine may be substituted for another. It is proverbial that an experienced workman does not find fault with his tools: if a carpenter have broken or lost his chisel, he can use his plane-iron for the moment as an efficient substitute. This is meant to illustrate the abuse of calomel, and salivation by mercury, by those who consider mercury as a specific for fever. In the first place, it requires more time to affect the system by mercury than by tartar emetic and salines, &c.; so that some cases are saved by the prompt use of antimony, leeches, &c., which would not have waited for mercury. The other useful means are often overlooked in the treatment of fever, from a too exclusive dependence on mercury. And we may add, that however valuable mercury is in all stages of peripneumonia, we know well that we cannot wait for its action in the acute stages without employing other active sedative treatment, especially bleeding[a] and tartar emetic. Moreover, salivation puts the patient to very unnecessary inconvenience, independently of the weakness, produced by it, prolonging the convalescence.

The alternations in the use and neglect of antimony, one of the most useful of all medicines, are unaccountable. At all periods we have heard of a few men having used it with great success, and at the present day every practitioner will tell you that he is acquainted with the use of antimony; but if he is, why does he not employ it? for there are scarcely ten per cent of the profession who do.

Dr. James thoroughly understood its value, and saw how it was neglected; so he hit upon an expedient for getting it into use, *pro bono publico*, in the large range of diseases called fevers and inflammations, and inveigled the profession into employing it by the bait of a *secret* nostrum—James's Fever Powder. He

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[a] Bleeding again! So true is it that—

"Quo semel est imbuta recens servabit odorem
Testa diu."

the heart, but from weakness of the capillaries of the nervous centres.

I wish I could bring forward any more convincing arguments than those already adduced, that antimony is not "weakening" in rational doses; but usually, when it is proposed in consultation, one is met with the objection, "Is it not too depressing?" Almost any medicine is depressing in undue quantity, and "Too much pudding will kill a dog;" not to speak of such acrids as colchicum, gamboge, or croton oil. You might kill a person by salts, senna, colocynth, jalap, ipecacuanha, or even castor oil, in undue quantities long continued, and so you could with tartar emetic, as Palmer did—though tartar emetic has been the salvation of thousands. Let me mention two or three cases where antimony was not weakening, but strengthening, since it propped up a patient sinking under the weakness of disease.

well knew, that if he told them what it was—antimony—they would, even if they used it successfully for a time, become careless, neglect it, and let it go out of fashion, as heretofore; whereas, acting thus upon his knowledge of "poor human nature," his plan succeeded: and James's powder is prescribed to the present day, the chemical analysis not being known to every body—or to any body, if the truth were promulgated, as it is made by two proprietors at least, and of uncertain strength; so that it is much better to use tartarised antimony in definite doses. Somewhere about A.D. 1816, that clever practical chemist, Richard Phillips, F.R.S., published the fact that *different samples* of both James's powder and the pulvis antimonialis of the Pharmacopœia (made in imitation of it) varied indefinitely in strength, even when obtained from the same shops, on account of the different degrees of oxidation of the metal, caused by the varied degrees and duration of the action of fire in reducing the animal matter of the compound to a uniform appearance.

1. A patient who had only one lung, the other having been destroyed by pneumonia some years before, and the side of whose chest was so fallen in, that he was completely curved to one side (some of my readers may have remarked him walking in the street, for he had recovered his health as much as a man could with only one lung). He was attacked with bronchitis (not peripneumonia, or he must have gone), and was treated most judiciously by a mutual medical friend, but was sinking fast when I was called in. I said, "You seem to have used almost every useful medicine; but there is still one friend of mine, which has often stood by me in need—antimony." "But is he not too weak to bear it?" I resorted to the argument which I use in such cases: "You consider him dying?" "Yes." "Then he cannot be worse, even if I do not succeed?" "No." He was then in a cold sweat, suffocating, with blue lips, and unable to expectorate the muco-pituitous phlegm; though he was taking wine and brandy enough to help him, if that could have done it. I prescribed $\frac{1}{8}$ grain of tartar emetic in water, every three hours. The first dose produced a slight sensation of nausea, with some relief of dyspnœa. The next day, he was quite relieved in his sensations, and expectoration was easy; and in a few weeks he was as well as he had been before the attack. He lived for some years as well as could be expected with only a half allowance of respiration.

2. I was called to see an infant six weeks old, the medical attendant considering that the case was hopeless. The child, five or six days previously, had had sickness and diarrhœa, which last was stopped by chalk mixture and anodyne, or some such compound.

The little patient continued restless and feverish, with nausea, was sleepless, and was then evidently in constant pain in the head and left arm,—putting the right hand to the head with an awkward rubbing motion above the ear, and then frequently grasping the left arm, as the seat of pain also, so as to leave the marks of the nails on the cuticle. The nausea had increased to vomiting of every thing swallowed; and the skin was hot and dry: these symptoms indicating meningitis in the head. The prostration was so great, that the child could not suck; and I found that they had endeavoured to combat this prostration from inflammation by giving brandy with the nurse's milk in a teaspoon. Though burning hot, it was swathed in flannel. It was a child of a particular friend and relation, and I confess I was displeased at being called so late. However, I pulled off the flannels, got a large sponge, and sponged the infant's head, body, and limbs with tepid water; and desired that it should have no food except milk, and now and then a little pure water. I then sat down to write the prescription: Antim. tart. g. j, in ℥iv of distilled water; a teaspoonful every third hour—that is, $\frac{1}{30}$ of a grain: enough for a baby. My medical friend, looking over my shoulder, whispered, "Do you not think that antimony is too weakening? will the child bear it?" My answer was, "You will see that to-morrow." On my visit in the evening, I found that the child had not vomited from a short time after the first dose of the tartar *emetic*, seemed quiet, and, in fact, was asleep,—having had no rest, day or night, from the commencement of the attack. The infant gradually recovered, and lived for three years, sufficiently nourished, but with the brain and intellect

damaged, and was backward in speech; showing what had occurred before I saw it. The left side remained weak, though not actually paralytic. The child ultimately died of measles. It is not unlikely that it had been exposed to cold by the wet-nurse, which induced inflammation of the serous membrane of the brain, as it will sometimes induce pleurisy; and that the sickness and diarrhœa, in the first instance, were sympathetic symptoms.

3. A lady wrote to me from the country, to consult me about her infant. She had been confined about four weeks; but, from having been very ill, she had lost her milk, and, by the advice of her accoucheur and nurse, was feeding the child with barley-gruel, without milk—in fact, *starving* it, though filling its stomach with matter containing no proteine nourishment. Under these circumstances, the child became sleepless and convulsed—a mixture of delirium tremens of inanition, with congestion of the brain—for which the doctor was giving it Dover's powder and brandy. I telegraphed, "Give nothing but milk until you hear from me;" then posted a prescription for a mixture, with $\frac{1}{60}$ of a grain of tartar emetic in each dose, to take off the congestion of the capillaries, and 2 drops of chloric ether, to soothe the nerves, every four hours. The convulsions ceased entirely within twenty-four hours; and the child throve well upon cow's milk, with a little sugar and water, and grew up healthy.

These instances are given from memory, as it is some time since I have kept a clinical journal: but my recollection of such cases is very vivid; and I may relate a triumphant one which I witnessed in the days of my youth.

A certain dissenting minister, yclept Wilson, a very intelligent and agreeable gentleman, called Doctor,—whether of divinity or physic *non constat*, but who certainly had a smattering of the latter,—seizing upon the idea, as it afterwards proved, of Dr. James's powders, and having read of the "pilulæ perpetuæ," and the "currus triumphalis antimonii," manufactured "Dr. Wilson's powders,"—very different in appearance from Dr. James's; these powders, like all quack remedies, he recommended, in his pamphlet, for every malady that flesh is heir to; and, being well puffed by "his friends and the public," they made a comfortable addition to the stipend of his chapel.

It so happened, that an aunt of mine, a married woman, with children (not hysterical), had suffered for three or more years from sub-acute bronchitis, with muco-purulent expectoration, by which she was reduced and emaciated, with a degree of hectic; so that she was considered to be in an advanced stage of tubercular consumption by the regular faculty, who had not then auscultation to confirm or confute their opinion (a dozen years after, *ope* Laennec, I had). Although she was so much reduced, some persons hoped that it was not consumption, but "humoral asthma;" as the paroxysms of convulsive, suffocative coughing were terrific, with blue lips and dyspnœa. At this juncture, she was persuaded by one of her acquaintances of the Doctor's congregation (who had as much *faith* in Wilson's powders as individuals of the present day have *faith* in *homœopathy*) to make trial of them, which she did for a few weeks; but, finding no benefit from them in the ordinary doses, she,

in desperation, took above ten times as much;* and the second dose, taken a few hours after, produced what in those days was called cholera morbus,—that is to say, violent vomiting and purging. Being a strong-minded woman, she obstinately refused to take any thing from the faculty to stop it, as she said it must "kill or cure her;" she merely drank a quantity of weak tea to relieve her sensations. In fine, the operation of the antimony gradually subsided in about thirty hours, leaving her weak,—that is, rather weaker than before, but comfortable in respiration, and with very little cough, which gradually ceased; and she lived upwards of thirty years in good health. I may, perhaps, be admitted as a credible witness, as I was studying medicine at the time, and on a visit at the house.

But to return to the powders. I got our Professor of Chemistry to examine them, and they proved to be tartar emetic, antimonium tartarisatum, and tartrate of soda and potash, then called Rochelle salts. It was clear that the two had been dissolved in water, so that the admixture should be perfect, then evaporated and recrystallised, and ground into a rather coarse powder, with a saline appearance and taste, very unlike James's powder. The dose was a couple of grains dissolved in tea, or any other liquid, night and morning, or three times a day, according to circumstances,—the

* To his friends, he did not dispense the powders, as sold in the shops, in separate doses, but in a kind of wholesale parcel containing about a quarter of an ounce; and the dose, about two grains, was taken rather by guess, like a pinch of snuff, out of the paper, or on the point of a penknife. The dose taken, as above mentioned, with a teaspoon, must have been ʒss at least.

proportion of the ingredients being 1 to 60; so that the ordinary dose contained $\frac{1}{30}$ of a grain of tartar emetic. Thus my aunt took above half a grain at each of the two doses. This was a valuable case for his reverence to quote (*mirabile dictu!*), which he did abundantly *vivâ voce;* it was left for me to put it in print.

Now—*audi alteram partem*—it is my bounden duty to confess how, where, and when, tartarised antimony *does* evince a debilitating tendency: first, in acute cases, where used in *injudiciously* large doses; secondly, when, an acute disease having been arrested by it, it is continued *inconsiderately*, as in the case mentioned at p. 217. Again, in cases where I have prescribed it wittingly in chronic diseases,—such as cutaneous, &c.,—in doses not exceeding $\frac{1}{30}$ of a grain three times a day, for various periods, from ten to sixty days, the patient has begun to feel a sense of languor and anorexia, but without any mischief—simply requiring that the medicine should be omitted; or, if still indicated, should be continued in reduced doses. Some persons are so susceptible to the influence of antimony, that a few doses of $\frac{1}{60}$ of a grain will check a feverish cold (bronchitis).

It is impossible to foresee, *à priori*, in any case, what amount of poisons, mineral or vegetable—arsenic, antimony, or mercury, colchicum, digitalis, or elaterium—may be "tolerated," as shown by cases quoted in this work: but every one can begin with rationally moderate doses; and $\frac{1}{30}$ of a grain of tartar emetic, or even $\frac{1}{8}$, will never "knock down" an adult.

Thus we witness the operation of two modes of diminishing the exertions of the heart, the neces-

sity for which is universally acknowledged when the pulse is too *strong* and frequent; but it is not so generally acknowledged that when the pulse is frequent and *weak*, the heart is also *over-exerting* itself. It should be, however, remembered that in each case the blood is not only the load which is to be moved by, but the excitant of action to, the heart.

The diminution of organic action in the heart by sedatives diminishes its efforts equivalently to reducing the quantity of blood; and it is obvious to every one who has observed or felt the effect of a dose of salts, or of an emetic, on the pulse, that this is the effect produced on the heart by salts, antimony, and other emetic and purgative substances, as well as by digitalis, prussic acid, and other purely sedative remedies. The operation of cold drink, or of cold externally, is also sedative; as is shown by persons, who, when exposed to inclement weather in travelling, can, though unaccustomed to stimulants, swallow brandy, which, under ordinary circumstances, would produce a sense of burning in the throat, and intoxication. By the continued application of intense cold, as when persons have been lost in the snow, the sedative effect on the nervous system and heart produces total loss of sensibility* (miscalled sleep), and painless death by asphyxia.

* When cold is applied to the head in fevers, &c., by means of pounded ice in a bladder, the medical attendant must himself from time to time watch its effects; of which the best nurses even in hospitals are not capable of judging. This applies especially to cases in which the patient is insensible. In all cases the cold should be removed, temporarily at least, when it ceases to afford sensation of relief, and becomes evidently disagreeable to the patient.

Although emptying the primæ viæ by purgatives and emetics is useful in fever, it is not merely to the evacuating properties, but also to the sedative and constringent effects of those medicines that the benefit is attributable; and of this we have sufficient proofs. First, antimony can control fever, without either producing vomiting or purging,—of which we are aware in the present day, when we use small repeated doses of tartar emetic, with or without salines, as a "febrifuge" medicine. Again, when James's powder was formerly much used for the same purpose, it was a common observation, that it appeared often most efficacious where it produced no evacuation by vomiting or purging: perspiration cannot be called an evacuation, as it is only an evidence of returning function of the skin from decline of the fever. The saline medicines appear (besides their constringing effect on the capillaries) to have some influence in giving to the blood that arterial property (colour,* at least) which is so connected with nervous energy. Armstrong and Clutterbuck empirically confirm the benefit of sedatives, antimony and salines, in fever, without having accounted for their action.

In surgical cases, the symptomatic fevers often require antimonials and salines to cool them; and though surgeons have employed emetics to *promote the absorption* (as they say) of abscesses when *formed*, they are not sufficiently in the habit of resorting to antimonials to prevent the *mischief* of their *formation*. The rigors, burning skin, and pain

* Stevens attributed a preposterous efficacy to this phenomenon in cholera.

in the glands of the groin or axilla, from dissecting-puncture or other injury of the finger or toe, may be cut short, in the course of an hour or two, by an emetic, which removes the above symptoms, produces perspiration, and prevents abscess:* the sedative in-

* A young surgical friend called me one evening to see his brother, saying that he had fever, and so much shivering and occasional bursts of perspirations, that he feared it would turn out to be small-pox. I saw at once, by the patient's eyes, that it was not idiopathic fever of any kind. On inquiring if he had not hurt his foot or hand, he said he had run a splinter into his middle finger the day before; but that he had been so wretchedly ill all day with headache and shivering, that he had never thought of that, so as to mention it to his brother. There were already red streaks up the back of the hand, slight swelling, and great tenderness on pressure in the axilla. I prescribed an eighth of a grain of tartar emetic every quarter of an hour until vomiting should come on, and afterwards every two hours until the tenderness should subside, or half the quantity if it should produce more than very slight nausea. The second dose produced the full emetic effect, with instant relief of the headache and of the rigors, which never returned; and when I called the next morning, he had no pain in the axilla. The red streaks of the lymphatics on the wrist remained, which will suffice to remind any surgeon what might have been expected, if the inflammation had not been cut short. I have pursued the same practice in other similar cases of my pupils, with equally rapid and decided relief. When students puncture their fingers in dissecting, they often apply caustic, which is very bad treatment of the wound. The best plan, if the finger be hot and painful, is to keep it in a basin of cold water, or cold poultice, and to take tartar emetic in the manner just mentioned, which will soon allay throbbing and inflammation.

My friend Dr. John Potter, of University College,—one of the cleverest and most agreeable of physicians,—lost his life by one of those dissecting (*post mortem*) punctures. He was attended by one of his Professors, the celebrated Liston, Travers senior, and other surgical magnates: but he died;

fluence should be maintained for twelve or eighteen hours by from a sixteenth to an eighth of a grain of tartar emetic in solution every two or three hours, or just sufficient, according to the stomach of the patient, to keep up the influence without causing the inconvenience of sickness. Lind, when speaking of the destructive fevers of Senegal, describes the power of an emetic in arresting the fever; but complains that an emetic failed of producing so good an effect on the return (exacerbation) of the fever the following day. Had he kept up the influence in the mean time by antimony or ipecacuanha, in small repeated doses, as just described, with cinchona (quinine) in addition, the fever would have been controlled.

The successful practice of Broussais is a proof that the sedative effect of abstracting blood by leeches, watery diet, and withholding stimulants, can operate sufficiently in many instances, in spite of what others call his neglect of the bowels. At the same time that this is conceded, gastro-enteritis cannot be considered the *cause* of idiopathic typhoid

though they gave him plenty of stimulants, and put him to torture by cutting him in the fore-arm, arm, and side, searching for matter which did not exist, there being only erysipelatous redness and swelling. That "relief" by cutting large gashes had been preached up at one time by Lawrence, who, however, soon changed his opinion. Potter's uncle, the venerable and respected army physician, Dr. Joseph Skey, who had served in every part of the world, and seen as much treatment of wounds as any of them, actually began to give antimony on my plan, as he said, but he was overruled by the Professors of Surgery.

fever; though it is true, as was shown above, that in every instance, from the secondary loss of tone of the primæ viæ, and consequent unnatural state of their contents, more or less gastric morbid sensibility, congestion, or even inflammation of their mucous membrane, of the glandulæ agminatæ, &c. must be a constant *concomitant* of the fever—as, in fact, dissection proves. Arguments drawn from successful practice are sometimes fallacious: the cure of fever by abstracting blood from the abdomen by leeches is no proof of gastro-enteritis being the proximate cause of fever, any more than that the seat of the disease is in the arm, if cured by taking blood from that part. I once met with a publication in which it was asserted that the seat of hooping-cough (pertussis) was the head, because leeching the temples relieved it: leeching any other part would have had the same effect; as, in fact, formerly, blood was, by some persons, taken from the feet to relieve affections of the head, by "derivation," as it was called, in preference to taking it from the part affected.

I have endeavoured to explain why in typhus we should avoid the direct treatment by stimulants as much as possible, inasmuch as, the nervous centres being in a diseased state of congestion or inflammation, neither they nor other organs have their power increased by them; whereas, by *indirect* (the sedative) practice, as it is called, we relieve the organs, and give their capillaries an opportunity of recovering themselves.

Leeching in fever is by no means more indirect practice, considering the symptoms, than in many

cases of peripneumonia or of enteritis. These three states of disease, side by side, present the same aspect, neither of them having the direct indications for bleeding, if, as such, strength of pulse and flushed hot skin be required to be present. A patient in fever has the same proportion of blood in his system twenty-four or forty-eight hours after the attack as if he had been seized by peripneumonia, pleuritis, or phrenitis, in which no one formerly would have hesitated to adopt antiphlogistic treatment; and the prostration of strength in the three diseases is, in many instances, exactly similar. Every practitioner knows that patients in severe peripneumony have the dusky colour of skin, the weak, rapid pulse, and lie supine, like typhose patients; nay, more—when in this most dangerous state, they scarcely cough, on account of oppression and insensibility, and the cases may be easily mistaken by the inexperienced for idiopathic fever; yet who would think a patient too weak to be leeched or bled, however weak the pulse may be, when he is comatose, and in danger of suffocation from congested lungs?* Where is the difference in the physical

* I may here give an example, which approaches closer than peripneumonia to what is called typhus. My clinical clerk told me one day that a patient had arrived much sunk in typhus; we went to the bed-side, and found that he had all that appearance: dusky skin with *petechiæ*, eyes dull, lying on the back, answers incoherent, the pulse small, soft—120; the skin dry, but rather below the natural temperature; the tongue dry and brown in the middle, with a margin of white fur. He *did not cough;* but on applying the ear to the chest, there was rhonchus sonorus, gravis, sibilans, and crepitans—thanks to Laennec for enabling us to discover the last symptom. The man had been ill nearly a fortnight: and

strength of the patient? or why may not an exactly similar set of symptoms be relieved in fever by similar means? Sometimes a patient in peripneumonia cannot at once be bled from the arm when much sunk, any more than in advanced typhus, lest

how often have we seen patients plied with wine in such circumstances, from the supposition that they were sinking from debility! I pronounced the case to be fever, "complicated" with the bronchitis of the epidemic (December 1831) in an aggravated state, and incipient peripneumonia. This was a case to show students that the debility of febrile disorders is oppression from relative over-load of blood and the severity of disease —that depletion will lighten both—and that at the end of a fortnight it is not too late to adopt antiphlogistic practice. I recollect one student asking me if the man could bear bleeding. My answer was, "Do you think, if a scaffolding fell upon you, you could *bear* to have it lifted off?" We bled the patient immediately to sixteen ounces, gave him a purgative draught of salts and senna, and ordered it to be followed up by one drachm of sulphate of magnesia, and one-eighth of a grain of tartar emetic in solution, every fourth hour. The next morning he was nearly free from delirium, and sat up in bed; the bowels were still confined, and he had *some cough*. The cathartic was repeated; but by midday, the medicine not having operated, he relapsed into stupor, the skin having become hot, and the *relieved* pulse 84, and full: he was immediately bled again, had another purgative draught and a purgative enema, and the saline antimonial continued. The next day, after the free operation of the medicines, he was relieved and the skin softer, but he *coughed more*—was *able* to cough. As he had been very delirious in the night, and the sensorium was still slightly affected, he had ten leeches applied to the temples; and from this time he quickly recovered.

In another of these cases of fever with rash (1831), "complicated" with pleuro-peripneumony, which had been treated exactly in the same way—bled and leeched, &c. freely at the commencement—the patient (a girl æt. 15) became, on the fourteenth day of confinement to bed, much oppressed (sunk), feeble, lying

fatal syncope should ensue; but by applying leeches, as in the case quoted below, and drawing the blood gradually, the patient will be so far relieved that blood may subsequently be freely taken from the arm, to subdue that inflammation which had been only slightly relieved by the leeches,—or without leeches, by skilful management, a little blood may at once be taken with a lancet. No man before Rasori had the determination to try "contra-stimulants" (bleeding, antimony, &c.) in typhus; and he cured his patients by these means.

But it must be remembered that the disease has a *certain number of days to run*, like small-pox; and, therefore, the patient must not be bled from day to day when the symptoms continue severe; nature can only be lightened of a load to a certain extent, and so helped to totter through the weary journey with the assistance of medicines. It having

supine, delirium increased, skin dusky, pulse weak and frequent, rhonchus crepitans. One of the students asked if I did not think she was sinking from debility, accelerated by the former loss of blood. My answer was, "Put your ear to her chest, and then bleed her;" and that there might be no mistake, I stood by until seventeen ounces flowed: from which time her pulse rose, and she gradually recovered. It is only clinical experience that can teach how apparent debility may be relieved by depletion, or how late in a disease it may be resorted to with the most gratifying success.

I would now ask, had these cases been called (according to Cullen) synochus, and the latter stage considered to be typhus ("typhoid" then not yet known) and stimulants resorted to, as they would have been by those who employ them not only in typhus, but in typhoid and pneumonia, what would wine or brandy have done for the patients, who were cured by bleeding, purging, tartar emetic, &c.? Will not the Toddite exclaim, *Credat Judæus Apella!*

been thoroughly ascertained and recorded that patients may be bled with advantage in some cases of ague, men were found inconsiderate enough to attempt to cure the ague by mere repetition of bleeding, the mischievous result of which may be easily imagined. In cases of simple typhus, it is seldom necessary to bleed from the arm, but frequently from the head with leeches, using at the same time cold lotion, saline antimonials, and purgatives; but in typhus, complicated with inflammation of the lungs or other viscera, bleeding from the arm has been followed, in days of yore,* by as marked benefit as when the fever was not of the typhous character.

One of the circumstances which led physicians to understand how a patient in a low, apparently sinking, state of fever might bear bleeding, was the occurrence sometimes of spontaneous hæmorrhage from the bowels or nose, to the amount of a pint or more, from which "effort of nature," though causing alarm, the patient recovered his strength, and immediately rallied; as the author has witnessed, both in hospital and private practice.

* Those who cannot resist the overwhelming evidence brought forward here and elsewhere, assert that the constitution of men and the character of zymotic disease have undergone a change. I have lived long enough to testify that man's constitution and susceptibility to remedies, as bleeding and brandy, antimony and laudanum, &c. &c., is the same now as it was when I was clinical clerk, fifty-six years ago. Nay, even lately Dr. Little demonstrated to his class that V. S. was not "sudden death." But, on the other hand, I have throughout given evidence in favour of the use of stimulants, and also cautions against the abuse of depletion, and have endeavoured to explain the contradictions in both theory and practice.

There are persons who urge strongly that bleeding should never be resorted to in any disease. I feel certain, however, that there are a few cases in which it would be unjustifiable to lose a moment, as in cases just related, and at p. 68, and elsewhere; such as some inflammations of the head or chest, whether idiopathic or from metastasis, in which bleeding produces immediate relief; and even the short time necessary for the sedative influence of medicine to be induced, might give time for irremediable mischief to take place. It is necessary to know that the quickest substitute for venesection is an emetic of ipecacuan. or antim. tartar.; and it should never be forgotten, that a table-spoonful of mustard (which may be found in every house), mixed with a little water, is a quick and efficient emetic, though not so sedative as antimony or ipecacuan.; but it does to begin with, to be followed by saline antimonials and other sedatives,* or, if these are not to be had, by common table-salt and water. A practitioner, who is skilful and decided in the use of sedatives, can dispense with venesection much oftener than was the common custom.

In the commencement of fever, the saline draught, with $\frac{1}{8}$ of a grain of tartar emetic and ʒss Epsom salts, should be given every half-hour, until nausea or vomiting be produced, and then every three or

* As an example of the use of simple remedies on an emergency, the author, when on a shooting excursion in a remote district, treated a couple of cases of fever in the house of a peasant with a mustard emetic, followed up by a teaspoonful of common table-salt (chloride of sodium) in water every four hours; the mustard and salt being procured from a small country inn, not itself abounding in commissariat *matériel*.

four hours, or in diminished doses, so as to keep up the sedative influence.

I may now speak of the *use of stimulants*—how it happens that stimulants sometimes save the life of patients in fever. In the states hitherto considered, the heart was not deficient in perception of the presence of the blood—it exerted what strength it had; but from the violence or long continuance of the fever, it will sometimes flag, before the nervous system, upon which the vital powers depend, has made any progress towards amendment; the patient will, in fact, begin to die, the pulse fluttering, with cold clamminess on the skin. It is now that artificial stimulus will sometimes renew enough of action to gain time for the nervous system to recover, if not already too far exhausted, or the respiratory function too far gone to arterialise the blood, in which case life cannot be sustained; as may have been seen when the pulse has actually been kept up unavailingly by stimulants for many hours before death. The exact period at which stimulants* may be administered with benefit is one of the utmost consequence in practice, involves

* In fevers, one of the most useful medicines which come under the denomination of stimulant is Spiritus Etheris Nitrici (sweet spirit of nitre), in doses of from a quarter to half a drachm in cold water, frequently repeated; it relieves thirst by promoting circulation in the dried exsanguious papillæ of the tongue; and it has a stimulant effect similar to alcohol, with the advantage, from the rapidity with which it decomposes, of not affecting the brain injuriously, in cases in which brandy is contra-indicated; and where brandy is useful, it is a good assistant to it.

great responsibility, can only be ascertained by experience at the bed-side, is difficult to describe, and varies peculiarly in the epidemics of different seasons.

Those who stimulate *too early*, by making the heart over-exert itself, and by expending the nervous influence, actually *bring it* and the nervous system sooner to that state previously described, in which a continuation of stimulus will be necessary to carry the patient through the definite duration of the fever; for upon every remission of the stimulus, they find the patient drooping; and therefore, from observing this phenomenon, they become persuaded that they have been pursuing the right plan from the beginning. Sometimes there is a necessity for stimulants, when the fever is gone, which has been called the CRISIS ("the diathesis of disease being changed"); and there is yet not enough of natural strength left to carry on life. But how is it to be known when fever is gone? By referring to its *essence*, the *loss of function of the nervous system.* The fever is gone when the nervous system begins to regenerate nervous influence; when the intellect becomes clearer, and volition free, however weak—for *subsultus may still remain*, with other marks of *great debility*, and there *may be debility of brain*, amounting to childishness, —*but delirium is gone*, and *the eye follows objects*,*

* This is the great means of distinction, *the eye;* for even in this stage there may still be delirium: but after the crisis or change of diathesis, it is no longer the dull-eyed typhose delirium, but the delirium (tremens) of inanition; and it is at this point that the experienced practitioner uses stimulants and opium with masterly

besides the evidence of renewed secretion in the mouth, nose, skin, kidneys, &c. Patients themselves can often refer to the exact time of the fever passing off, by the mere return of consciousness, although they may not have had power of moving or speaking;* but even then we may have some difficulty in conducting them to perfect health, by food, tonics, narcotics, stimulants, and occasionally perhaps a recurrence to sedative evacuants, according to the changes which take place. The *collapse* produces a state of inanition favourable for the action of stimulus; nevertheless, if capillary action,

effect. *Even in the commencement* of inflammatory and febrile attacks, the *man of experience* will be on his guard against a state of delirium tremens, and will *ascertain the habits* of the patient, who may have been accustomed to live freely and luxuriously, though much within the bounds of what could be called intemperance; and, again, delicate persons of nervous temperament, especially females, who live abstemiously, easily fall into the delirium of inanition.

* A friend of mine, commander of a ship, on the crisis of fever, becoming suddenly conscious, though still apparently dying, and unable to move or speak, heard his men talking over the mode of sewing his body in his hammock, in order to consign him to a watery grave, with the greatest propriety and respect. A lady told me that, after having been "given over in a twenty-one-day fever," she became suddenly conscious in the middle of the night, but unable to move or speak. Her maid and a hired nurse were discussing the hopeless state of the patient over a jug of porter. She managed somehow to make them understand her desire to have some of it; upon which they consulted together, and coming to the decision that it could not make her worse than she was, gave her nearly a tumblerful. She immediately fell asleep; and, awakening in the middle of the next day refreshed and strengthened, startled her servant by speaking to her in a distinct voice.

contraction, do not recommence in the cineritious substance of the nervous system, death must take place in spite of stimulus.

Those who, on the contrary, relieve the system early by sedative (antiphlogistic) treatment, will (though they cannot alter the duration) diminish the *duration of the violence* of the fever; but as in every fever a poison is introduced into the nervous system, from the effects of which, in all cases, a certain time is required for its recovery, the young practitioner must not be induced to think that, by any measures, fever can be "*cut short*" all at once, or that it can be more than held in *check*. There are some cases *recorded* which apparently support the opinion that active antiphlogistic treatment can stop idiopathic fever at once; but I am more inclined to think those have been symptomatic fevers depending on some intensely acute internal inflammation; or if idiopathic, of that rapid course which sometimes takes place during epidemics—sometimes malignant, but not always so. Or it is possible that idiopathic fevers have been in some instances so completely checked as to have appeared cured; as patients in chicken-pox or mild small-pox feel well and able to exert themselves after the fourth or fifth day, though the disease remains for many days afterwards. As a general rule, idiopathic fevers, as far as I can judge by experience, run a definite course, though we have had only lately—through Jenner's perseverance—the same accurate information with respect to the duration of typhoid and typhus as we had concerning small-pox, measles, and other febrile diseases pro-

duced evidently by infection, which may nevertheless be subdued, though not stopped, and of whose existence the spots are evidence, even when completely subdued. Cases of mild small-pox frequently occur, as above alluded to, in which, if it were not for the danger of infecting others, the patient could attend to his business long before the crusts have fallen off; still, in those cases we know that there remains a spark, a smouldering fire, which is capable, during a short period, of being relighted. In many cases of *fever* also, the *symptoms relax* a week or a fortnight earlier than in others; and, on the other hand, severe typhus or typhoid, like small-pox, may be protracted much beyond the ordinary duration, even when not eventually fatal. Thus, the ordinary duration of fever is about fourteen days; but when it is protracted to three weeks, the popular term applied to it is "a twenty-one-day fever," implying that it has been severe.

Jenner has proved that we have no *continued* fever that is not *exanthematous*, *i.e.* with rash—as typhus and typhoid. "*Relapsing* fever" is palpably of the *remittent* (aguish) type, doubtless malarious,—both the symptoms and *autopsies* showing the hepatic and splenic congestions peculiar to that type of disease; and it is curable by quinine, g. v to x, or more, ter die.

The *yellow* fevers of hot climates are sometimes epidemic *continued*, sometimes malarious *remittent*. All of them are to be combated by antimony, calomel, salines, and cold lotions, and Martin says V. S., in the early stages; opium, stimulants, nourishment, and quinine during the subsequent progress; arsenic, mercury, &c., when there are troublesome sequelæ.

When the remittent type can be detected, quinine should be administered in every stage.

It may appear as if, having said so much against the *misuse* of stimulants, I were inclined to deny their *utility* in fever. But, on the contrary, I have just shown one state in which they become indispensable; and that they are often of great benefit the moment the fever has ceased, when the influence of the poison has passed off, which has been called the CRISIS: there is then often so much real debility, that the patient's recovery (convalescence) would be very tedious, or perhaps the powers of digestion, &c. would not be equal to restoration, unless assisted by stimulus; and when fever is gone, to promote appetite and digestion, wine may be of the most marked benefit, if not indispensable.

I have often been asked for a rule as to the administration of wine in fever, by persons who have remarked that they have seen others administer it with great success, but could not themselves feel certain in the indication. Besides what I have stated above, I should say, that the person who best understands the nature of delirium tremens will be the quickest to discern the propriety and necessity for the administration of wine and opiates in fever, erysipelas, &c. Even in inflammation of the viscera occurring in debilitated or debauched constitutions, it is absolutely necessary to give more or less of stimulants at a very early stage.

Thus, in a case of a foreman in a manufactory, who, though not a drunkard, habitually consumed a considerable quantity of spirits and strong beer, being attacked with severe pneumonia, his medical

attendant most judiciously let him have a considerable allowance of stimulants in addition to the appropriate medical treatment, and brought him through triumphantly. But this treatment would not have suited a temperate man; it would have lighted up or fanned the flame of pyrexia, producing thirst and delirium.

After all this discussion about sedative (antiphlogistic) or stimulant treatment in fever, in many cases it is not *necessary* to adopt either; every real idiopathic fever will run a certain course of time, whether interfered with or left to itself—it is not necessary to do any thing but give the patient what he asks for; so long as the case is so moderate that he retains his senses, what he will ask for is only drink—*cold* water in preference to every thing else—and he is right (ἄριστον μεν το ὑδωρ). If he does not ask for food, it should be suggested, and sufficient nourishment given in the shape of milk, gruel, barley-water, or broths; but usually the odour of meat in the latter is disgusting to fever-patients,—and milk, either plain or diluted, is the most perfect of nourishment. So far, so good,—as long as the fever continues a moderate course; according as symptoms demand them, the appropriate remedies are to be administered—sedative, stimulant, or narcotic.

However, no medical man can venture (except in his own family) to dispense with medicine; independently of other considerations, he incurs too serious a responsibility; for in case of any adverse turn of the disease, he would be blamed for not having given the

"necessary" medicine, though, in reality, none was necessary until some fresh symptom arose. The only safe and useful medicine in all fevers is a *mild* saline* antimonial mixture every fourth, sixth, or eighth hour according to circumstances. Such use of antimony, like the small quantity in James's powders, cannot possibly depress the system; but it requires great dexterity to handle the large doses of antimony (tartar emetic) exhibited by the new Italian school, of which we are inclined to doubt both the safety and utility, any more than of the profuse bleeding once in fashion.

I may here observe, that narcotics are frequently useful *during* fever—nay, necessary—as may be understood by referring to the *essence* of fever, and knowing that sleep is nature's restorer of the deficient nervous influence.† The obstinate wakefulness which takes place in most cases of fever must have a deleterious tendency to produce collapse; hence the benefit of gentle opiates: and in support of this opinion and practice, I may quote two good authorities,—Dr. R. Williams, in his useful and

* In some of the fever hospitals, the judicious physicians, who are not obliged to study the opinions of the patients or their friends, uniformly give only a weak saline medicine, such as liquor ammon. acetatis; reserving any more active means, whether sedative or stimulating, for the circumstances as they may occur.

† From the congested state of the nervous centres in fever, syrup of poppies, or a few drops of laudanum, will produce an effect equal to that of a larger dose of opiate medicine in other states of disease. This receives confirmation from the ingenious experiments of Durham, showing that during sleep the capillaries resume their normal state of contraction, opposed to the congestion of the nervous centres which is the essence of typhus fever.

interesting work, the *Elements of Medicine;* and Dr. P. M. Latham, in his Clinical Reports,—the opinions of both having the value of being formed on extensive clinical experience.

The eruptive fevers (exanthemata) are to be treated precisely on the principles already laid down. I cannot too seriously caution the young practitioner against implicit reliance on the nosologists, as the exceptions to their rules are endless. For instance, scarlatina is put down amongst the exanthemata as occurring once only in life. I have known it occur three times in the same individual —frequently twice: in one instance, in its exquisitely marked form, as to inflamed tonsils, appearance of tongue, eruption, and desquamation of skin, twice within ten months. Again, the duration of the stages may vary: thus, it is said that the eruption appears on the third or fourth day. I have seen a child in good spirits, and perfectly well in every respect (having examined it on account of the other children in the family being affected with scarlatina) one evening, and before the next as red as a boiled lobster from the rash of scarlatina, with sore throat and swelled tonsils. An eighth of a grain of antim. tartariz. produced vomiting, with relief of the difficulty of deglutition, and stopped the swelling of the tonsils, within an hour. At this time the tongue was as represented in the plate in Bateman's edition of Willan, with a white fur, and scarlet papulæ staring through it. The following evening,—the child taking in the mean time nothing depressing—in fact, it did not take sufficient sedative (Lind's error, see p. 310)—only a weak mineral acid

mixture,—a state of collapse came on, with delirium, the pulse being rapid and weak, the breathing laborious, lips purplish, skin cool, and rash faded. It is in similarly rapid cases that death takes place on the third or fourth day. I administered another dose of the tartar emetic, which produced vomiting in a quarter of an hour. Within two hours the breathing was relieved, the pulse fuller, though still 130, and the skin returned to its redness and to the full heat of regular scarlatina. The lips also lost their lividity, showing the relief of internal congestion by the antimony; yet, in similar cases, how often have I seen wine, and even brandy, given to children of the same age (five years), who did not recover! On the third evening, less than seventy hours from the commencement, the child asked for animal food; from which I felt certain that the crust must be coming off the tongue, and on inspecting it, I found, in fact, that it was loosening at the edges; and it began to come off in flakes during the night, and from the tonsils, which had never swelled any more after the first emetic. Thus the disease, which we usually see occupy seven or eight days, went through its phases within seventy hours;* and, notwithstanding the severity of the symptoms, the child was well, and walking about the house, on the fifth day, the skin having begun to desquamate. This patient, being a relative, and living near me, was visited, whilst dangerously ill, half a dozen times during the twenty-four hours. After the second dose of antimony, I prescribed sulphate of quinine

* This is not a solitary instance of severity. I have several times seen similar cases.

and sulphate of magnesia in water acidulated with sulphuric acid, every six hours, and lemonade in abundance as drink; the child had had one dose of pil. hydrarg., and pil. aloes cum myrrhâ, the first day. The immediate relief of symptoms may be fairly attributed to the treatment, though not the rapid progress (evinced by the early desquamation) of the disease; for, on the contrary, it showed a rapidity of malignity, such as we too often see in fatal cases of scarlatina. Quinine is not considered to have much influence on any continued fever; but it unquestionably makes the convalescence more rapid in all cases. The sulphuric acid and lemonade drink, or lemonade made with lemon-peel and a mineral acid, are of the greatest use as a lotion to the fauces and primæ viæ,* which are in an inflamed or congested state: in the case above related, they assisted in preventing the croupy state which sometimes destroys life in scarlatina, a coriaceous diphtheritic lymph in the fauces having existed when the laborious breathing came on.

* The sulphuric, nitro-muriatic, and other acids have been recommended by many experienced practitioners in fevers as well as for gargles; and their utility, when applied to the mucous membrane within view, as in the fauces, will explain the efficacy of the vegetable or mineral lemonade in relieving the tenesmus, griping, and nausea of bilious diarrhœa, more quickly in the first instance than opiates alone; as they not merely constringe and relieve the congested or inflamed capillaries of the mucous membrane, but help to wash away the acrid bile. The author never prescribes gargles, which are troublesome to use, and do not reach beyond the velum. Whatever is suitable for the local affection of the fauces, whether vinegar, or mineral acids diluted, or vegetable astringents, he directs to be swallowed in small quantities frequently.

This reminds me of the similarity between the epidemic called diphtheria, and Cullen's cynanche maligna, which I saw in my youth, and which was cured by ipecacuan. or antimony in the beginning; diluted vinegar, with rosemary in it, to sip and gargle with; and lemonade to drink, followed up by wine as required. Some prescribed cinchona-bark besides.

I have used no remedy for diphtheria except tartar emetic, gr. ii, in O. ss of vinegar and water, equal parts, or more diluted if required, sipped frequently, diminishing the antimony as the disease yielded,—which I have found it to do uniformly and quickly. I have been fortunate in not losing a patient by this new-fashioned cynanche pharyngia, though I have been called in at the death of several who, besides the misery of their disease, had been martyrised by caustic applications; most injudicious, because the solid nitrate of silver, which will relieve a throat when the tonsils or pharynx are only slightly inflamed with common colds, will produce immediate sloughing of the parts in the low typhous constitutional state of cynanche maligna, which is almost, if not altogether, identical with scarlatina anginosa ("putrid scarlatina"), which is always worst when the rash does not appear, though known to be scarlatina from its contagious origin in some instances. If nitrate of silver be used, it ought to be properly diluted.

I may observe, that small-pox differs from the other eruptive fevers in one respect as to its nature, which does not alter the indications of cure, but only increases its difficulty; small-pox is dangerous in

proportion to the quantity of eruption; whereas the others are rather the reverse,—scarlatina certainly, measles less decidedly. (I do not include chicken-pox, in which there is no danger at all.) Independently of the fever, small-pox destroys life, when there is a great amount of confluent eruption, by the depression of the system produced through the destruction of a large surface of the skin, such as takes place from extensive burns or scalds, which are confessedly very fatal. The large number of peripheral branches of nerves exposed in both cases fully accounts for the degree in which the constitution suffers, and for the number of deaths.

Small-pox is so seldom seen now, that it may be excusable to make some remarks on a disease which was once so common, and supposed to be well understood. It is one which takes the inexperienced practitioner, sometimes fatally, by surprise, and is often quite unmanageable. The period at which there is danger is sometimes, though seldom, (1) the very onset. If the dose of epidemic poison has been deleteriously large, there is agonising pain in the back, head, and stomach, *i. e.* spinal cord, brain, and visceral nerves, ending in convulsions, sometimes fatal. This state used to be relieved by bleeding, followed by opiates.

(2) The fever runs high in the severe cases at all periods; nevertheless, as the disease must last two or three weeks, active antiphlogistic means ought not to be used at any time, so as to induce debility; mild saline antimonials and opiates are the most suitable.

(3) In the moderate cases, when there is but little eruption, there is usually no danger; the patients

need not lie in bed, and require no medicine, except *pro formâ;* and yet the doctor must be aware of the peculiar danger which does exist even in these cases, which he can neither ward off, nor often cure when it occurs, viz. that in small-pox there is always a certain number of the pustules in the fauces: a patient may have, perhaps, not a hundred pustules all over him, and yet from a dozen to twenty in the roof of the mouth and throat, some of them being out of sight about the rima glottidis. When all the pustules have arrived at the height, those on the edges of the rima glottidis may so swell the part as to cause suffocation,—for which, the only possible chance of relief is tracheotomy; but the inexperienced practitioner is not aware either of the danger or of the resource which he ought to keep in readiness. Thus, a patient may be walking about the house one day, feeling quite well, giving no warning to the practitioner except that he is *getting hoarse*—a sound more appalling to the experienced ear than that of croup; and within thirty hours he may be dead from suffocation by the ripened "pustules" on the glottis: and, of course, this source of danger exists in all cases of variola, though not always impressed by writers.

It may be truly said that the severe cases (confluent) are dangerous through the whole period, from the exhaustion of the symptomatic fever; the exhaustion from morbid sensibility being similar to that from severe extensive burns or scalds, so well understood by those who have seen them in hospitals and elsewhere, and which can be carried through only by rational and moderate use of opiates, stimulants, and nourishment—such as milk and eggs,

especially milk. And thus a patient with severe (confluent) small-pox may linger on for five or six weeks, or more, and die at last.

It is not an unusual thing to be summoned to a private patient, or to see an out-patient at the hospital, who complains merely of feeling an indescribable sensation of weakness, and being out of sorts. You see that there are six or seven spots, like pimples, on the face; and, on looking close, you perceive the flattened top of small-pox eruption. You then inquire, and find that there are, perhaps, not more than twenty or thirty more of these spots over the whole of the body and limbs, not yet sore, and not having been thought about, if no person of the family is aware of their nature. On further inquiry, you ascertain that, about five or six days previously, the patient had felt very unwell; for a day or two had experienced chilliness, pains in the head and back, sickness, and uneasiness of the epigastrium,—in fact, the eruptive fever,—all slight, requiring no particular treatment, and causing no anxiety, unless there be the horrible warning of hoarseness, or a sensation of soreness about the glottis.

It will be useful to point out in this place the distinction between disease in an organ arising secondarily during fever, and primary disease of the same organ exciting fever. Our subject will be equally illustrated, whether we select an organ in the chest or abdomen. Let us take a case of idiopathic continued fever, in which, from the disturbance in the secreting organs, gastric morbid sensibility comes on early; the mucous membrane

of the intestines being irritated by their unnatural contents, there is uneasiness of the abdomen on pressure of the epigastrium, though not always diarrhœa, and great heat and dryness of the skin; and, along with this, languor, prostration of strength, more or less confusion of ideas, or delirium, evincing lesion of the nervous system,—the essential marks of *fever*.

On the other hand, let us take a case—not idiopathic fever—in which, from any cause, there is a *deficiency of good bile* in the intestines; the food, instead of being digested in the natural way formerly described, becomes putrid, acid, or otherwise acrimonious, not affording nourishment, and at the same time irritating and producing morbid sensibility, usually diarrhœa. We shall here have the same gastric symptoms; but instead of fever, there will be only *feverishness* (*pyrexia*), from the disturbance (morbid sensibility) communicated to the nervous system, inducing heat of skin, quick pulse, headache perhaps, but not delirium; and little languor, until actual debility from inanition ensues.

Now, as to treatment: if tartar emetic be given in the dose of about one-eighth or one-fourth of a grain in water every hour, the effect upon the febrile state, depending upon mere gastric morbid sensibility, will be to produce sickness, by which the patient will be relieved, and immediately cooled, particularly if the bowels be opened by it at the same time; and a repetition of the tartar emetic will produce sickness each time, but will not cure, as other medicines are required besides.

The effect of tartar emetic on the case of severe

idiopathic fever will be less marked; for though it may produce nausea or vomiting at first, with some diminution of febrile symptoms, yet the relief is not so decided; and if the medicine be repeated, it does not produce nausea, but only diminishes the febrile symptoms, and must be persevered with in small doses of from one-sixteenth to one eighth of a grain, four or six times in the twenty-four hours, to control the idiopathic fever, which cannot be stopped like that from morbid sensibility.

Either case of disease may prove fatal: the idiopathic fever, by the gradual failure of the functions of the lungs, heart, and brain; the sympathetic fever, from gastric disease, by rapid marasmus; for though the sedative tartar emetic cools the patient, and subdues the symptomatic fever for the moment, the patient will rapidly sink under recurring symptomatic fever and inanition, if digestion cannot be restored; and the same result takes place whether the disease be gastro-enteritis (that is, inflammation), or gastro-enteric morbid sensibility, caused by the irritation of undigested aliment from want of secretion of good bile. The latter case is an illustration of what takes place in infantile fever (the infantile remittent), or "gastric fever" of children—which is pyrexia, not fever. It is often cured in the commencement by a dose of calomel, either alone or with castor oil or other purgatives, evacuating the primæ viæ; whilst, at the same time, the mercurial renews the secretion of bile, so as to restore digestion, and all goes on well, either permanently, or only requiring a repetition of the same remedies. But often the case is more obstinate, and a torpid,

congested, or perhaps we should say sub-acutely inflamed state of the liver, requires not merely repeated doses of calomel or other mercurials, but leeches and poultices, or cold* wet cloths, to the epigastrium. One of the embarrassing symptoms in these cases is a purging of a dirty, watery fluid;† but this must not dissuade the inexperienced from persevering with calomel; for, on the contrary, as soon as it makes the motions‡ yellow or green, this

* The application of cold is not sufficiently often used in inflammation of the viscera of the chest and abdomen when the surface becomes decidedly hot.

† This, in hot climates, runs on to dysentery; and we have had cases of old dysentery from India, which it had been attempted to cure by various astringent and other medicines, that yielded to blue pill, hydrargyrum cum cretâ, or arsenic.

‡ The appearances of the fæculent excretions, though constantly examined, are scarcely sufficiently understood. The first thing with which the student should become acquainted, in respect to the appearance of the intestinal excretions, is, the variation of the natural colour, which resembles that of gamboge; which drug, when moistened, is of a pale bright yellow colour, and, when dried, gradually becomes darker until quite dark brown. Such are likewise the shades of tint of the fæces in health; becoming paler in proportion to the scantiness of good bile, until, when that is wanting altogether, they assume a light gray appearance. When, for example, the liver is inflamed, gorged, and swollen, it excretes a quantity of nearly black bile, causing diarrhœa, as is frequently seen in the hepatic complications of fever of hot climates: calomel, sulphate of copper, and liquor arsenicalis, are remedies for this black bile. In the chronic hepatitis of persons of intemperate habits, there is often an abundant secretion of a reddish bile. There are some substances, more especially calomel, which produce a chemical change in its colour, and consequently in the colour of the motion, rendering it grass-green; and persons who are ignorant of this fact, often continue to give more mercurial and other medicines, though the green colour of

state will cease; or if chronic diarrhœa then continue, as it sometimes does, from a chronic inflammation or congestion of the mucous membrane having been induced, astringents, such as catechu or hæmatoxylum, will cure it. These cases, though called "infantile remittent," unlike the genuine aguish remittents, are little relieved by quinine alone.

Medicines and dietetic directions sometimes fail merely from being too energetic. Thus, a child aged eight was very pale and wasting, with no evidence of disease except total loss of appetite, which had ensued after mild scarlatina. She had slight swelling of the submaxillary gland, but could not be called strumous. A medical friend, who saw her, prescribed animal food and fermented liquor, compound infusion of gentian with a little quinine, and gentle laxative doses of calomel and rhubarb, as the

the fæces is a proof that sufficient secretion from the liver is going on, the colour being that of good bile acted upon by the medicine,—showing, therefore, that more is unnecessary. This is often misunderstood with children, whose motions (after a dose of calomel, given judiciously or not) are bright green; when the parent, nurse, or some one else proposes that the calomel should be repeated, though the green is a proof that it is not required. Independently of colour, slimy, mucous, or gelatinous matter in the fæces is an evidence of merely over-purging from diarrhœa, dysentery, or cathartic or other medicines, and generally indicates the propriety of astringents and mucilaginous diluents.

The alterations of the secretion of the kidneys have been already alluded to, and the peculiarities in each disease are generally understood. Young practitioners and patients are frequently unnecessarily anxious about the common appearance of sediment, sometimes with a reddish tinge, which takes place as the natural process of the decomposition of the urine after standing a few hours, and which varies very much within the limits of healthy secretion, according to changes of diet, wine, &c.

bowels did not act. Finding in a week that she was no better, and that she was annoyed with flatulence and acidity in addition, he consulted me.

The prescription was excellent, could it have been borne; but as excessive debility of the mucous membrane and glands of the primæ viæ existed, a milder medicine and diet were indicated. I prescribed half an ounce of decoction of hæmatoxylum, with an equal quantity of chalk mixture, to counteract the acidity and flatulence, and half a drachm of Epsom salts, to keep up the peristaltic action, three times in the twenty-four hours; and a diet of animal food made into a strong soup (instead of giving it in substance), with milk and bread. In ten days this plan induced appetite and digestion, and enabled her to resume the medicine and diet at first prescribed, which soon perfected her cure.

The logwood, from its slightly sensible qualities, is much undervalued as a mild tonic, and is too much looked upon as a mere astringent, though it contains little tannin. It is so commonly considered as a mere astringent (on account of its great efficacy in checking diarrhœa and dysentery), that to prescribe it with a saline laxative would be thought contradictory by those who do not consider that it was given in the above case as a mild and efficacious tonic. Some think it contradictory to give an astringent with an aperient, because astringents have been usually exhibited along with stimulants and stimulant narcotics—in diarrhœa, for instance; but enough has been already said to show the benefit of astringents with salines where the diarrhœa is combined with an inflammatory congested state of the

mucous membrane, and a febrile state at the same time; and that simple narcotics and astringents in themselves are not "heating," any more than tonics; though the patient will become heated if the requisite collateral treatment be neglected.

Having passed in review the train of symptoms denominated FEVERS, symptomatic and idiopathic,—which we have traced to a disturbance of the functions of the nervous centres, ganglia, and subsequently of the organs depending on them,—we next have to consider other diseased states, denominated NEUROSES (nervous diseases), which, like fevers, consist primarily of derangement of the nervous system, though differing from them in the subsequent phenomena, and the leading characteristics of which are pain, rendering motion difficult, or a tendency to spasmodic, convulsive, involuntary motion. It is necessary to keep distinct views of these different states of diseases (febres and neuroses), though they sometimes run into each other, pyrexia (feverishness) participating somewhat in the characters of each, and constituting the link.

In explaining these disorders of the nervous system, neuroses, we must still refer to the principle, of disease being only the *alteration* of healthy *actions*. Hence a sound physiology is absolutely necessary as a substratum to the practice of medicine; for, however much has been gained in general pathology by mere experience, the practitioner will observe, as he advances in acquaintance with the neuroses, how completely we are dependent upon a knowledge of the manner in which the

functions of the nervous system are carried on in health, for any correct principles which must guide us in their treatment.

When the sensibility of a part morbidly increased becomes pain, and this takes place without *perceptible* accompanying inflammation, pathologists name it a state of NEURALGIA, implying merely *pain of nerve*, in contradistinction to *pain of inflammation*, in which there is always palpable evidence of the *vessels* being implicated. Neuralgia has been known by the term "irritation," or "irritable state of a part," as the "irritable spinal cord," "irritable mamma or uterus." This morbid sensibility is in the nerves, existing often without that perceptible participation of the vascular tissues which constitutes inflammation, though sometimes inflammation is induced by it. Each organ will express its nervous derangement in accordance with its function—sensitive nerves by pain, the cardiac nerves by disturbance of the heart's functions; and so with other parts.

Now, when this state, which I call MORBID SENSIBILITY (p. 186), of sensitive nerves exists, it is indicated by pain. But it may exist in the organic (and incident?) nerves without pain; and thus a disordered state may be set up in the nervous centre, producing evident symptoms there, having spread thither from a part in pain, or from a part not in pain, according to whichever class of nerves is injured.

The import of the term morbid *sensibility* must not be misunderstood, because I apply it to a state of the central organ, of which the patient's sensorium is *not conscious:* he is not conscious of the morbid sensibility; but the central organ, the spinal

cord, has become over-susceptible to impressions on its nerves; therefore the state is morbid susceptibility, excitability, or sensibility of the spinal cord, independent of cerebral sensation.

An inquiry into the nature of the proximate cause of morbid sensibility ("irritation"), or the actual state of the minute filaments composing the nerves and central masses of medullary matter when they evince the phenomena of morbid sensibility, offers an extensive field for research. Is it inflammation? It has occurred to me that it will hereafter be proved, perhaps by means of the microscope, that it is inflammation, neuritis, error in metamorphosis (p. 187 *et seq.*), either in the tract of the nerves, or at their union with the nervous centres. It is necessary to observe, however, that as in external parts, so also in the nervous centres, morbid sensibility, with or without pain, exists with a state short of inflammation, viz. with that state of inanition or contraction of capillaries which we sometimes see to precede inflammation, but which is not always followed by inflammation, as in case of depression from hæmorrhage, sudden fright, extreme cold, or an undue quantity of digitalis, or other sedative medicine; all of which produce the convulsions of morbid sensibility, and all evidently induce the contracted state of capillaries, the opposite of inflammation. Some of the symptoms of general morbid sensibility result from the inflammation which ensues upon excessive contraction: the two opposite states of contraction and dilatation of capillaries, therefore, are accompanied by the same phenomenon, morbid sensibility

("irritation"). An exemplification is the morbid sensibility which accompanies symptomatic ("irritative") fever. In order, therefore, to cure, we ought to know whether the indication be to employ stimulants to dilate the capillaries, or sedatives and tonics to constringe them, and thereupon adopt rational treatment.

The consequence of the brain or spinal cord being in a state of morbid sensibility is, that its healthy actions are deranged; that is to say, in health the brain communicates to the muscles of voluntary motion the dictates of the will only; but if the origin of the voluntary nerves of a part in the brain be in a state of morbid sensibility, or if the same disordered condition of the part of the medulla spinalis through which the nerves pass exists, that part may be thrown into action independently of the will, or even against its dictates. This is the explanation of those involuntary motions, convulsive or spasmodic, arising from a spicula of bone within the skull, or from a tumour pressing on the brain, which produces convulsions called epileptic; or a depressed fracture of the skull, which also causes convulsions. Similar local injuries of the spinal cord are followed by the like results. The same effect is even produced when nerves, being injured at a distance from the nervous centre, the injury, whatever it may be, whether physical (neuritis?), or an alteration of the dynamic or electroid property of the nerve, spreads, whether of sentient or of organic (or incident?) filaments, to the nervous centre, so that the injury to the nervous centre at the origin of the nerves of motion makes it react,

and throw the muscles of voluntary motion into involuntary action, which is the *rationale* of locked jaw, tetanus, hysteria, some kinds of epilepsy, and chorea.* It is well known to those who are acquainted with surgical practice, that epileptic convulsions, as well as tetanus, will come on occasionally from morbid sensibility in the nerves of a fractured or wounded limb.

Mental excitement, such as anger, grief, or fear, which are analogous to the direct *irritation* of the brain or spinal cord by a depressed fracture or spicula of bone, will produce the state of *morbid sensibility* of the nervous centres indicated by involuntary, or almost involuntary, muscular actions, —frowning, clenching the teeth or the fists, striking, or screaming,—even by epileptic fits. Laughing and sobbing (convulsions) are produced by the cerebral excitement of good acting, and of various kinds of eloquence, as well as by the immediate morbid sensibility of damaged brain in paralytic cases, in which there is involuntary weeping or

* The morbid sensibility from long-continued voluntary action of the sphincters induces reaction in the form of the convulsive motions called rigors, or shivering. Every nurse knows, when she feels an infant shiver, that it is about to make water; and the shudder produced by the sphincter vaginæ is well known, as also the shivering produced by the painfully continued action of the sphincter ani caused by piles, or by the necessity of retaining the fæces against the natural inclination. These instances of shivering are convulsions independent of temperature. We see an almost involuntary reaction when a person under the influence of pain clenches the hands or grinds the teeth. Marshal Hall immortalised himself by inventing the term "reflex" action for this reaction.

laughing, which are also the result of distal-produced morbid sensibility in hysteria. Again, we know that a person may be tickled into fits; and that certain pleasurable sensations in excess may produce epilepsy; which is analogous to the accidental injury of nerves at a distance from the central organ. The instances of morbid muscular actions produced through impressions on the *brain* show that, notwithstanding the independence of the spinal cord as to some of the functions or properties of the nervous system, a most intimate connection exists between them, although the mode of connection has not been hitherto satisfactorily explained.

Impressions upon the nervous system distant from the brain—for instance, any continued irritation of an organ, as of worms in the intestinal canal, though scarcely or not at all perceived by the individual—or disease of the nervous centres, even in the fœtal state, will produce partial or general convulsions, followed by either paralysis or a permanent spasm of certain muscles, as of the gastrocnemii, giving rise to the production of club-foot, as shown by Dr. Little in his treatise on the cure of that disease by division of the tendo Achillis or other tendons.*

* There have been at all periods attempts made to cure contractions of the joints by mechanical apparatus alone, without cutting the tendons of the contracted muscles; and the success in some has made instrument-makers and others, who do not understand physiology and pathology, think that all cases are curable by this means. Dr. Stromeyer and Dr. Little, both in their publications and practice, prove that many cases are curable by apparatus, without dividing tendons. Dr. Little has further shown, that there are certain cases in which even instruments are

Or a higher degree of injury of the nervous centre, at the nucleus of the nerve, may produce paralysis, which, by destroying the equilibrium of the different classes of muscles, is another cause of club-foot and other contractions of the limbs. The well-known fact of diarrhœa producing cramps in the calves of the legs, is an additional illustration of this subject. These partial and general convulsions, or spasms, arising from irritations at a distance from the nervous centre, are instances of morbid reactions (deranged "reflex" actions) of the spinal cord; and the tenderness (morbid sensibility) of the abdomen, without inflammation, in hysteria, is an example of the reflex morbid sensibility through the spinal cord, propagated from the uterus. To compare small with great things, there is an analogy between globus hystericus and hydrophobia; and the discovery of a cure for the latter, in some medi-

not required; but that, being spasmodic affections, they are curable by medicine alone, combined sometimes with a little manipulation. He has also clearly pointed out the cases in which the tendons *must* be divided; thereby setting aside the absurd assertions which have been made, through want of sufficient experience in the actual treatment of these diseases, or through not having sufficiently considered the subject. Granting that there is a certain class of cases, which might, with great care and attention, be cured by instruments in the course of months or years; by adding in many of these the operation, which is scarcely painful, and not in the least dangerous, they may be remedied in as many weeks—sometimes, it might almost be said, in as many days; for as the minute wound invariably heals by the first intention, the patient sometimes begins to put the foot to the ground in a day or two: so that, independently of there being cases not curable by instruments alone, many curable by them are remedied by the Stromeyerian plan without any comparison of time, expense, or pain.

cine which has a rapid effect in allaying that state of the nervous system common to the neuroses, should not be despaired of. In fine, we see that convulsions—involuntary actions or spasm of the voluntary muscles, as well as spasm of the involuntary muscles—are produced by whatever excessively excites (produces morbid sensibility of) their nervous centres, either locally or from a distance.

In *local* neuralgia—as painful chronic affections of the face, heart, stomach, uterus, mamma, or colon—there is no perceptible alteration of structure; whereas many serious and destructive inflammations, combined with pyrexia, give but little pain. The degree of *constitutional* or general morbid sensibility also is not proportional to the local pain or inflammation, but often much greater; nor has it been hitherto explained why one gun-shot wound of a limb should produce fever, and an apparently exactly similar one cause locked jaw. The difference may depend upon whether the cineritious or the medullary part of the nerves be principally affected: fever consisting of congestion of the former—tetanus, of disturbed action in the latter. Fever and general morbid sensibility must be well distinguished; for though fever be accompanied by morbid sensibility, as nausea, headache, and rigors,—and continued severe constitutional morbid sensibility may be accompanied by febrile excitement of skin and pulse,—we must be cautious in depleting in the neuroses, as depletion increases the sensibility of the nervous system; and this, in some of the neuroses, is a difficult point to *discriminate* in practice, when an organ of importance *appears* to be implicated, as when hysteria *simulates*

peritonitis, pericarditis, pleuritis, or phrenitis. We must not, however, underrate the consequence of morbid sensibility, though it be not fever, for it sometimes proves fatal, as in tetanus, hydrophobia, or epilepsy; never in hysteria—*nisi ex nimiâ curâ medici.* We may consider gout of the stomach to be a mixed case, and it is relieved by treatment different from what we should resort to in inflammation of that organ with fever, in which we should employ depletion and antiphlogistic means; for in gout in the stomach* we must immediately resort to laudanum,† and sometimes, if the pulse flags, to brandy, for the relief of the morbid sensibility. Again, another instance of morbid sensibility—without fever, though sometimes with considerable pyrexial flush of surface—occurs occasionally after *parturition,* where, in many cases, an inexperienced person would suppose, from the tenderness on pressure of the abdomen, that there was puerperal peritonitis and a necessity for bleeding; whereas, all that is requisite is an opiate and repose. Bleed-

* Gout (to be discussed hereafter) commences with neuralgia; inflammation might follow: the painful morbid sensibility may stop the action of the heart, through the nerves of the cardiac plexus, and thus cause death suddenly before there is time for inflammation,—like a blow on the pit of the stomach, or the swallowing an inordinate quantity of ardent spirits.

† Laudanum will be enough, if the heart has not begun to flag. A young practitioner nearly lost a gouty patient by treating him as for gastro-enteritic inflammation, with leeches, &c.; when a clinical clerk of mine, who was a relative of the patient, happening to call in, recognised gout in the stomach, and speedily removed it by a large dose of laudanum, followed up by brandy and water.

ing or purging would be highly injurious, the abdominal tenderness being only morbid sensibility of the part, arising from the origin of its nerves communicating with, and being rendered morbidly sensible by, those of the uterus.

In many instances where there is inflammation, if there be *also* much morbid sensibility, evinced by *pain*, the latter is a most urgent and dangerous symptom; as in cases of *poisoning* by oxalic acid, cantharides, arsenic, and other acrid substances, in which, besides getting rid as much as possible of the poison, large doses of *opiates* are necessary. Remedies which are of use in inflammation with fever are of little avail, if not injurious, in the immediate treatment of cases wherein morbid sensibility is the predominant symptom, as in the cases of poisoning, or in gout in the stomach, just alluded to.

I cannot help here again hazarding a speculation upon hydrophobia; namely, that it is morbid sensibility, produced by a virus which poisons the nerves it reaches, but takes a considerable time to contaminate the nervous centres, and that it will eventually be remedied by some medicine which conquers neuritis—perhaps arsenic—perhaps some narcotic. My own inclination would be to try as much arsenic as the constitution would bear, combined with plenty of opium, which always enables the patient to take more arsenic than he could without it, as I have found to be the fact in old cases of ague and of dysentery, which I have cured by the combination; indeed, it is also proved by the efficacy of opium as an antidote to arsenic.*

* It is not very uncommon, on patients being brought to the

There is a great difference between fevers and neuroses, both in proximate cause and *treatment*. In fever, there is chiefly lesion of the cineritious part of the nervous system, rendering it insusceptible of being beneficially affected by ordinary stimuli, as above explained, the delirium or coma of fever being from plethora or oppression. In the neuroses, the nervous system is subjected to some noxious local influence or impression, which produces altered sensibility or spasms of various recurrence and duration; as seen in a healthy animal convulsed from loss of blood; convulsions in a healthy child from teething or worms; or tetanus produced by cold; or hysteria, or chorea: the nervous tissue being rather in an *anæmic* than in a *plethoric* state.

Most or all of these forms of neuroses—variously modified indications of the state (in opposition to fever) called morbid sensibility ("irritation")—appear to depend more particularly upon diseased action

hospital in consequence of having taken poison, to find that, thinking to make assurance doubly sure by taking arsenic and laudanum together, they have saved their lives. In an experience of many years, I have always found these cases which I have seen do best; and many patients who had taken arsenic (arsenious acid), we have recovered by laudanum and calcined magnesia freely administered; making use, according to circumstances, of the stomach-pump, leeches, and other means not necessary to be enumerated here. The pain (morbid sensibility), independent of inflammation, would kill, if not relieved by opium, as I have mentioned elsewhere in the instance of gout in the stomach. I must add here, for students, that what is called gout of the stomach is almost wholly neuritis; but that in poisoning by arsenic there is, besides neuritis, considerable inflammation of the capillaries of the membrane.

of the medullary parts of the central organs, however produced, whether arising there primarily, or induced there by disturbance in the periphery of the organs. The delirium or coma of inanition—either delirium tremens, or delirium from loss of blood—depends upon a state of the cineritious tissue the reverse of fever, anæmia rather than plethora. But although, upon a careful analysis of the symptoms and different forms of the neuroses, we may, with attention to physiology, refer some to an affection of the cineritious parts of the cerebrum and cerebellum (the gray matter of the spinal cord, and of the sympathetic system), others to an injury of the medullary parts of the nervous system, we should, *à priori*, from our knowledge of the connection and mutual coöperation of these two divisions of the nervous system, expect to meet with disease depending upon simultaneous disturbance in both. Thus, from the violent operation of sedatives or cold, or when an animal is bled to death, the first to suffer is the most vascular, the secreting and the sensorial part, the cineritious substance; hence the indistinctness of the perceptions and thoughts, and the weakness of the involuntary and voluntary actions. If the operation of the sedative be increased, or the analogous injury of further loss of blood take place, the medullary part of the nervous system evinces the effect upon it by general spasmodic muscular contractions: the state of the medullary matter during this time being represented by the symptoms which I designate morbid sensibility, which may exist in all grades, constituting the various forms of neuroses—from a slight neuralgic pain, to sciatica, to the most distressing clavus hystericus,

tic douloureux, or agonising pain in the back of the head and loins, as in hysteria, or from hæmorrhage; from the spasm of one or more muscles, the gastrocnemius or those of the jaw, to the universal spasm and universally increased sensibility of tetanus and hydrophobia. Epileptic convulsions from terror must be a compound affection—the disturbance of the medullary part depending upon the previous affection of the sensorial.* The actual condition of the capillaries of the medullary tissue,—the proximate cause of the symptoms of morbid sensibility, *i. e.* whether the phenomena of the latter depend solely upon an alteration of the dynamic state of the nervous tissue, independently of any physical change in the capillaries, such as *neuritis*, for example,—is a more difficult subject to determine. Whatever it be, it is a state relievable by narcotics and tonics with stimulants, and injured by sedatives, in opposition to fever.

Throughout my remarks on nerve-disease, I have retained the terms *cineritious* and *medullary*, for convenience' sake; they were used in every previous edition, before the cellular and the tubular structure of the medullary nerve-tissue, as suggested by me (p. 136), was more clearly ascertained. Now that physiological inquiry has distinctly shown the same arrangement in the nervous system as in other

* We may attempt to explain this by the analogy of the starting of the limbs, which are deprived of the influence of the will, in paraplegia. In epilepsy from fright, terror produces an effort of the will on the muscles to escape, the fright at the same time causing syncope, or an approach to it sufficient to take off the control of the will: the impulse having been given, the muscular action is then continued in an abnormal spasmodic manner by the nervous centres during the state of insensibility.

secreting organs (*the cells to secrete, and the tubules to convey the product of the secretion*), the original terms continue to have the same signification. Different forms of nervous disorder must be traced to defect of secreting power in the ganglia, whether of the hemisphere, the motor tract, the spinal cord, or the sympathetic system. The problem is, how to accord to each separate portion of the nervous system its share in the production of nervous disease; to separate those forms which result from defective secretion by the cellular structure, from those which are produced by the interruption of tubular conduction, whether from the periphery to the nucleus, or from the nucleus to the periphery.

Delirium tremens affords a good contrast to fever. This disease is analogous to the state (described at page 131) of a weakened action of the brain induced by forced watching. In delirium tremens, the weakened action of the brain is produced by the absence of accustomed stimulants; thus, in those who are in the habit of using much stimulus (of fermented liquors), the heart being accustomed to it, its actions proceed with regularity: when suddenly deprived of it, either from accidental cause, from voluntary refraining, or from its *being forbidden on account of some disease or accident*,*—the want of it

* Young practitioners in medicine or surgery are frequently at a loss to account for the state of a patient under such circumstances, seeing that he is very ill without marked symptoms arising directly from the primary disease. Thus in the case of a gentleman in the habit of living generously, rather high, though by no means intemperately, and whose brain had been during health in a state of constant activity, he being moderately leeched and purged, with a very low diet, for common sore throat, on the

causes the pulse to become weak, as if from the operation of digitalis, or other sedatives; the absence of stimulus being equivalent to the influence of sedatives. The brain at the same time is sound, and remains in full activity, but weak from the want of arterial injection and of the usual stimulus. There is, therefore, a succession of thoughts, rapid but weak (delirium), wakefulness (pervigilium), and weakness of volition, causing trembling, whence the denomination "tremens."* Delirium tremens is a state analogous to that produced by sedatives,†

third day fell into delirium tremens, which required the copious and long-continued administration of opium, with brandy and water, to subdue it. In a similar manner, the sudden change of diet necessary in surgical cases often brings on delirium tremens in various degrees, both with the rich, and with the labouring classes (such as draymen) when brought into hospital, especially the latter, who, when intemperate, indulge more in ardent spirits. Publicans are peculiarly liable to this disease; they continue habitually to drink an unnecessary quantity of stimulants, with impunity, until, from some accidental circumstance, such as a catarrhal or diarrhœal cold, or from the stomach losing its tone from abuse, they want appetite for food; they then become weak: so that, even if they keep up the usual stimulus, they fall into a state of inanition; and still more so if, from mistaken suggestion of their own minds or of friends, they abstain from liquor, and thus fall into delirium tremens. It is only of late years that this state has been thoroughly understood, and even now the gradations of the affection occasionally produce embarrassment.

* I here give but the leading symptoms; the detailed description will be found in the *London Medical and Physical Journal*, January 1813, and in various works since that date. A clinical lecture by Dr. Roots, printed in No. I. of the *St. Thomas's Hospital Reports*, forms an excellent treatise on this subject.

† I have seen delirium tremens produced, apparently, by large doses of digitalis administered in a pleuritic case.

which, if slight, will pass off; but to which at last, if not relieved, succeeds the coma of inanition and death. The usual mode of remedy is by narcotics and stimulants; by which, in addition to the counteraction of the sedative state, a greater tendency to sleep is produced. The stimulant narcotic tincture of opium, or the simple narcotic morphia, should be used—not the sedative narcotic hyoscyamus, which itself may produce delirium tremens (p. 139). At the same time that the patient is manifesting incessant muscular action (jactitation) and raving, the pulse is frightfully weak, both symptoms coexisting, as in persons dying of hæmorrhage: stimulants and opium must therefore be given freely until they counteract this state, and the patient must be confined to his room; for if allowed to run about, as inclined to do, owing to the delirium, syncope will ensue, and probably terminate fatally. When the stimulants and narcotics begin to produce their good effect, we first perceive the brain recovering power, evinced by more steadiness of the ideas and by rationality; succeeded by calmness, then sleep; and we cannot with safety relax stimulation until the patient does sleep, as the raving will otherwise return.* Sometimes the patient will sink into sleep previously to becoming rational; but some degree of calm of the sensorium will usually be perceived first, and increased firmness of the nervous system, evinced by less trembling,

* This may help to reconcile a remarkable anomaly: that some practitioners recommend, and have succeeded with, digitalis for the cure of delirium tremens; the only way I can account for which is, that, by making the pulse slower, sleep is induced, according to Durham's theory. (See pp. 134, 183, and 199.)

&c. There are some cases of delirium tremens which are embarrassing to the practitioner, on account of the brain being diseased—tendency either to apoplexy or paralysis existing, or recent inflammation from accidents or wounds. Under these circumstances, alcoholic stimulants cannot be safely used, and in such cases chloroform may be resorted to with benefit, combined with morphia.

Friends or attendants who do not understand the nature of the affection, and who have been accustomed to consider that all delirium depends upon what has been called determination to the head, and that depletion is required, have resorted too often to bleeding, purgatives, and other sedative medicines, which increase the malady; and they will even remonstrate with the physician sometimes against the exhibition of the remedies which have in similar cases proved efficacious. The bowels are usually torpid in delirium tremens, and will remain so until *stimulants cause them to act*, by restoring that state of the nervous system in which the nervous principle is developed and distributed to the alimentary tube as to other parts, besides their stimulant agency upon the muscles of the intestines themselves; and hence the administration of the sedative cathartics is not merely useless, but, by counteracting the stimulants, rather retards than promotes the cure of the patient. The bowels in general act of themselves, therefore, as soon as the energy of the nervous system is restored by stimuli; and when the urgent symptoms are removed, it is time enough to give laxatives, if then required, when

the patient begins to take solid food, which he had not done for some time.

This is analogous to the constipation of bowels in tetanus. Has any one ever succeeded in purging a tetanic patient by the most drastic medicines, until the nervous system was relieved? or if patients have recovered from tetanus, when purgatives, calomel, aloes, salts, &c., have been administered, may not the mischievous sedative effects of the latter have been neutralised by opium and stimulants taken at the same time? or when we find tetanus often fatal, even when opium and stimulants have been resorted to, is it not because the quantity of sedative and drastic medicines has counteracted the effects of the former, which might have cured ?*

* Since the above was first published, I have had two cases of the disease : the one, locked jaw (trismus) in a debilitated habit, recovered with an opiate every night, and a tonic medicine (inf. gent. co. c. vino ferri), with nourishing liquid food and fermented liquor. The other, aged seven, traumatic tetanus (locked jaw, with opisthotonos in frequent paroxysms), recovered also. The treatment in the latter case was (third day of the disease) an opiate immediately, to be repeated every night, and a narrow blister along the spine. Fourth day, the report was, felt better, and bowels acted; but blister appearing to irritate, ordered an enema, with Battley's liq. opii. gt. xx., ol. terebinth. gt. xxx., every third hour; the second dose produced calm. Fifth day, better, and jaws relaxing. Sixth, no opisthotonos since opiate last night ; muscles of neck and abdomen still rigid, bowels confined. A purgative was given by an assistant, which acted towards evening, producing griping and *return of opisthotonos:* I consequently ordered an opiate enema, with gt. xxx. of ol. terebinth. as before ; a second in four hours produced calm and sleep. Seventh day, no return of spasms ; from which time the patient gradually recovered. The amelioration as evidently depended upon the opiate as did the relapse upon the sedative (purgative).

I think, from the various statements already made, it may be deduced, that the diseases of morbid sensibility, were it proved even that they depend upon inflammation, are not curable by common depletion; the medullary tissue is too fine to be affected by the force of the circulation, or relieved by taking off the *vis à tergo*, by bleeding, digitalis, &c.; hence neuralgia, tetanus, hydrophobia, chorea, hysteria, epilepsy, &c., must be reached through the circulating fluid, by what have been called tonics—iron, quinine, arsenic, &c.—combined with narcotics and with stimulants according to circumstances.

The jumble of treatment usually adopted in tetanus has been such as to defy any calculation as to what has done good: opiates and stimulants have been counteracted by purgative sedatives—hot baths by sedatives—stimulants and narcotics by cold baths; bleeding opposing wine, brandy, and opium. In one remarkable case on record, the patient recovered, after the nurse, by mistake, had given during the night, instead of the medicine, a liniment containing a large proportion of laudanum. Many cases of tetanus have recovered under the employment of warm baths, stimulants, and narcotics; from which, and various analogies, I adopt the treatment by opium in tetanus: if any addition be made, it should be that of tonics and stimulants when required, not sedatives. We have succeeded in finding the mode of curing tic douloureux and delirium tremens, which were once *opprobria medicorum*. Why may we not, by investigation and analogies, succeed at length in curing tetanus with

more certainty; or that most dreadful of human inflictions, hydrophobia?—recollecting that, when the patient cannot swallow, medicines may be introduced into the system, either by applying them to a surface from which the cuticle has been removed by blister or moxa cautery, or by hypodermic injection.

I think one point is clearly made out, that where there is fever, whether idiopathic, or symptomatic from local inflammation—loss of power from lesion of the nervous system, so that nervous influence is deficient—it is vain to attempt to excite action by stimulants, until, from the cessation either of the operation of the morbid poison or of the inflammation, or from a state of collapse, or the operation of sedatives, the capillaries of the cineritious substance have resumed sufficient contraction to renew the generation of nervous influence, through which the delirium or coma of plethora ceases; and that, on the other hand, when the nervous system is in a state of morbid sensibility, combined with the delirium or coma of inanition, stimulants and narcotics are directly indicated; and tonics should be added according to circumstances.

We have here an exemplification of what takes place, as mentioned at p. 153, in the alternation of the necessary combination of narcotics sometimes with stimulants, sometimes with sedatives, and sometimes with tonics. From Durham's experiments we seem to have derived a great advance of knowledge on these subjects, and hints for the explanation of another of the contradictions in medical practice known to persons of experience, but previously inexplicable by

physiology or hystology, viz. that, as just mentioned, the usual plan of curing delirium tremens by opium and stimulants has been often beneficially reversed by using digitalis, antimony, or other sedatives, either with or without opium, and with no stimulants. But most of the papers published in the journals on this new practice have been merely empirical, and therefore unsatisfactory. Durham's experiments show that the one thing needful, sleep, is accompanied by a contracted, in opposition to a hyperæmic, state of the capillaries of the brain; and, according to the constitutional state of the patient, this will be effected, where there is much inanition* (debility) of pulse and of nervous influence, by stimulants; or, on the other hand, where there is a quick pulse, by sedatives, such as digitalis (p. 111), with or even without opium; and in this way eventually sleep is induced, and with it contraction of the capillaries, renewing the secretion of nervous influence. But the more empirical administration of digitalis will certainly disappoint the practitioner in cases of great exhaustion; and as these are the most common, the old empirical practice of stimulants with narcotics has usually been successful.

The assumption that the solid brain-case could not by possibility contain a larger amount of blood at one time than at another was the adopted notion in my earlier days. Still, clinical experience seemed to cast a doubt about it; and Dr. Kellie instituted some experiments on animals, which led to the conclusion

* This word *inanition* has been used in several places, as at p. 130, to imply weakness of the frame, and exhaustion, with deficiency of nervous influence, rather than any emptiness of vessels.

that, although the solid cranium must always contain the same volume of blood, the doubt was to be solved by the disturbance of the quantitative balance between the arterial and venous sides of the circulation. Still further clinical observation led Dr. George Burrows to doubt Kellie's deductions, and induced him, in 1843, to adopt another similar series of experiments, which led him to the conclusion that "the quantity of blood within the cranium, so far from being a constant or nearly constant quantity, is, on the contrary, as variable as in other parts of the body" (Dr. Burrows *On Disorders of the Cerebral Circulation, &c.*, 1846). The whole difficulty, however, is cleared up by Mr. Hilton, in his lectures on *Pain and Rest* (p. 17 *et seq.*), where, in illustration of the general law, that every organ in a state of activity is in a state of erethism, and that Nature has in every instance provided an adaptation of contracted vessels to the condition of rest, and of distended blood-vessels to the condition of action, he remarks:

"The completed brain being enclosed within a solid case with unyielding walls, admits of no possibility of eccentric enlargement. If parts or organs, liable to excessive or enduring function, were placed within or surrounded by solid brain, they could not enlarge, except by pressure or encroachment upon some other parts, without creating mischief;" they could not, in fact, be obedient to the general principle in physiology which I have mentioned.

This increase in dimension of the parts forming the floor of the lateral ventricles is permitted, however, towards the interior of the ventricles, by the cerebro-spinal fluid receding through the foramen

of Monro, the third ventricle, the aqueduct of Silvius, and the fourth ventricle, and thence, through the cerebro-spinal opening in the lower part of the fourth ventricle, to the base of the brain or sub-cerebral spaces, and so into the vertebral canal.

As the local hyperæmia of the blood-vessels in the interior of the organs, such as the thalamus and corpus striatum, subsides, the cerebro-spinal fluid rises into the ventricles, and makes a properly adapted pressure upon the corpus striatum and thalamus, reducing them to their size of inactivity, and sustaining them in a state of rest. Properly adapted pressure is that of the circulation, MINUS the local effect of physiological excitation in the part actively employed; the cerebro-spinal fluid, in this respect, serving the analogous purpose of the elastic capsule of the liver, kidney, and spleen.

There is an analogy between the circumstances under which trismus nascentium usually occurs, and the coma of inanition of infants (p. 130).

A state *analogous to delirium tremens* is well known by surgeons to occur after accidents and operations, which induces some to give an opiate almost uniformly after an operation; and many formerly used to administer one beforehand, as is now done with chloroform, to prevent the "shock," or exhaustion of the nervous system. This state is occasionally witnessed in hospitals in the persons of patients who have been in the habit of drinking much fermented liquor; but we must not imagine that delirium tremens, or delirium *sine febre*, comes on in those only who use stimulants freely; it will

occur with delicate, young, nervous females who scarcely taste wine or any fermented liquor; it will occur also under a variety of circumstances where morbid sensibility and over-excitement of the nervous system exists, with exhaustion, or a debilitated instead of plethoric constitution. Cases of this kind occur after parturition, from exhaustion, constituting examples of *puerperal mania*, sometimes misunderstood; in hysteria; in hypochondriasis; after apoplexy, or wounds of the head, when much depletion has been, perhaps necessarily, resorted to; after hæmorrhage, sensual exhaustion, over-study, and anxiety. It is but within forty or fifty years that delirium tremens has been recognised and described as a disease distinct from inflammatory affections of the brain requiring depletion; and though experienced surgeons knew how to treat the symptoms when they arose after accidents and operations, it is only latterly that they have been identified with delirium tremens, any more than the medical cases just alluded to.

In these cases, tonics are generally useful; and in some, stimulants with opiates are necessary to prevent collapse. In those cases where there is want of sleep, opium is generally preferable to stimulants alone, because it produces the tendency to sleep without so much increasing the force of the pulse: it may, in some instances (such as the cases after apoplexy and injuries of the head from accidents), be contra-indicated, on account of the risk of increasing local injury, and then the preparations of morphia, being unstimulating, are most valuable.

In many other instances of nervous disease besides delirium tremens and tetanus, opium opens the bowels: it will do so in diabetes, in which the increase of secretion of the kidneys is at first functional disease from sympathetic* morbid sensibility, analogous to that in hysteria, or from teething; it will do so in colica pictonum from white-lead, and in cases of colic from other sedatives. On the other hand, it is well known that it will stop the diarrhœa of morbid sensibility from sedatives, such as unripe fruit, or drugs; so that what Celsus said of venesection, we may say of opium—that it relieves obstinate costiveness as well as obstinate diarrhœa: but these useless, merely empirical, assertions of the ancients, without explanation, might lead, on the one hand, to the injurious employment of sedative antiphlogistic treatment in colic, or, on the other, of narcotic remedies in enteritis, without sufficient antiphlogistic treatment.

Many cases of mania or temporary insanity, especially in puerperal or hysteric females (p. 130), are delirium *sine febre*, and would be aggravated by depletory or sedative treatment; and the patient would either die, passing into the coma of inanition, or, when the constitution began to give way, either the necessary improvement in diet, with stimulants, might work an improvement, or a pathological change might take place, and a febrile relaxation of the capillaries of the brain change the entire character of the complaint. This, as to proximate cause, is the reverse of what I have elsewhere described as taking place

* This has been sufficiently proved by several ingenious pathological experiments.

sometimes in the *crisis* of fever. But we have not yet done with neuralgia.

"Thou canst not minister to a mind diseased?" Certainly not,—there is no such thing; say, a *brain* diseased. And here I must insist upon repudiating any allusion to that bugbear called "materialism," which is always thrown in the teeth of doctors, whether they are phrenologists or not. The *body* is *material;* and the *brain*, as a part of the body, is material; but the *soul* is *immaterial*, and the *mind* is only the *evidence* of the soul (whether in the body as we are acquainted with it, or when released from the body, in which state we are not yet acquainted with it), which is dependent on the corporeal brain for its intellectual *phenomena*. The brain is the locomotive; and if out of order, the traffic of ideas is impeded. The brain is material, but neither the soul nor its mind is material. The soul and mind exist, whether the brain be asleep or awake, paralytic or sound, raving or sensible, desponding or joyful; and when there is a "screw loose" in the material brain-machine, we do not find it so difficult of adjustment as it was before Esquirol, Conolly, and the Tukes* took the question in hand. I say, therefore, that there is no such thing as a "mind" diseased,—there may be a diseased brain.

We know that the above-named gentlemen (mad-doctors, as they have been quaintly denominated)

* Samuel Tuke, of York; and my friend Dr. Edward Francis Tuke. Their sons—Dr. Harrington Tuke, and Dr. Daniel Tuke—have worthily sustained the reputation of their fathers.

could and did often permanently cure individuals who used to be called mad, or, to the scandal of Diana, lunatic. Now, Tom Moore sings of "maids who love the moon;" who would make a scurvy return for their attachments if she robbed them of their "poor wits." And I opine that the mind has as little to do with causing insanity as the moon has; it is the brain which is diseased when the "wits are a-wandering;" for, the brain and nervous system being the machinery of the mind, when they are out of order, the phenomena of mind are abnormal, "deranged." Here I have included the nerves of the frame with the brain, because, although the brain is the part immediately implicated in "insanity," whether temporary or permanent,—whether produced by a blow on the head, a *coup de soleil*, or fever; by the shock of some dreadful event, or the slower wear and tear of harassing mental exhaustion; or by bodily ailment, as hysteria, puerperal mania, or epilepsy,—still, it is the brain which is altered in its physical state, as much as a leg or an arm which either suddenly or slowly becomes unable to perform its functions, from accident, rheumatism, or other disease.

Continued morbid action going on in the trunk of the body, by keeping up a constant injurious communication with, and impression upon, the brain through the nerves, disturbs the action of the brain, and the mind may consequently become impaired; examples of this are familiar to all medical men. Hypochondriasis is well known to us all as a morbid state of the mind, produced, as its name implies, by disease in the upper part of the abdomen; and

though this scarcely amounts to insanity, yet in severe cases it falls little short of it. It might form the boundary of the present subject; for I do not habitually encroach on the province, or, as we sometimes say, poach upon the manors, of the aforesaid gentlemen or their heirs. I content myself at present with what is, nevertheless, a not small range —the causation and symptoms of *low spirits*.

The passing shadows of depression sometimes appear and flit away like summer clouds, casting a mere momentary gloom over the *spirits*, so that the individual almost doubts the reality of the impression; at other times, they last long enough to leave a disagreeable certainty; and, again, sometimes the sensorial sky will remain clouded for the greater part of the day, or for a whole day, or for days, or weeks, or months, or years.

How often have I been consulted by persons apparently in good health—ay, and in good spirits, too, whilst in company—who have said: "I am almost ashamed to ask you what can be the matter with me, or what can be the cause of my feeling depressed, without any sensation of bodily ailment, or any untoward circumstance in worldly affairs; yet, when alone, and at particular hours, I feel unhappy without cause, or magnify trifles into causes." Happy are they who have the resolution to make this confidential communication!

A patient investigation, and sometimes a not very tedious one, will ascertain the source of these feelings; some morbid state of stomach, liver, kidneys, sexual organs, or other part, not perceptible to the patient, yet sufficiently discoverable by disturbed

functions. As the brain itself, or the heart, may be the part affected, and as it is generally known that this might be the cause of depression, it is too common for *low-spirited* persons to apprehend that they have diseased brain or heart. "Mens sana in corpore sano" —"A sound mind in a sound body"—is the chief condition for constituting happiness; but the sound mind is of by far the more consequence: for we see persons enduring years of pain without the nervous system giving way, and consequently with a cheerfulness which seems to bid defiance to suffering. This, however, happens most commonly in diseases of external parts; whilst the painless or almost imperceptible affections of the internal organs, communicating with the brain by the eighth pair of nerves (which, though not called the sympathetic nerve, is the chain of sympathies), are those which give rise to the symptoms recorded by that truthful observer, Cullen—the "languor, sadness, and fear without adequate causes," in hypochondriasis; and the "spirits variable, and changing contrary to the will" ("animus nec sponte varius et mutabilis"), in hysteria.

But besides these cases of pure hypochondriasis or hysteria, here alluded to, young persons of either sex are liable, after puberty, about the time that they are emerging from "their teens," to become the subjects of *low spirits* to an unaccountable and distressing degree; and this will occur sometimes to three or four of the same family in succession, at the same age,—at the time when, as parents say, they have not a care in the world: and, in point of fact, when physical causes lead to this state of mind, it is

rather aggravated by the circumstance of its subjects having nothing of business or family care to divert the attention,—being just at the period of transition from the occupations of school-days, and before engagement in the necessary affairs of life, which subsequently form a useful distraction. There are such cases which, by injudicious treatment, may terminate, and often have terminated, in permanent insanity, or that have recovered only to regret through life the severe steps which were taken by ill-judging relatives. Let us take,for instance, a young lady who, from the distressing headache and languor of an hysterical complaint, has become moping, morose, and irritable, unable to take food, wandering in her ideas, thin, and weak, in fact, in body and mind, and temporarily incoherent,—as any person will be when the brain is affected by fever or many other diseases, acute or chronic;—under judicious treatment of the bodily ailment, this young person will soon recover both bodily and mentally. But it used to be too often customary for the family, with the sanction of inexperienced or unskilful medical advisers, to commit such a patient to the care of the proprietor of a lunatic establishment; where, good and skilful care being taken of the health, the patient recovered in a moderate time—as she would have done at home, under the same good advice; but, observe, she was marked for life with the indelible stigma of insanity—sufficient, in many nstances, to prevent an amiable and accomplished person, most highly qualified for the duties of wife and mother, from ever becoming either. I have been consulted about several cases of this kind;

some of them upon a second attack, or recurrence of the original bodily complaint, bringing with it also the symptomatic disturbance of the mind; and have removed both in a much shorter time than when the asylum had been resorted to,—and these cases have never relapsed.

But to pursue the subject of *low spirits*. The influences of different diseases on the brain are well recorded, and notorious; as, for instance, the contrast between the effect of liver, and of lung, or other disease—the usually distressing effect of the former, and exemption of the latter. When obstruction in the liver causes the bile to get into the circulation, so as to reach the brain, it produces uniformly mental sluggishness and depression, as is evinced remarkably in even short attacks of common jaundice. Again, when the kidneys are so diseased that urea becomes circulated through the brain, it produces sluggishness, stupor, and even death. On the other hand, in tubercular consumptive disease of the lungs, as the lungs decay, the patient wastes away also,—but as there is no unnatural product conveyed to the brain, it retains its natural state to the last (with some exceptions, when there is hectic feverish delirium); and, in consequence, the patient being unconscious of any thing but weakness,—which hope leads him to expect will pass away,—serenity, in general, exists, and plans for the future are indulged in, until death.

When the brain itself is diseased, it is unnecessary to go into proofs that its functions of thought will be disturbed; sometimes alone, though frequently with

derangement or paralysis of sight, hearing, smell, taste, or motion, and, still more frequently, with *low spirits*.

It is to be hoped that the perfect *curability* of real "insanity" (a physical disease of the cineritious tissue of the brain) will every day become better understood and more generally known by the public, because the knowledge and skill of the practitioners in that department, as in every other branch of medicine, are so vastly increased; and because recovery—permanent recovery—is so frequent, that mankind will begin to lose that superstitious dread of mental derangement which existed formerly, and will understand that it is not so liable to recur as was imagined. Cases which occurred twenty, thirty, or more years back, some of which I saw under restraint in consultation, and some of which were cured under my own care, have remained perfectly well in mind up to the present time; and among them are highly talented persons, who are now fathers and mothers of families. It is always desirable, for the reasons above referred to, that temporary derangement should be kept secret; but sometimes the finances of a family cannot afford the expenses entailed by the necessary extra attendants, and separation ("isolation" of Esquirol) from the members of the family, which is often essential; under which circumstances, the management can be carried out more efficiently at an establishment;—and, in the case of male patients, less damage is sustained, as with them matters can be managed with less notoriety, and they are not obliged to wait to be asked in marriage; besides, physicians in ordinary practice cannot well spare the time necessary for cases complicated with much or prolonged

mental disturbance. It is, however, the bounden duty of every medical practitioner to weigh well the subject, before consigning a patient to a lunatic asylum. Some of the cases I have known, which lasted but a very short time in early life, and which never after relapsed, were accompanied at the time with a tendency to suicide even; and whenever this is the case, an *asylum nurse* or *attendant* ought to be employed, because ordinary domestics are not sufficiently aware of the danger, nor sufficiently on the alert to prevent mischief. It is the duty of friends and relations to inquire into and correct the cause of evident *low spirits* at all ages, in order to prevent the sufferer from resorting to laudanum, prussic acid, or leaping from the window.

When the heart is diseased, it affects the brain in various ways, according to the varieties of derangement produced in the circulation. It may act secondarily through the lungs, that is, by preventing the proper action of the air on the blood in the lungs —evinced by livid lips—whereby the brain is rendered sluggish: this is a too evident instance of physical malady, to be spoken of as mere *low spirits*. But there are nervous and other complaints of the heart which induce defect in the circulation, imperceptible externally; and the faltering supply of blood to the brain produces exhaustion and depression—*low spirits;* or in other cases, by obstruction, it induces congestion and imperfect nutrition—more especially "the dilated right side of the heart," so accurately described by Dr. Daldy.*

* *On Disease of the Right Side of the Heart,* by Thomas Mee Daldy, M.D., M.R.C.P., &c., late President of the Hunterian Society; 1866.

The stomach and intestinal canal become the source of *low spirits* by indigestion (commonly called "being bilious"), whether in reality connected with an abnormal state of the bile or not. In order to understand this, let us refer to a few ascertained and well-known facts. Irritation of the stomach and intestinal canal by worms causes sympathetic irritation (by nervous communication) in the nerves of the head and brain, itching and consequent picking of the nose, headache, and, moreover, even convulsions and fits, and *low spirits*. Indigestion causes acidity in the stomach, and headache, and *low spirits*. Indigestion without acidity, called biliousness, causes headache and *low spirits*. In these cases, however, there is not always perceptible headache, the discomfort (*malaise*) not always amounting to pain, or aching of the head,—being, in fact, not sufficient to be perceived by the patient (nevertheless, producing *low spirits*); just as the sympathetic irritation from worms is sufficient to produce epileptic fits, with temporary suspension of the intellect, without any headache or other symptom. In the preceding statement, the irritation adduced has been that caused by undigested food, or worms, on a *healthy* membrane. A similar state of head-sympathy takes place when the intestinal membranes become *diseased*, from inflammation or other cause; then, from their morbid sensibility, naturally digested food has the same effect as unnatural or undigested matters on a *sound* intestinal membrane. In many of these instances, little or no uneasiness is perceptible within the body, and the patient complains only of the head, or of *low spirits;* or perhaps of pain in

the left side or in the back,—from the nerves and *spinal cord*, as well as the *brain*, *sympathising* with the *suffering part*.

We have next to consider the *low spirits* resulting from abnormal states of the organs of reproduction, one of the heavy taxes which we pay for civilisation,—for though there are numerous cases of *low spirits* from the causes already enumerated, we must add to these the disadvantages arising from celibacy, unknown to the untutored Indian or the unsophisticated mountaineer; the deterioration of human nature by restraints, arising from fictitious wants, luxury, and refinements; the restrictions of society producing crime; and the perversion of religion thwarting the commands of God to increase and multiply: so that uneducated Mormonites and others, with little conscience or religion, retrograde into unrestrained, meretricious uncivilisation, because early marriages are incompatible with *prudence*—which means, the being able to support that style of luxury which always keeps pace with, and is the great curse of, polished society, and is perhaps the penalty of advanced civilisation.

In connection with this subject, we must refer to the trash that is written and spoken about "breeding in and in." If a family which is scrofulous, or weak-minded, or both, is met with, they may not have been breeding in and in; but if they have, that is a convenient reference and excuse, and an alleged cause of the defect: whereas, there are numbers of healthy families in which the practice prevails; for where it is a fine family, handsome and talented, it is no wonder that cousins should take a

fancy to each other. But we have one convincing proof—not to go so far back as Adam and Eve, when, of course, there was nothing but breeding in and in, to the degree which is now called incest, as that was inevitable: we can take a more recent example—the family of Israel. The whole nation of the Jews are a family of one father, breeding in and in for about 4000 years, and with the propensity still to do so in the branch families; yet where do you find such talent in literature, diplomacy, manufactures, money-getting, science, painting, sculpture, and music?—and in this I am in accord with D'Israeli and other authorities. Is there, in any nation, beauty equal to that of a lovely Jewess, such as Sir Walter Scott's ideal Rebecca, not to mention numerous real living examples? and, as to the males, many are splendid fellows, though our notions of beauty are founded on the Greek model. However, beauty is conventional; the Hindoo or the Tartar, the African or the Carib, would not prefer the face of Apollo Belvedere to their own ugly physiognomy. And in them, again, we have evidence as to the question of cerebral insanity,—it does not occur, on the average, more frequently amongst the Jews than in any European nation: this I can affirm with confidence after half a century of experience; being on terms of intimacy, both as patients and friends, with, to the best of my belief, more of the sons and daughters of Jacob than any other Gentile in England—the people who were acknowledged to be the nation most favoured of the Almighty, and of whose care they are still the objects.

It is the medical profession only which is fully

acquainted with the dependence of a large proportion of *low spirits* upon celibacy, through the thwarting of the best feelings of our nature, and trying to mould them to that calculating prudence, which becomes necessary through the worship of the golden calf of all highly civilised society; where it is as useless to struggle against it, as it would be for the fly caught in the net of the spider.

But the degree of derangement of health and *low spirits* from this cause is very unequally divided; females suffer little in comparison,—notwithstanding the preposterous assertions and treatment advocated by an author whose name will never be forgotten: he will be as immortal as Beelzebub. It is the "lords of the creation" who—as they make the laws, and, having the remedy in their own hands, neglect it—deservedly suffer most—suffer in body and in mind. But as great pains are taken to conceal both, it is the experienced physician alone who can draw back the veil from the sad picture, or describe the cruel vengeance wreaked upon males by the unprincipled quacks, who prey on those whom they can seize upon to devour, and rob them doubly; for "who takes the purse, takes trash:" but the harvest of the secret quack depends upon his not curing his patient, keeping him in his power, fleecing him, and harassing his mind to madness by threatening to "filch from him his good name;" and the victim has not even the solace, as in other misfortunes, of confiding his distress to some friendly ear, unless he break his chain, and put himself into the hands of an honourable medical adviser.

Vicious propensities indulged in at an early age lay the foundation for debility of body and mind—often exaggerated, however, especially by infamous quacks —but which it sometimes calls for the utmost exertion of skill and experience to counteract,—and the *low spirits* resulting therefrom often more decidedly leads to a state of celibacy than the vows of a priest.

We have here considered most of the circumstances connected with the organs of the body which induce *low spirits*, and we may now take a review of the modes of living which act upon the mind. One agent is fatigue. Nothing is better for the health and spirits than exercise, but that ought to be kept within the bounds of fatigue. Habit and practice will enable most persons to go through great bodily exertion in riding, walking, rowing, &c.; and whilst in health, men suffer little from over-fatigue; but if they are naturally feeble or out of health, exertion enfeebles still more, and at the same time *depresses the spirits:* a healthy, strong man is not damaged by occasional over-fatigue; he sleeps it off, or recovers after two or three days' rest. But it is different with females; for, though they cannot—and they ought not to—dispense with regular exercise, a long, over-fatiguing walk may leave injurious consequences throughout life, by exhausting the lumbar and sacral nerves, and producing derangements of the uterine system, which will bring in their train more or less of hysterical symptoms and *low spirits*.

After exercise comes the question of diet; and

as it is unnecessary here to discuss the subject of food, we may confine ourselves to fermented liquors and tea and coffee.

The word wine must be understood to represent generally all fermented liquors which intoxicate if taken in excess; beer, and malt spirits mixed with water, being the substitutes for wine in those countries where the grape does not grow.

Fermented liquor is not necessary to all persons; but I am convinced that in this variable, rather cold and damp, climate, during the winter half of the year, it is indispensable to some constitutions; and I have induced not a few persons, "teetotalers," who practised total abstinence, to take a moderate quantity daily, as a medicinal agent, with such good results, that they have not been able to leave it off again, except, perhaps, in summer time; others, of stronger frame, could return to their absolute "teetotalism" when they recovered their health. I have found many in the southern parts of Europe who did not like wine, and did not drink or require it.

But our question is, how wine produces *low spirits?* It will be beneficial in the quantity which agrees with the health, and no person can lay down a rule as to the number of glasses or bottles per diem which comes under that category. But whenever it produces a degree of feverishness, however slight, evinced by thirst in the night, the spirits will be lowered the next morning, and a want will be felt until luncheon or dinner time; then, if less be taken than on the previous day, so as not to produce feverishness, the spirits will improve, provided some other cause, physical or moral,—such as visceral or other

disease, enumerated before,—does not cause depression. It is difficult for the individual to know what is feverishness; but we may go so far as to state, that waking with a dry mouth, and hot, dry hands, is an evidence of it. Generally speaking, any chronic complaint of the viscera, as it is usually accompanied by latent feverishness, causes wine to be badly borne; but, as was said, the quantity consistent with health is most variable and uncertain: different persons drink, habitually, a couple of glasses, half a pint or a pint, a bottle or two bottles of wine, or an equivalent of beer or spirits, daily; not many go beyond that in these days. With strong individuals, who can take plenty of food, wine does not seem to disagree, and is taken for pleasure, though it does no good; and in the olden time the quantity habitually drunk used to be very great. One remarkable instance of capability seems to have been of service in the sister kingdom; as a certain gallant general, sent there as Commander-in-Chief, drove drinking very much out of fashion by putting all competitors "under the table:" up to his time there had been an undecided rivalry as to who had the hardest head; but as he conquered all, they gave up the game in disgust. This individual lived to be an old man, with excellent health; and he died, not of disease, but in consequence of an accident—hydrophobia; when it was more wittily than humanely remarked, that he had shown signs of *hydro*phobia all his life. Hundreds and thousands drink excessively without apparently suffering, and, therefore, we can give no test of its detriment, except that of feeling out of health, or *in low spirits;* the

reason for which, it would be best to ask of the medical attendant. It would be well if this slight warning were attended to in many cases before excess brings on serious disease.

It is always worthy of attention when it is found that a very moderate quantity of wine disagrees, for this can only depend upon some incipient, though still unperceived, visceral disease; and it is very unsafe, for any length of time, to avoid the inconvenience by great abstemiousness alone, without medical advice, as the constitution may in this way be injuriously lowered.

Many persons are in the habit of wasting a large quantity of wine upon themselves without becoming in the slightest degree intoxicated—and, so far, they are not offensive; but, besides the chance of this habit inducing disease of the liver or kidneys, the great danger is, that if, from any accident or illness, they become indispensably deprived of stimulus, they then run the risk of falling into that distressing and dangerous state of depression called delirium tremens—one of the worst phases of *low spirits*. There is scarcely an instance of a person who has once had delirium tremens being weaned from drunkenness: of this, there are numerous notorious examples; because the brain has been so much weakened by the disease, that, however rationally disgusted with himself for the bad habit the patient may be, his resolution is too much weakened by intemperance to resist the temptation of drink.

Notwithstanding the above assertion, the author *did* once actually cure a patient addicted to this vice

by "a fluke." He was called in consultation with two medical men about a patient insane from dipsomania (the modern polite name for drunkenness); and during the discussion of the patient's case, he made the above assertion, at which he thought the two looked rather more serious than was necessary. However, within a few days, one of them called to consult him, confessing the fact of his own drinking habits —which was in itself an evidence that he had still some brains left—and he was *cured*. The other practitioner and his patient did not live long. The owner of the asylum, to which the dipsomaniac was necessarily transferred, told me that in the evening, when the patient, the latter surgeon, and the attendant arrived, they were all three very drunk!

Tea is an article of diet now universal in these realms, and one which, though unheeded, produces a decided influence on the animal economy. (I am not here speaking of the weak tea used by the multitude, which is little else than milk and water sweetened, and slightly flavoured by tea, but of the strong tea used by the higher classes.) Until of late years, tea was sold on the Continent by the apothecary, and used only as a medicine, being taken as the exact opposite to wine, that is, as a sedative agent,—as, for instance, to remove a feverish cold, by lowering the pulse and relaxing the skin. Wine, as a matter of healthy diet, tends to promote sleep; tea, as is well known, tends to keep awake even those persons who are accustomed to it, and, in a remarkable and distressing degree, those who are not. Much of what was said of

wine holds good as to its opposite—tea; thus strong, healthy persons can use it as part of their diet, whilst those who are weak are depressed by it: its action is opposed to wine, as mentioned when discussing sedatives,—that is, it counteracts the sleepiness produced by wine; but, in one respect, the same result follows—that of improving the spirits temporarily, and tending to induce subsequent depression. Wine creates hilarity; tea, serenity—"it cheers, but not inebriates." Wine excites the thoughts, but does not add to their clearness; whereas tea, at the same time that it keeps the brain awake, adds to the distinctness of perceptions, by the tone communicated. But this has its limits; for as tea debilitates the pulse and circulation, the mind soon becomes fatigued, and too much tea will bring on faintness, which is incompatible with mental exertion; so that, with wine, the excited thoughts may become muddled —with tea, excited and clear, but weakened, and eventually so weakened as to cease to be clear, *i. e.* indistinct. Thus, I have known a student to be disappointed, who, having sat down for a quiet reading-evening, and having taken strong tea in order to induce wakefulness, became soon exhausted, and so too weak to apply the mind. Thus Nature will have her way: "*Expellas furcâ, tamen usque recurret.*" Tea always produces, at first, this clear and tranquil tone of the intellect, but tends to induce the secondary depression of exhaustion, unless the person be so accustomed to it that it does not prevent sound sleep, and unless he take abundant food; but even then the tendency is to *low spirits*. Tea

—or coffee, which is similar in its action—will for the time somewhat counteract wine; but the secondary effects of both are depressing — wine, however, only relatively and secondarily, if taken too freely, or in an unsound state of health; tea, absolutely and directly, though often in an imperceptible degree,—just as there may not be wind enough to move the thistle-down on the earth; but if you raise it and let it go, you will see which way is the tendency of the wind, if it were strong enough to make itself felt. Tea is an agent of considerable power, and may be used with medicinal* views as well as dietetically; but here we have no occasion to consider it further than as it *depresses the spirits.*

Tobacco—*chewing, snuff, smoking.* Pugh! nauseous! delicious!—stinking! fragrant!—poisonous! wholesome! There must surely be some mistake; it cannot be the same thing to which these opposite

* There have been communications in the journals lately, recommending tea in febrile disease as a *novelty;* one of those *réchauffés* which are frequently of use to those who do not read much besides the journals. Dr. E. Percival almost exhausted the subject in a treatise sixty years since, and forty years ago one of my clinical clerks gave a practical illustration of it. Some of his fellow-students thought I attributed too much medicinal power to a mere article of diet (page 122). He invited three of them to spend the evening with him, and have a rubber of whist: he began by giving them some very strong green tea, without any thing to eat with it; before long, they were all uncomfortable, and one was actually sick. This sedative effect was quickly removed by a glass or two of sherry. Q.E.D. Thus, tea may be substituted for saline antimonial in fever, as recommended in one of the journals.

epithets are applied, with perfect sincerity on both sides. Forgive me, gentle reader, a momentary egotism, that I may prove myself a credible witness. I was, when an undergraduate, an inveterate smoker, and withal contributed to the revenue by taking snuff also,—the latter above-board, the snuff-box being at the period rather a fashionable dandyism; but the smoking "on the sly," as being at that time thought a vulgar habit,—the practice being confined in this country, ostensibly, to the lower orders; so that on going to the Continent, immediately at the end of the Peninsular War, we were astonished to see gentlemen smoking in broad daylight. At that period English gentlemen smoked only under peculiar circumstances: the sottish dulness of the lower classes being attributed to their filthy habits of smoking and drinking. Smoking was not permitted to the servants in gentlemen's houses; a footman would have lost his situation if detected in such a practice, much more if he had smoked behind his mistress's or master's carriage, as I have seen one do! Indeed, the domestic of those days was too genteel; he aped his master, as he does still, and would not be guilty of the habits of "low people." Two circumstances led to the extension amongst gentlemen of the custom of smoking: one was, the return of our gallant officers, who had found solace from indulgence in it during the war in the Peninsula; the other was yachting,—this was the way in which I learned a habit—long since abandoned—which, however tolerable in the open air, is disgusting in the house.

After smoking in a room, it is utterly impossible

to divest the clothes and furniture of the odour; and even after changing every article of dress, the hair will retain more than, as Lady Macbeth says, "all the perfumes of Arabia could sweeten." Then, the stale smoke in the clothes on the next day is disagreeable even to the smoker himself, as is the smell of a cold pipe: what, then, must be the disgusting effect of the smell of a smoker's clothes, if he be sitting down beside a delicate female at dinner, or be close to her in a waltz or a polka! I have seen a young lady faint away from the effluvia, after waltzing with a partner redolent of tobacco-smoke; and I have heard another young lady say, with a simper, rather than part with her odoriferous partner, that she did not dislike the smell of smoke,—though her white lips and the expression of her face showed that she was more than half sickened by it at the moment.

But what has this to do with our theme of *low spirits?* Now comes the most difficult part of my task, because I have a large proportion of *the profession* against me. "Quod volumus, facile credimus"—"What we wish, we easily believe;" and as they wish to smoke, and do smoke, and do not like to give it up,—and as, like other narcotics, and drunkenness, tobacco has a tendency to carry the brain with it,—it weakens the argumentative force against itself, and false reasoning is brought in aid of the besetting infatuation.

Even if gentlemen would persist in being nuisances, they will not, if they have any power of resisting temptation, damage their own health and comfort, when they understand how the matter really stands.

I despair of doing good, however, unless I can convince my own profession, who are the advisers of the public; and it is to them that every thing I have written in this work is addressed. But will they, even when convinced, have themselves strength of mind to relinquish a most *fascinating* habit? are there not some of them who know the injurious effects of *drinking* too much, who yet cannot give it up?—"Poor human nature!"

Almost every person knows that "*my first cigar*" (so well portrayed in the popular caricature) produces sickness. How lucky for those who have, on the first trial, *had enough of it!* But mere boys, almost children, persevere, out of bravado, that they may *be able to do it;* and then the vile, intoxicating vice takes hold. The intoxicating effect goes off in a short time, and then by degrees the unconquerable wish is formed to renew it, just like dram-drinking, or taking laudanum, or opium-eating; but it must be renewed more frequently in order to satisfy the feelings,—the tobacco tending to produce nausea, a weak action of the heart, and a faint sensation, or at least a feeling of *wanting something*,—after the original comfortable sensation, which lasts for but a short time, has gone off,—like that irresistible craving of the tippling dram-drinker to indulge his propensities; and out comes the cigar-case or pipe of those who are not prevented by business, or society, or some other cause, from smoking all day long. In some of the German counting-houses in the City, in the Turkish Embassy, and in various places where there is no etiquette or other restraint to prevent it, the smoking is perpetual. Even gentlemen are

now seldom seen without a cigar in their mouths. But I have not lost the hope that we may get rid of this bad habit, as we have of the *cacoëthes venæsectionis*.

The sickness produced by the "first cigar" is the first stage of the *poisonous* effect of tobacco: every medical man knows that it can produce and once produced *death*, when used in too large a quantity for strangulated hernia. Well, it is answered, so is opium a poison; and yet people will take it to *raise their spirits*, and make them comfortable. But all the world has for a long time been satisfied that opium-eating is injurious; and therefore but a small proportion of mankind give way to taking opium or laudanum, even a less number than yield to drunkenness. Yet some, even medical men, are opium-eaters or laudanum-drinkers; one of the cleverest and most agreeable men in the profession (alluded to at page 183), lived to an advanced age, though an opium-eater, without suffering much from it except the perpetuation of *low spirits* in the intervals.

One of the fallacies respecting tobacco arises from the circumstance that it has not the same constipating effect upon the bowels as opium. Nevertheless, it is a sedative narcotic, which depresses the vital powers; and, however habit may enable persons to resist the poison, poison it is; and its tendency, great or small, is debilitating. Active young men, in health, who eat and drink sufficiently, can bear up against it; but many may be seen to be suffering its baneful influence: and as they grow weaker, they become more in-

fatuated, and smoke the more, from the constantly recurring feeling of wanting the gratification; and you see them crawling about, languid in body and in mind,—not desiring society, having become unequal to it, more especially female society; for tobacco is a most favourable aid to celibacy. Smokers will deny this to be the case: *they* are not always conscious of it. Tamen, audi alter*am*. *Apropos*, one young friend of mine, who had got to sixteen cigars a day, became so thin and debilitated, with a constant, purely nervous, cough, that his friends all thought he was going into a consumption. After trying many arguments in vain, as he was a married man, I suggested this anaphrodisiac property. Whether he was conscious of the truth or not, he reduced his cigars to about a couple a day, recovered his flesh, and lost his cough.

As said above, those who are robust can bear a great deal; but tobacco is a decided diminisher of all appetites. Every one who has read *Robinson Crusoe* knows that tobacco allays hunger, as, in fact, is the case with opium, and all narcotics, and also with drunkenness. Smokers generally have bad appetites and *low spirits*.

Excess of every kind, as producing a feeling of exhaustion, *lowers the spirits:* even too much sleep; for though the healthy individual rises fresh and elastic after a moderate allowance of sleep, say about seven hours, a protracted indulgence of repose in bed, by deferring the time of taking food, and diminishing the circulation of the blood (at the same time that the horizontal position favours congestion of the brain), induces languor and *low spirits*.

We find that *agues* and *fevers* of all kinds are accompanied by *low spirits*, from the depression of the power of the brain; we have seen that various bodily ailments, by inducing a similar state in the brain, do the same; and that errors in the mode of life produce a like result. And thus we have the clue to the detection and correction of one of the most general and distressing complaints which "flesh is heir to." Persons who suffer but slightly and occasionally do not think seriously on the subject; but those who have felt the weight of woe produced by aggravated *low spirits* will be grateful to their medical friend for relief, and I shall be happy if I have assisted him in their diagnosis and treatment.

It has been impossible, in treating this subject, to avoid making some allusions to insanity; and it may be interesting to my readers to add some observations upon the nature of that disease—one of a decidedly *physical* and curable nature, when stripped of the absurdities which have arisen from taking a *meta*physical view of the subject. The ancients knew it to be a disease of the substantial brain, curable by medicine, as evinced in the description of an individual so mad as to have "tribus Anticyris caput insanabile." In head-affections, as in every instance of disease, we must refer to the physiology of the part affected; —and ignorance of one part of the *physiology of the brain* greatly retarded the proper knowledge and treatment of insanity.

Physiologists had long been well acquainted with the connection of the nerves with various parts, and aware of their communication with the brain as sub-

servient to sensation and motion; but this is evident, also, in a monkey, a dog, or a cat; and all the ingenuity of anatomists went no farther than physical physiology: this was enough for physical disease; this helped in the straightening of crooked feet or squinting eyes, relieving the diseased lungs, heart, or kidneys,—nay, more, it led to the cure of disease of the brain itself, as connected with sensation and motion, paralysis and apoplexy. It was, however, manifest that there was something still to be elucidated; we had got no further than the monkey functions; we could not yet account for the undiminished energy and powers in the mental faculties, in those cases in which the brain retained the full functions of mind, though half the body were dead (paralytic); while, on the contrary, in other cases, the brain had lost its mental powers, though the animal functions of all the limbs were as perfect as ever.

It had long been established, that the white nervous filaments were the conductors of sensation to the brain from the extremities, and of volition to the extremities from the mass of brain within the skull—the *mass* of the brain; for no attempt was made to distinguish between gray or white tissues, except that the gray was evidently the more vascular, and so far the nutrient part,—nor, beyond dreams and guesses, to distinguish any peculiarity of function, except such as that the pineal gland was the seat of the soul, or other equally sage speculations or hypotheses. It was afterwards, however, observed that, though the white nerve-filaments were not coated with an equally strong neurilemma

within the skull as in other parts, because *there* it was not required to support and protect them, yet that the white part of the brain nevertheless consisted of these filaments, each with an infinitely finer covering, laid so close together as to *seem* to form a homogeneous mass, though they still preserved their individuality; and that these filaments terminated when they came to the cineritious—or gray vascular substance, of which, to a certain depth, the convoluted surface of the brain consists. And it is clear that this vascular cineritious part secretes the nervous influence with which the filaments are supplied, as much as the kidney secretes the fluid which is supplied to the ureters. And it is evident, also, that the *cineritious* part, chiefly occupying the superficial *convolutions* of the brain, is the *instrument of mind;* for, the white filamentous parts being *only the conductors* of will and sensation (the electric-telegraph wires), the *will* must come from the *cineritious* part, and the sensation go to it: and we find that the *mind* is developed or otherwise in the *proportion* of the *gray* matter; for in the defective heads of idiots, where the cineritious convolutions are scanty, the mind is deficient. We find, also, that certain *parts* of the mass within the skull have *peculiar properties.* Thus, the back part of the brain and the cerebellum direct the harmony of muscular movement, and perhaps influence the faculties connected with procreation; and the ancient sculptors, who were accurate observers, without speculating on causes, uniformly represent Hercules—who was no great wit, though physically powerful—with a large preponderance of the back part of the head: while

the intellectual and amative Apollo has a much more expanded and beautiful forehead, as well as a due proportion of the seat of the animal propensities.

It was not till the end of the last century that it became suspected by Gall that propensities might be traced to even more definite seats than the mere back and front of the head, or that there might be some parts of the brain dedicated to particular talents or dispositions,—such as music, painting, sculpture, machinery, mathematics, poetry, jurisprudence, love, or war. It was observed that a man who had great talent as a *judge*, with a head quite as large as that of Beethoven or Rossini, did not care for *music*, and could scarcely distinguish one tune from another; that a painter, who *coloured* exquisitely, could scarcely ever draw the limbs of proportionate size, or *vice versâ;* that one individual could learn the multiplication-table, and accomplish addition or subtraction, but, to the day of his death, at the age of thirty, could not master an easy sum in division, much less in the rule of three; whilst, on the other hand, a youth at the age of ten or twelve years could answer a question in arithmetic in a few seconds, impromptu, which would take a university professor of mathematics ten minutes, or more, with the aid of pencil and paper: yet these two individuals, in the ordinary functions of life, and in shrewdness,—barring arithmetic,—were very much on an equality. Again, it was noticed, that of some public singers, who have delightful voices, one can never be taught to sing in time, another is constantly getting out of tune; and it has been remarked of Bellini, the most rich and varied of

melodists, that his orchestral arrangements are far behind those of Rossini. So two men will make great and constant and successful exertions to get wealth: such a man as Peabody will part with it in acts of munificence to others; whilst another will give nothing away, and almost starve himself, and even his child, through avarice.

Again, of men equally well educated, some will gain wealth by the crooked paths of chicanery—some by open, fair dealing—whether their pursuits be professional or commercial. One man, not satisfied with overcoming his enemy, will kill him; another spares a fallen foe. One man is respectful to his superiors, deferential to his equals, and civil to his inferiors; whilst his neighbour is insolent to every body, unless restrained by strong motives. One man is always dull and desponding, even in prosperity; another, under misfortunes, gay and elastic. We do not find, of these opposite characters, that the head of one man is larger than that of the other; the difference, then, does not depend upon the mere *size* of the brain. It may be said, that difference of circumstances of *education* produces the different result; but not so: we see children educated by *the same* parents and tutors—see six brothers, or, more certainly, perhaps, six sisters, as being more directly under the eye and guidance of one individual, the mother; every one of the six will show some marked distinction of character, on one or more points of religion, sentiments, or taste. And so far from education deciding the character, we see youths brought up, according to parental selection, to some profession or business, who, as soon as they

are of an age to think for themselves, adopt an entirely different pursuit, whether it be divinity, law, or medicine, war, engineering, commerce, or the fine arts: has any one ever thought or asserted that the mere bulk of the brain would account for this? Nor, in fact, does the bulk of the brain, if it be of a fair average size in proportion to the stature, cause any difference. It is only if unnaturally *deficient* in the proportion of the *cineritious* covering of the convolutions that the individual is *weak*, or even idiotic. Some later physiologists consider that they have made out that the *quality* of the mind depends upon the proportions of the convolutions of the brain to each other—that a brain of a certain form produces a certain turn of mind and disposition; and that these agreements of dispositions with forms are constant. This proposition, whether true or not, has been thought by some excellent men to be dangerous, as leading to materialism and non-responsibility for crime. I deny that there is any such danger. With those who have a steadfast Christian faith, there is no fear; and with others, it will neither mend nor mar the position. I repeat that the soul, or spirit, is distinct from the material of the brain and body, though it can *express* itself only through their means, by operations of mind—mind being the manifestation of soul. I entirely avoid the expression "psychology," as it leads to the subject being confused with "materialism."

When an individual is stunned by a blow on the head, or is struck down by an apoplectic fit, the soul lies dormant—there is no expression of mind—

and if the shock be sufficient to destroy the *animal* life, the released *spirit* takes flight; otherwise, as the frame recovers, the operations of mind return, the eye rekindling in expression,—showing that the *spirit* is there still.

The spirit, or soul, is in complete abeyance during a fainting fit of a few minutes; but upon the revival of the bodily sensations, it is capable of displaying the qualities of the soul—the phenomena of mind. Sometimes, however, the fainting fit ends in death, and the spirit has departed.

Again, a great deal of ingenious reasoning has been expended upon the question of the responsibility of insane persons, without either our lawyers or metaphysicians having yet come to any clear understanding on the subject; not from any denial that a really insane person is irresponsible, but from the difficulty of deciding what is insanity: one party declaring that every man is more or less mad, and the other insisting that madmen should be as capable of self-restraint as the sane, because knowing right from wrong. To a person who has any experience on the subject, this is too glaringly false to require argument in confutation; though it has afforded abundant scope for the ingenuity of the bar, and for contradictory decisions of judges, from the time of Sir Mathew Hale to the present. And sufficient consequence is not attached to a person being quite mad upon one point, when it is found that he reasons clearly on nearly every other, if not on every other, subject. No person, who holds the old metaphysical notion of the faculties of the mind being jumbled up in the brain like plums

in a pudding, can understand how this happens. But by those who consider that certain parts of the brain are the seat of certain faculties and propensities, it can be understood that one part may be in a state of disease, whether inflammatory or otherwise, and its propensity, in consequence, either excited or diminished in an unnatural degree. An individual may have great powers of music, painting, or arithmetic, good-nature, courage, or gaiety, if the part of the brain which supplies those ideas be full, and *vice versâ:* and although, when the parts of the brain are only moderately sufficient, education can do much in improving special faculties, yet they never attain the power of those which were originally fully developed, any more than you could make a Cerito or a Perrot of a child born with weak legs, or get a man with feeble arms to wield a sledge-hammer with due effect.

The ancients understood empirically that "Non omnia possumus omnes"—that individuals ought to follow those pursuits for which they are adapted by nature; but the modern system pretends to improve upon that adage, and now a man with several sons puts them to such professions as he can find for each at the successive dates of their adolescence; and often the arrangement is so unfortunate as to be the cause of *low spirits* in the individual, who is besides taunted with the "laudant diversa sequentes," as if he had been himself in fault.

If there were not some connection of this kind between the parts of the brain and certain faculties, we might, on the plum-pudding system, cultivate *any* faculty in a clever individual: and I need not

say that it is very clear this is not possible, beyond the attainment of a certain *competency*, but not *proficiency;* as is well known to those who have charge of the education of youth: for instance, how different is the power of attaining classics, mathematics, history, or engineering! Otherwise, why is it that there have been surgeons, with the most intellectual heads, clumsy in manipulation; whilst some of the most adroit operators had little skill in treatment; though these men may have been educated by the same masters, in the same school of surgery? But these, as being negative assertions, are not so evident as the proofs of bent or disposition. "Poëta nascitur, non fit." Could any thing have prevented Horace, Anacreon, Byron, or Scott from versifying? could any instruction, or any effort on their own parts, make some of our talented divines or barristers write a respectable ode? Again, look at the strong propensities evinced in what are called the accomplishments of the fine arts and *belles lettres:* a youth who has been hard-worked at school, whose "res angusta domi" keeps him hard at work at college, and in after life in his profession, will snatch hours from his repose, that he may cultivate drawing, music, poetry, sculpture, natural history, or astronomy: in which he will make such proficiency, as to rival Professors of those studies. And we see men with the distinction of F.R.S., of various professions and pursuits, who are amateurs of some other art or science besides their own: *e.g.* Sir James South, surgeon, and Bailey, stock-broker — astronomy; Gassiot, wine-merchant — chemistry; Bowerbank, distiller — geology; Grove, barrister — physical science;

Sir Henry Thompson, surgeon—painting; Benjamin Babington, physician — sculpture; myself — gem-engraving; and we might extend the list.

It must be evident to the reader that the author has been lately writing, to some extent, as a phrenologist; but he is not one—neither could he make a map of the head, or point out the "organs," though he has a general notion of their alleged positions. If he were to attempt it, he would make all sorts of mistakes, and bring discredit and ridicule on a most interesting and valuable branch of science,—as happened in the instance of a young man who was an assistant, and almost a pupil, of Spurzheim's; he was industrious and energetic, but, unfortunately, was not himself possessed of the organs necessary for the examination and description of a head, so as to enable him to state accurately its organs, and thence deduce a character. This was well done, in a rough though tolerably accurate way, by the illiterate, vulgar Deville, who did possess the organisation necessary for their ascertainment; but then, when he had done so, he was deficient in the intellectual powers whereby to calculate and combine the probable result in forming a character, and hence often failed in the ultimate scope and object of that which he attempted and for which he had been consulted. Spurzheim's pupil failed still more, for he had not even the power of ascertaining thoroughly the mere organs, much less of making out a character; but, being possessed of considerable activity and vanity (speaking in common, not phrenological, language),

he was perpetually volunteering his opinions, and bringing ridicule upon himself and his science by his assertions about disposition, which his hearers, from personal knowledge of the individual under examination, knew to be unfounded. Having been, from his intimacy with Spurzheim, thrown much in the way of those who began to take some interest in the subject, he did much mischief to the cause of phrenology. I have named Spurzheim, because he was much more known in England, from his long residence amongst us, than his teacher, Gall, who was little known here personally. Those who have not paid any attention to the subject can scarcely be aware of the absurdities broached by smatterers in phrenology, when they attempt descriptions of character.

This is not the case with my friend Doctor Giovanni Fossati, who has been established in Paris for half a century—a most talented and skilful physician, and one of the best and kindest of men—the translator and illustrator of the *Manual of Phrenology* of Combe. He was and is idolised by his compatriots for his unceasing efforts to relieve the miseries of his suffering expatriated countrymen. The crash of Solferino set them free; and now "Othello's occupation's gone"—that is, his humane occupation, not his phrenological; for he has established the science at Milan.

When Gall settled in Paris, Fossati lived, studied, and worked with him in that gigantic undertaking, the *New Physiology of the Brain*—miscalled "new;" there was not one previously existing deserving the name.

I once heard Fossati describe the characters of four children, referring to their mother, who confirmed all he said. The youngest was not quite two years old; yet he was able, on that young head, to mark out and give the value of the organs; he especially remarked one peculiarity of character, which, he said, would last through life—and I can vouch for the truth of his prognosis in that case, which was as correct in the other three. When I asked him to account for our friend Vincenzo Bellini not writing overtures to his operas, his answer was, "The next time you see him, you may remark how his organs connected with music are developed —time, tune, ideality, imagination—every thing except constructiveness (which was so large in Mozart and Beethoven); hence he has a difficulty in constructing or writing concerted music, and therefore is gone to work it up in Germany, where they are such great instrumental composers." Alas, Bellini did not live to return; and we must enjoy his exquisite melodies in *Norma* or the *Puritani* as well as we can without an overture, or, if we must have one, borrow it from *William Tell*, or some other opera.

At the introduction of the new science of phrenology, nothing led to so many discordant altercations as the subject of music, which ought to be all harmonious.

The first *musical* organ discovered was *tune*, which the canary-bird has, although not a proficient on the pianoforte. This prime *organ of music*, which is very conspicuous in the temple, was by some thought the one thing needful; but

the contradiction arose, that A., with a great "bump of music," as the organ of tune used to be called at first, can neither sing nor play: true; for where are the organs of time, space, and number, all of which are so necessary to music? The handsome Favanti came out at the Opera with a most delicious warbling voice, and delighted those who, like herself, had not good ears for time or intonation; but she made a *fiasco*, and, if she had persevered, would have been hissed by the *habitués*.

So much for phrenology, which is the only key to properly understanding the mind. With your leave, gentle reader, one word more, that may illustrate the first principle taught me by my dear fellow-student and faithful friend through life, Edward Tuke. It is perfectly well established, that the *exercise* of organs, whether of classics, science, arts, manufacture, preaching, or fighting, will *increase* and *strengthen* them; hence Tuke's well-reasoned first principle of treatment of the insane—not to touch upon the subject of the delusion, but to let it die out, working any other subject of pleasure or business. This exactly confirms the principle of phrenology, that the more you exercise any organ, the more you increase its activity. Following the same idea, Sir Mathew Hale says: "A man may allow his imagination to dwell upon an idea until it acquires an unhealthy ascendency over his intellect." The same learned judge speaks also of the "insanity of bad habits." I recollect on one occasion seeing Tuke with a new patient, who was telling him an extraordinary farrago of incredible nonsense, all which Tuke appeared to believe as

Gospel,—and he afterwards explained his doing so, for the reason which I have here adapted to phrenology. In this patient, I may mention, as in other mental cases, there was distinctly bodily ailment to be cured; for in all there must be some derangement of liver, uterus, or other organ of the body, or sometimes of the head itself (as chronic arachnitis), which requires to be set right, in order to cure that morbid sympathy of the brain, miscalled the "mind."

I cannot dismiss the subject of mental derangement without quoting a description of monomania by my friend's son, the present Dr. Tuke; his paper bears upon a point which I have touched upon—the responsibility of the insane. Dr. Tuke recognises entirely the distinction I have drawn, and in the diagnosis of insanity dwells, as I have done, upon the necessity of demonstrating the existence of physical disease.

*On Monomania, and its relation to the Civil and Criminal Law.** By HARRINGTON TUKE, M.D., Hon. Secretary to the Medico-Psychological Association.

"Mr. President and Gentlemen,—The fact of my having been frequently summoned as a medical witness in the civil and criminal courts of justice, in cases in which monomania has been alleged to exist, and the examination of the evidence in two recent and important cases of disputed wills, induce me to review the present practice of the courts in relation to monomania, and to attempt a concise description of this form of disease for consideration and discussion.

"I believe that much misapprehension has arisen, and much mischief has ensued, in consequence of some medical writers entirely ignoring, and others varying in their acceptation of, the

* Read at the annual meeting of the Medico-Psychological Association, held at the Royal College of Physicians, July 31st, 1867, under the presidency of Dr. Lockhart Robertson.—*Lancet*, Sept. 28, 1867.

well-known term 'monomania,' which, although of recent date, is constantly used by our law-writers, and has become ingrafted in the popular language of all the great countries of Europe.

"We owe the first introduction of the word 'monomania' to Esquirol; and, although it is interesting to trace the process of reasoning by which he arrived at the necessity of a new term to supersede 'melancholia,' yet we must recognise it as unfortunate that he should have coined one so etymologically incorrect, and so much at variance with the true description of the malady he intended to define.

"The ancient physicians divided the insane into two great divisions: from the leading symptoms presented by the frenzied and distraught, they called one form of disorder *mania;* from a belief as to their exciting cause, they classed all other forms of insanity under the one generic name—*melancholia.* The division thus made by these acute observers, although erroneous pathologists, is exactly equivalent to describing the disease as constituting a complete or a partial insanity, and in that sense the words were understood. It is not necessary to detain you with any attempt at proving this to have been the case; but the instance of monomania familiar to us all as mentioned by Horace, and the forms of unsoundness of mind which Aretæus has described, demonstrate that melancholia was the term applied to those forms of insanity in which the patient was still to some extent in the possession of his reasoning power. In later years, the term melancholia became significant of the existence of gloomy and distressful impressions, and in this restricted sense it is employed by Celsus, who does not, however, give any name to the remaining forms of melancholia, or reasoning insanity, thus deprived of their distinctive title. Esquirol, in his nomenclature of mental disorders, adopted the division of Celsus, and divided melancholia, as that writer had done, into two principal divisions. The one he called lypemania, the insanity of grief, the *atrabilis,* or true melancholia of Celsus; for the second he ventured to do that from which Celsus shrank, and coined the new word 'monomania.'

"The mischief done by this ill-chosen word became almost immediately apparent; and Esquirol himself, with the vanity of a neologist, in a note to one of the later editions of his work, drew attention to its first development, without noticing the

error he had himself induced. He says, 'The French Academy have done me the honour to adopt this word (monomania) into their dictionary.' He does not say that they define it as describing a disease in which one delusion only is present—translating, in fact, *monomania*, but of course being in utter ignorance that such a disease is one which may be theoretically possible, but, as far as I know, has never yet been seen, and is certainly not stated to exist, even by the inventor of the term. On the authority of the French Academy, the word monomania, however, became popularised, and has since been freely used as implying the existence of a delusion upon one subject. I speak in the presence of many of the first and most experienced psychologists of Great Britain; and I believe they will concur with me in the opinion that such a monomania is practically an unknown malady. Esquirol himself is careful to define monomania in a sense entirely subversive of its etymological meaning; he describes it as involving *one or a limited number of delusions;* and, with further inconsistency, he implies that these delusions must be all of a cheerful character, although there can be no reason why monomania, under his own definition, should not involve the most sad and depressing delusions. The American writer, Dr. Rush, has appreciated this difficulty, and has divided partial insanity into two divisions: to the first of these he has given the far more distinctive appellation of *tristimania*, marked by sad delusions; the second he calls *amenomania*, characterised by lively and cheerful excitement. The more etymologically correct nomenclature of Rush is forgotten, the *lypemania* of Esquirol absolutely ignored; but *monomania* is still in general acceptance, although it expresses a disease that does not exist, and translated literally can only lead to error. It is not surprising, then, to find that many of our writers do not employ it at all; that it is not found in our records or case-books; that some, as our late President, Mr. Commissioner Brown, define it as an insanity embracing a group of symptoms arising from disorder of some special faculty of the brain; that others confuse it with moral insanity; and that judges, lawyers, and juries, find themselves perplexed by the use of a term by medical men which means so much more than its etymological signification, so very much more than its popular acceptation. I would specially insist upon the importance of this

last error. There is no greater mistake that juries or judges can fall into, than imagining that monomania in a patient can exist, and at the same time perfect sanity upon other subjects can be safely assumed; and yet this error is the most common of all.

"A purist in language must of course decline to use the word monomania as meaning any thing else than a belief in a single delusion; but as monomania has become an acknowledged word, and new terms in science are not often useful, it will be well to retain it, only assigning it a wider signification. I attempt a definition of monomania that may accomplish this purpose, in the hope of eliciting from some of the many psychological physicians I see around me some suggestion that may render my definition less imperfect, and as much as possible in accordance with our individual experience and observation.

"*Monomania is a disease of the brain in which delusions, or erroneous impressions, with morbid states of feeling, exist on one or more subjects, while on others the intellectual powers remain apparently uninjured.*

"It may be objected to this definition, that it requires disease of the brain to be admitted; delusions or erroneous impressions may arise from other causes, and therefore to declare monomania to be disease of brain, and disease of brain monomania, is arguing in a circle. I have considered this objection, and demur to its validity. It is true, a delusion may arise, or an erroneous conviction be persisted in, while the brain is healthy. In such a state were the people of whom the apostle spoke as being under 'delusion,' so that they 'believed a lie;' such is the state of the believers in the ghostly power of Home, and in the supernatural wonders of the Davenport Brothers. But in the monomaniac there must be disease, and that disease will be indicated by the very nature of the delusions, or by the general medical history of the case. The want of attention to the possible existence of erroneous belief, or even of absurd fancies, with perfect sanity, led to the mistake of the two physicians who declared, or who are said to have declared, their belief in the insanity of Luther: it was a mistake excusable enough when speaking under the pressure of severe cross-examination. But how great a mistake it is, and how uncon-

sciously it may be committed, were curiously illustrated by a well-known professional writer in the *Pall-Mall Gazette*, who, coming to the 'rescue,' as he calls it, of Luther, in effect admits that he should have thought that 'distinguished ecclesiastic,' as he oddly styles him, to have been insane, if he had still persisted in asserting that he had seen the devil after the writer had examined him, and by argument shown the folly of his belief! The story itself is apocryphal; but, assuming that Luther said, and persisted in saying and thinking, that he had seen the devil, it by no means certainly indicated insanity; nor would persistence in such belief make any difference. The whole tenor of the reformer's life proved his mental soundness: his vision was the result of an overworked brain; his conviction of its reality was consistent with his deep religious feeling, his ascetic devotion, and with the superstition of the age. There was as much and no more insanity in the honest belief of Wesley and his chaplain that the prayers of the former had instantly calmed the sea, or the fixed impression of Dr. Samuel Johnson that he heard his mother call him 'Sam,' she being then at Lichfield and he in London. But if we contrast this with the really monomaniacal, we meet at once the evidence of disease. Thus, Swedenborg we might possibly conceive to be sane when he fancied he had seen angels and spirits: we recognise illusion or hallucination, and that they alone do not prove brain-disease; but we know him to have been mad when we find him writing and publishing wicked lies about the Society of Friends, which he gives upon the authority of the said angels, without the slightest consciousness of the incongruity and folly of quoting such beings as uttering falsehoods and absurd scandals. On this subject his reasoning power had left him.

"There are some delusions so gross that they at once indicate disordered brain; as when a man states himself to be the rightful king of England, or says that his head is only a tin-pot. In minor delusions, the question of disease must be determined by the physical symptoms, by the general history, or by the change in the manner and morals of the subject of examination. On this point, two great lawyers are singularly correct and clear. Sir H. J. Fust, in the case of Mudway *v.* Croft, quoted with approbation, and applied to the case before him, the opinion of Dr. Ray (p. 55, Shelford): 'It is the prolonged

departure, without an adequate external cause, from the state of feeling and modes of thinking usual to the individual when in health, that is the true feature of disorder of mind.' Again, Lord Lyndhurst, in one of his judgments, says: 'In monomania the mind is unsound; not unsound in one point only, and sound in all other respects, but this unsoundness manifests itself principally with reference to some particular object or persons.'

"With these dicta it would seem that, monomania being proved in any case, either by absurd delusion, by physical symptoms, or by a combination of mental, moral, and affective morbid changes, the decision as to the incapacity of monomaniacs to make a valid testamentary disposition of their property would be easily arrived at. But, unfortunately, this is not so. Juries are too apt to think for themselves, and to despise that which they believe to be the view of a mad-doctor; and, for the reasons I have already given, the definitions of monomania lead to error, inasmuch as they assume sanity upon points not connected with the delusion. Chief-Justice Hall defines partial insanity as importing that a person is insane on one or more important points, *and sane in all other respects;* exactly contradicting Lord Lyndhurst. Therefore, in the civil courts, it is no uncommon thing for hours to be taken up in reading to the jury the letters of an undoubted monomaniac, with the result of convincing the jury that the writer is perfectly responsible, or has full possession of his faculties, although any one accustomed to observe monomania would be prepared to find even much acuteness of intellect in many cases of serious brain-disorder, in which partial insanity was demonstrable. It must, of course, be admitted that the border-line between the delusion or erroneous impression of a sane and those of an insane brain is very difficult to define; but it is obvious that this difficulty has arisen, or, at least, been much increased, by the principal test, the presence of disease, being so much ignored. It is forgotten that monomania is only a symptom, not the disease itself; and just as a fast pulse does not prove fever, so a delusive impression does not always indicate brain-disorder. The question as to whether a case of admitted eccentricity of thought, or extraordinary actions, or strong and even erroneous religious or hypochondriacal impressions, may or may

not be one of monomania—that is, may not constitute a form of brain-disorder, which renders the sufferer irresponsible or unable to manage his affairs—seems to me to be almost entirely a medical question, and in its examination I would dwell specially upon the following points for consideration in cases of alleged monomania:

"1st. Are there any morbid or other physical symptoms that may primarily or secondarily affect the organ of thought and volition? Is there strong hereditary tendency to insanity? Have fits or convulsions appeared? For any of these, in addition to a monomania, even of a slight description, would go far to indicate organic brain-disease.

"2d. Is the monomania itself of such a character as to be obviously a symptom of disordered brain? Or is it associated with ideas or actions inconsistent with the education and position and former conduct of the monomaniac?

"3d. Are there any, and what, changes in the affective faculties? Have there been changes in the moral conduct, aversion to those formerly dearly loved, or irrational behaviour, which, though in themselves trivial, become important when taken in conjunction with intellectual aberration?

"4th. Is the will that has been made, unjust? or the trust-deeds executed, absurd? or the recent marriage, ridiculous? or the libel cruelly promulgated, unprovoked or unaccountable? The 'factum,' as the lawyers call the provisions of a will, in itself is often the strongest indication of insanity. And here let me observe that, often as I have heard the jury in such cases charged by the judge to consider the necessity of upholding the will of a deceased testator as a solemn document, which they should respect, as they would wish their own wills righteously carried out, I have frequently listened in vain for the admonition, that apparent justice to the dead may be the greatest injustice to them and to the living also. Which of us would not wish, should an inexplicable monomania attack him, and, at his death, his will should have left his property to keep cats, and his intestines to be made into fiddle-strings, that the condition of his mind should be medically investigated, and those nearest and dearest to him not left to the tender mercies of jurisconsults, who know nothing of mental or physical disease, and who, in deciding the validity of his will, would

seriously consider whether such monomania was or was not consistent with a disposing power?

"Of course, in thus arrogating for the profession of medicine so great a responsibility, I am aware that there is much to be done before medicine can take the place it ought to hold in our law-courts. It is not now the time to discuss medical evidence; I would only suggest the paramount importance of educating medical men to some knowledge of mental disorders, and training all to the habit of careful and logical reasoning. Our procedure, also, as to consultations before giving evidence, and the advisability of having one expert always appointed by the court, are subjects of grave importance in the consideration of this question.

"If, however, the procedure in the civil courts is sometimes contrary to recognised scientific truths, the criminal courts show a still more lamentable variance in their decisions. The introduction of the question as to the existence of a 'disposing power' in monomania, is a trivial mistake to that which condemns the monomaniac to the scaffold, upon the hypothesis that, though insane, he knows right from wrong. The course of the legal proceedings in cases of insanity in which homicide has been committed, seems to depend very much upon the individual judge, and not upon any fixed law. I am aware that this is a strong assertion; but let me illustrate the proposition, and judge yourselves of its truth. One judge is reported as saying, 'Is there any necessity, Mr. Attorney-General, after this (medical) evidence, to carry the case further?' and the prisoner is acquitted. Another judge said recently, 'I don't consider the prisoner in a state to plead,' and at once took the jury's opinion as to whether the culprit was insane or not. A third judge, in my hearing, informed the counsel, who was about to open a defence upon the ground of insanity, that the question he (the judge) should put to the jury, and to which he advised the counsel to speak, was not the insanity of the prisoner, but his knowledge of the difference between right and wrong; and that this issue only should be put to the jury.

"I have never heard a counsel bold enough to venture upon the doctrine of the possibility of a disorder of volition, although it is known so well to us all that intellectual disturbance is so frequently accompanied by deranged impulses and uncontroll-

able propensities. But this is a negative fault in the law; there is another and more extraordinary proceeding of frequent occurrence. One judge, having almost compelled a jury to find a verdict of guilty, will, upon his own belief that there is some lurking delusion in the prisoner's mind, write privately to request a further inquiry, or ask for a remission of his sentence; while another judge, rigid in his own view of the law, will allow a monomaniac to be hanged, in spite of earnest and repeated representation of the uselessness and cruelty of the proceeding. In such cases, the prisoner is not tried by a jury, but by the judge; is not condemned by the law, but by the Home Secretary. One remedy seems to be patent for these cases —abolish altogether the punishment of death. The inconsistency of the legal course is rendered obvious in another way. Homicides, already certified lunatics, are always removed from the asylum to prison to await their trial; and yet we hear that, at the last assizes at York, a prisoner, having become insane, has been removed from prison to an asylum, and therefore cannot appear! I will not dwell upon the error, and sometimes cruelty, of trying and condemning to death or lifelong imprisonment the unfortunate victims of puerperal monomania who have killed their children. It may be state policy—it may, indeed, be necessary—that infanticide should be severely dealt with; nevertheless, it is our duty to say boldly that law in these cases may not be justice; the teaching of medical science and the experience of physicians should be called in to avert the punishment of a crime so frequently the result of physical disease.

"With regard to minor offences, the law is again in a most unsatisfactory condition. There seems to be no fixed rule to guide judges or magistrates. In one case, a man charged with assault, whom I examined at Pentonville Prison, was not brought to trial, because insane; again, an insane gentleman, whom I found undergoing imprisonment in a county gaol, and very resignedly picking oakum, had already been brought to trial and condemned; and in a third case, one of forgery, by a man whom I had stated to be suffering under brain-disease, the judge, to my astonishment, in his charge to the jury, informed them that if they believed me, the gentleman would be confined, perhaps for life, as a criminal lunatic, whereas, if found

guilty, he would have only a short imprisonment. I may as well mention that the jury, in this case, solved the legal difficulty by finding the prisoner 'not guilty,' and, acting on the judge's hint, said nothing as to his insanity.

"In defining monomania, then, as essentially a disease of brain, it would seem to result that all wills made by monomaniacs must be considered invalid; and that for all acts done by them they must be irresponsible. My argument would hardly go so far. It is by no means necessary that all sufferers from chronic or acute brain-disease must necessarily die intestate; let the validity of the wills in question be tried before a jury, and, if found reasonable, let presumption of a lucid interval be fairly laid before a jury or a competent arbitrator. The provisions of the will would afford the strongest evidence of the capacity of the testator. I take it, that alienation of property from relatives, that sudden and causeless testamentary changes, that codicils hurriedly added, would hardly be admitted as valid, where medical evidence strongly proved the testator's brain to have been diseased. Opposition to a perfectly fair and rational will would be undertaken at the peril of the opposer; who would, however, have an easy task where the medical evidence was strong, and the will itself strange, capricious, or unfair.

"The admission of the possibility of a monomaniac making a will that may consistently with justice be considered valid, may seem to involve the admission of the criminal responsibility of those suffering under brain-disorder; and to a certain extent it clearly does do so. I can see no reason why the monomaniac, who is so far well as to be able to enjoy his freedom and exercise his civil rights, should not be responsible for minor offences, unconnected with his special delusions; otherwise, all monomaniacs should be confined, which would be cruel and indeed impossible.

"I would punish the monomaniac, not to revenge any wrong he may have done society, but to prevent other monomaniacs from imitating, or himself from repeating, his offence. Carefully examining the objects and mode of proceeding of the criminal, it would rarely happen that any injustice could be done. The semi-insane, if allowed to be at large, must feel the necessity of self-control, and they often can and do exercise

it. It is a false philanthropy that would excuse all monomaniacs from punishment, because such impunity must involve a punishment still more severe; for if monomaniacs are to be irresponsible, they must all be confined or restrained.

"To sentence a monomaniac to minor punishments seems to me to be possibly justifiable upon grounds of public policy; but to hang a lunatic involves, in my opinion, the commission of an absolute wrong; and nothing I have said as to his responsibility for minor crimes can excuse such a sentence, supposing that the convict is of unsound mind. For not any man can swear that at the moment of the act the prisoner knew right from wrong, nor can any jury decide that his crime was unconnected with his lunatic impression. The disease of brain must lead to doubt; and of that doubt, by English law and by common justice, the prisoner should have the benefit.

"I have to apologise to you, Sir, and to the members of the Association, for taking them over ground that must be so familiar to them; but I have tried to show that lawyers differ as much as, or more than, doctors—that the law is as uncertain as medicine is said to be. The remedy for all this is careful, deliberate, and public discussion of disputed points; and I believe that our Association can be made instrumental in rendering essential service to medicine and the law, if the collective opinion of its members upon such questions as those I have brought before them to-day could be elicited and recorded; carrying, as it would, the weight of the practical experience and long study of so many men of high reputation in the special branch of medicine to which they have devoted their attention."

To return to general pathology. We have seen above that local inflammation sometimes produces fever, but at other times general or constitutional morbid sensibility ("irritation"), which, although different states, alternate and pass into each other; so that we are obliged to vary our treatment according to circumstances. In surgical cases, for instance, so long as the inflammation produces fever,

we use antiphlogistic means: but when the character of the symptoms changes, and morbid sensibility prevails, as for instance when tetanus occurs, we must resort to narcotics with tonics and stimulants.

Again, visceral disease converts intermittent ague into continued remittent fever. Pulmonary consumption is accompanied by hectic, a remitting fever, —a mixture of morbid sensibility, and of pyrexia from inflammation,—to which combination the term "irritative fever" also has sometimes been applied in surgical cases.

Thus we see that inflammations destroy life in various ways: some by fever alone, as the acute inflammatory diseases—such as phlegmon, and the results of accidents; others, besides inducing fever, interfere with the functions of the organs, as peripneumonia, pleuritis, and enteritis; a third set, again, kill by morbid sensibility and wasting, as those which induce hectic; and a fourth set by the superaddition of morbid sensibility, as tetanus and hydrophobia. The constitutional disturbance of cancerous disease has more the character of hectic morbid sensibility, than of fever. Fever is not a higher degree of disease than morbid sensibility, since the latter may prove fatal without fever, as we see in tetanus, epilepsy, or hydrophobia. This distinction between fever and morbid sensibility will be found useful; and I believe, if followed up, may lead to a more definite and successful practice in many cases than has hitherto prevailed.*

* Travers points this out well and clearly in his treatise on "Irritation."

Inflammation, at least so much of it as to cause perceptible change of structure, is not absolutely necessary for the production of morbid sensibility: for there may be but a very slight inflammation preceding or causing hydrophobia or hysteria; and fright, as we have observed, will produce the diseased state of morbid sensibility in so great intensity as instantaneously to produce epileptic convulsions, without discoverable change of structure in the nervous centres, though morbid sensibility remains permanently, as evinced by the returns of the epileptic paroxysms. We see convulsions arise from morbid sensibility, without any degree of inflammation, and not calling for depletory remedies, but, on the contrary, aggravated by them; as we find hysteric fits increased by debility, and hysteric convulsions brought on or increased, when, for some really inflammatory affection, we are obliged to deplete a patient who has a tendency to hysteria: in these cases, sometimes delirium, with pain of head, comes on, simulating phrenitis, but in reality mere morbid sensibility, curable by tonics, with or without narcotics or stimulants,—not the treatment which cures phrenitis, though the skin be flushed. These examples suffice to show the necessity for making a distinction between a state of constitutional morbid sensibility and symptomatic fever,—so much resembling each other in some respects, and yet requiring such opposite treatment for the safety of the patient; and, moreover, as it was shown that these states run into each other, the treatment must sometimes be suddenly varied.

This may be illustrated by three cases in which

severe morbid sensibility was the urgent symptom, depending, however, upon different causes, and therefore treated and cured by different treatment.

1. A boy was brought into the London Hospital who had been confined to bed for some time with a rheumatic swelling of the knee, attended with constant pain. He had been for several days under the care of Sir W. Blizard, who consulted me about him: he was much emaciated, irritable, and languid; consumed by symptomatic feverishness; got no refreshing sleep from opiates; the pulse 130, thready, or rather wiry—very hard. He was too weak to bear more leeches to the knee, although that was hot, red, tender to the touch, and did not admit of the slightest motion, being kept constantly bent owing to the pain, and because the flexor muscles, by virtue of their superior strength, compelled the limb to obey them.* The indication was, to take off the injecting force, as the vessels could not be otherwise relieved; I prescribed fifteen drops of tincture of digitalis three times in the twenty-four hours. After the second dose, the pulse becoming immediately slower, he got better sleep than he had had from the opiates, and the pain was relieved; and in less than a fortnight he grew stouter, the swelling subsided, and he was able to walk home.

2. A medical student had a neuralgic-rheumatic swelled knee, without redness, suggesting white swelling, with such extreme pain as entirely to prevent sleep. He was treated *secundum artem* by several of our staff, amongst whom was one of our best surgeons. He had not fever, did not waste, but was

* Hilton *On Mechanical and Physiological Rest*, p. 156.

tormented with pain, and sometimes with painful applications, besides occasional purgatives and other sedative medicine. One night, in despair, he took a sup—which he imagined to be about a tea-spoonful (sixty or seventy drops)—from a bottle of tincture of opium; after which, he slept for twelve or fourteen hours, awoke free from pain, and very soon walked to his duties at the hospital without further medicine.

3. The following case is worthy of attention, as one of not unfrequent occurrence, and one of the nature of which it is of great consequence to be aware: A young lady had, for two or three weeks, been treated by *bleeding*, neutral salts, and low diet, for what was called determination to the head threatening meningitis, which had supervened upon a *supposed pleuritic* affection. When I visited her, there was jactitation; sense of oppression at the chest; incoherence of speech; severe pain of head, occasionally causing her to put her hand to it, and to cry out; intolerance of light and sound; flushed face; weakness, but *not sluggishness*, of the voluntary motions; —there was *no fever;* the pulse was jerking, as we find *after hæmorrhage*, but not firm; the tongue not foul, but white, as we always find it with an empty stomach.* I ascertained that the pain com-

* I say, always. There is no more common error than that of considering this natural appearance morbid. Thus, persons who are in the habit of thinking themselves "bilious," and taking physic, look at their tongue when they rise in the morning, and find it white. A good breakfast will make it look red, unless they take a dose of salts, or seidlitz powder, and sometimes even whether they do or not. The same persons will perhaps put out the tongue before a looking-glass just before dinner-time; and, seeing it white, they will forego a part of the wholesome meal which would

menced in the *left* side (p. 190): and, from that and other hysterical symptoms, I felt satisfied that the present state was clavus hystericus of the head, kept up by inanition. She had been allowed the day before a little weak chicken-broth; but as she became worse, it was supposed she was unable to bear even

bring the tongue to the natural colour of redness which it assumes after eating, and which replaces its natural paleness before eating. If they be gourmands and hypochondriacs at the same time, they will run the hazard of eating, and take a calomel "peristaltic persuader" afterwards. I have been constantly in the habit of warning my young medical friends to consider, when they see a white tongue, what time of day it is, and *not to purge* for merely a white tongue, or more properly a *pale* tongue.

The tongue is constantly very properly inspected in disease, as it affords an evidence of the state of the mucous membrane of the stomach and bowels, with which it is continuous. In health it is not of a bright red, but has a pale pink bloom on its surface, in consequence of the tips of the villi or papillæ being less injected with blood than the lower parts. When the stomach is empty, it contains less blood, its villi are of course paler, and those of the tongue also are sympathetically nearly white; but, observe, the tongue is moist; whereas, in the beginning of synocha, or pleurisy, or other inflammation, the stomach is empty from anorexia, and the tongue is white; but it becomes dryer than from a mere empty stomach, and not clean, being more or less coated, arising from the evaporation of the watery parts of the saliva and mucus of the mouth, which leaves the membrane indued with a more viscid covering than natural. After eating, when the stomach is in a state of healthy activity, the tongue becomes redder; but still it is not of a bright-red hue; which only takes place when the membrane of the primæ viæ is in a congested or inflamed state, as in dysentery, in phthisis when colliquative diarrhœa exists, or at the termination of typhoid fever, when there has been (in reality) gastro-enteritis or inflammation of the glandulæ agminatæ, &c.

In the progress of severe fever, when the secretions are suspended, the tongue becomes dry, the mucus which does exist dries,

that; and I was therefore consulted. Wine and animal food immediately and gradually administered, without any medicine except a few drops of vinum ferri, soon calmed all the symptoms of what was called inflammation and of determination to the head; and health was restored in a few weeks.

These three cases will illustrate several points. We see, 1. Local inflammation producing morbid sensibility and *symptomatic fever*, with frequent, hard pulse; on account of which, food and wine afforded no nourishment, narcotics no rest (as they would have done, had there been only morbid sensibility without symptomatic fever). Cured by the sedative, digitalis.

2. Local inflammation producing, not fever, but *general morbid sensibility*, chiefly evinced by loss of sleep; no indications for stimulants, sedatives, or tonics, and no want of strength or appetite. Cured by a narcotic,* which, by procuring sleep, gave the nervous system time to regain its natural state, so as subsequently to give energy to the vessels of the inflamed part.

and forms a brownish or blackish crust, and the papillæ become so much shrunk down to the level of the rete mucosum, that when the tongue becomes clean, on recovery, it looks glazed and smooth, and some time elapses before the papillæ rise up again.

In chronic affections, accompanied with a languid and flabby state of the primæ viæ, a discoloured state of the mucus occurs, constituting what is called a foul tongue.

* It has been shown here how a narcotic alone can effect a cure. It is in this way that it cures tetanus, sometimes with a tonic combined. The narcotic, in some instances, gives only temporary *relief*, as in tic douloureux, which it is necessary to *cure* by a tonic; but it may be inferred that this relief promotes the cure, inasmuch as the relief by a narcotic alone, as above, and in other instances of morbid sensibility, produces the desired result.

3. Local affection (chronic hysteritis) having produced, not fever, but constitutional *morbid sensibility*—hysteria, with deceptive pain in the side, accompanied by debility, arising from depletion and want of nourishment; so that narcotics could procure but temporary relief, as they afford no nourishment, and sedatives aggravated the delirium of inanition. *Stimulants* and food, by giving strength, acted as a tonic, and restored power to the nervous system, and consequently to other parts; and, moreover, the stimulant gave almost instant relief, by counteracting the over-sedatived state of the capillaries of the brain. Such cases are common.

A chronic painful (neuralgic) state of the brain, essentially connected with debility, comes on from a variety of causes—such as fatigue of body and mind, accompanied with indigestion, hysteria, or malaria in aguish districts; this state is often misunderstood, and, even when understood, is sometimes with difficulty treated, on account of the aversion evinced by the patient to take stimulants, the gradual introduction of which into the system is absolutely necessary. Such patients have a dread of what they call fulness of the head, which is in truth a false sensation depending on morbid sensibility. The temporary uneasiness or pain produced by stimulants, besides the accompanying dyspepsia, renders the use of much persuasion necessary in order to overcome the objection entertained to taking them when prescribed. This state often arises in delicate persons of both sexes.

An old friend of mine came to town for the purpose of consulting me, in consequence of what he

and his medical adviser considered determination of blood to the *head;* that is, occasional giddiness and headache, with some dyspepsia and depression of spirits, more severe after breakfast (that is, particularly after taking a sedative, tea) than after dinner. For these symptoms, although a slight person, he had been physicked, kept on restricted diet, and debarred from fermented liquors, entirely with his own concurrence, as he apprehended apoplexy. He is a member of one of the learned professions; and it appeared to me that he was labouring under morbid sensibility, a neuralgic state, from study and over-fatigue. He was convinced of this by my representations, and in about a couple of months was restored to health, by gradually resuming a generous diet with tonic medicines. Chronic neuralgia in the cardiac region, sometimes mistaken for disease of the *heart*, occurs under similar circumstances, and requires similar treatment.

Though keeping the bowels moderately open is useful in chorea, and in a variety of nervous affections, to promote the digestion,—hysteria, and other constitutional morbid sensibilities, are always aggravated by sedative agents, especially by abstraction of blood; so that, until food and tonics give strength, no cure can result. Now, in neuroses the patient sometimes cannot eat, any more than in fever, though from a different cause: in fever there is anorexia, from a congested state of the mucous membrane of the primæ viæ, and the obtunded state of the nervous system in general, and of the nerves of the stomach in particular; in the neuroses, from morbid delicacy of the senses of taste

and smell, or sometimes from morbid sensibility of the primæ viæ, the first mouthful swallowed produces a sense of repletion,* and this nervous anorexia sometimes increases the difficulty of distinguishing between pyrexia and constitutional morbid sensibility; more particularly when the primary local affection is in the primæ viæ, from indigestion simulating inflammation of the mucous membrane (gastro-enteritis).

In distinguishing actual fever from morbid sensibility, which is of so much consequence, we must not confound that *languor* which arises from nausea and other affections of the primæ viæ, such as diarrhœa, &c., with the languor of *want of power* of volition, owing to the weakened nervous centres in fever.

Morbid sensibility is an affection of nerve; but nerve, considered in relation to disease, is nothing without capillaries—capillaries nothing without nerves. The isolated consideration of either leads to the error in practice of attempting to relieve the vessels at the expense of the nervous system, or of resorting to nervous medicines exclusively, to the neglect and prejudice of the vascular system.

What I mean by mere nervous medicines is, in the common acceptation, anodynes—ethers, assafœtida, valerian, and other "nastiness"—which *divert* sensation for the moment, but, having no permanent effect on either the vascular or nervous system, do not *cure* the disease; neither will tonics effect a

* A little light wine, or wine and water, or other mild stimulant, and a few minutes' patience, will generally enable the individual to get on with the meal.

cure in all cases, without skilful adjustment of the digestion and secretions.

APOPLEXY and PARALYSIS depend upon disease of the *nervous centres*, produced by mechanical *injury*, spontaneous *inflammation*, or mere *congestion:** and may either be cured, and the paralysis *pass off;* or the usual results of inflammation, tumours, abscess, effusion, or softening, may cause the paralysis to be *permanent*. As the nervous centres are hidden from inspection, we cannot discover the degree of lesion; we ought therefore to persevere in our efforts to cure, which will often at a late period be crowned with success. I have had a patient, advanced in life, with hemiplegia, who neither spoke nor moved for more than six months, being fed during that time like an infant, and who yet recovered *perfectly;* and I have known of other cases very similar. The principles of treating these injuries of the nervous system—recollecting the importance of the organs involved, the necessity for energy in acting in some cases and for abstaining from activity in others, and, above all, the care necessary in watching the phases of the disease—are precisely the same as the treatment already laid down for inflammation in other parts of the body. A mystery was, indeed, attached to them by the ancients, and a much too depletory and lowering treatment was formerly indiscriminately† employed, frequently with an entire

* This congestion is one of the morbid states sometimes induced by a "weak right auricle," so well described by Dr. Daldy, *op. cit.*

† In addition to what is adduced here, as to rational dis-

neglect of tonics, from the false fear of their being stimulant. Mercury, indeed, was given, because it was not considered a tonic; though, at p. 149, I have shown it to be one of the most efficient.

The principles of treatment may be thus summed up: in *acute* cases and *plethoric* patients, active and *decided antiphlogistic and anti-congestive* practice —in *passive* inflammatory states, that is, with debility of constitution, just barely enough of local *depletion of vessels*, with *tonics*, and even *stimulants*, when the constitution and the stomach require them. Long and steady perseverance in the appropriate remedies is necessary, and careful attention to the ebb and flow of power in the constitution.

One point to which I particularly wish to direct the attention of the practitioner is, that there occurs in old people a paralysis from mere debility of the nervous centres, with local congestion, without either inflammation, softening, tension, rupture of vessel, or other organic injury, and which will appear sometimes on one side of the body, and afterwards on the other. These cases will recover, under gentle and judicious attention to the constitution, and by careful support and tonics, including a cautious administration of mercury. I have treated many old persons in this way, adding digitalis where there has been a strong, hard pulse; and have effected their recovery from paralysis, which had existed, first of one side, and afterwards of the other, but was proved to have de-

crimination of sedative, depletive, or stimulant treatment, the author confidently refers the reader to the various passages in which he has deprecated unnecessary bleeding.

pended upon merely temporary local congestion, when they eventually died from some other cause; no organic disease of the brain being discoverable *post mortem*.

Sometimes, without evidence of congestion, but from mere debility, old persons, whether exposed to fatigue and cold or not, will have hemiplegia with insensibility, but at the same time a weak pulse, showing the state of inanition of the sensorium. From this state, a moderate, gradual administration of stimulants, without medicine, will restore them. The author has seen the same persons attacked thus, and recover, at intervals of from two to four or five years; in one instance, four successive times: and at last the individual did not die of cerebral disease, but of influenza, without cerebral symptoms, and with no discoverable cerebral disease on examination after death.

The most remarkable instance of this nature which has occurred to the author was that of a person above sixty years of age, to whom, having imprudently undergone the depressing (sedative) effect of the low temperature of a cold sponging-bath in winter, the immediate result was a total loss of memory, without any other symptom. The author, when summoned about two hours after, found no evidence of the slightest deviation from health, except the forgetfulness. The patient, having taken breakfast as usual, was walking about and conversing, but could not be made to remember events that had occurred during the last three or four months, even in regard to one of most special interest. I directed merely a warmed bed, and prescribed a

couple of table-spoonfuls of brandy in a little hot water. The patient went to sleep almost immediately, and awoke in about three hours perfectly well, and with entire and perfect recollection of every thing, except what had occurred from the time of the bath before breakfast; and scarcely believing the history of his attack, only that it was confirmed by his being found in bed at that time of day. At the end of last or beginning of the present century, the case would most likely have been treated by leeches or V. S., with purgatives. This occurred some years ago, and the patient has continued in perfect health and strength of body and mind up to the present time.

In advanced age, chronic disease of the nervous centres sometimes produces a sufficiently evident paralysis, hemiplegia, paraplegia, or partial paralysis, sometimes combined with affection of the sensorium, sometimes the latter only. But the symptoms from affection of the spinal cord are often obscure; I have seen the muscles of respiration and circulation attacked periodically, so as to simulate what is called spasmodic asthma, the respiration being besides permanently though slightly embarrassed. This I have known also to take place from obscure chronic disease of the nervous centres; and it is precisely analogous to those symptoms which arise from the disturbance of the spinal cord produced by evident curvatures of the spine: it is best combated by quinine and good living, and by friction of the spine with a stimulating liniment.

Having commenced the pathological part of this

work with the consideration of the nature of inflammation, and the principles of its treatment; and having afterwards discussed the nature of the two grand groups of diseases which constitute fevers and neuroses, and shown that, although they are both essentially affections of the nervous system, they are widely different from one another,—I propose now to add a few observations upon some particular diseases. Although, in discussing their proximate causes, I may be met by doubts on the part of some of my readers, from the novelty of the opinions advanced,—which it may require further observation to substantiate,—yet their practical utility, or the principles laid down for their treatment, will not be founded on a less solid base than those which concern the treatment of inflammation, fevers, and neuroses in general.

There will have been observed nothing of humoralism in the preceding pages; for though I admit the influence of imperfectly assimilated nourishment, conveyed by the lacteals to the blood, in producing gravel, scurvy, and other disease, I ascribe the effects, whether remedial or noxious, of agents—mineral, vegetable, or animal—taken into the circulation, to their producing changes of the solids. All *diseases*, in fact, commence, as I have repeatedly affirmed, by disturbance of the function of the solid parts of the machine; and, first of all, of the nervous system. This is solidism, or neuro-pathology, not humoral pathology, —which, however, is beginning to come into fashion again, like Brunonianism.

The nerve system, it is almost superfluous to re-

peat, regulates and supplies the whole system with energy. There is no organic sensibility, or organic contractility, independent of the nerves. Every natural impression is received by the nerves; every morbid agent is first felt by, and operates upon, the nerves. *Inflammation* of areolar tissue, bone (periosteum), conjunctiva, or other parts, through mechanical or other violence, results, as we have shown, *in consequence of* injury to the *peripheral* nerves, and, simultaneously, to the capillaries; *fever*, from injury of the *centres* of the nervous system, which arises either from peripheral injury propagated to them, or through lesion by miasma, which, by the route of the circulation, directly poisons them by chemical combination and alteration, instantaneously lowering their power or energy. It has been shown throughout, that the immediate effect of excessively lowering the power and energy of the nerves or the nervous system is *inflammation*, or congestion of the capillaries—the first step towards inflammation, or *fever*, or *neuralgia* (called irritation); and subsequently alterations, acute or chronic, in the modifications of metamorphosis influenced by the nerves.

The diseases of morbid sensibility (neuroses), as we have seen, depend also upon a partial or general derangement of the nervous system; arising, when general, either from the disordered state being propagated to the ganglionic central organs from a distant region of the body, as from a wound, in traumatic tetanus; from a poison, in hydrophobia; from the uterus, in hysteria,*—or originating in the central

* Since this was written, Dr. Robert Lee has demonstrated the presence of nerves and ganglia in the uterus.

organs through the gradual operation of a debilitating cause, as in cases of delirium tremens, paralysis agitans, idiopathic tetanus, chorea, or when general morbid sensibility is suddenly produced by loss of blood or fright;—so that neuroses, as well as fevers, may be produced suddenly or gradually, and, like them, may be either idiopathic or symptomatic.

Fever, we have seen, depends essentially upon a diminution of the power of the nervous system—the nervous influence, whatever that be, is deficient; whereas the diseases of morbid sensibility appear to arise, not from a want of sensitive and motor nervous energy, but from a derangement of the machinery of the nervous centre, or a disturbance of that connection of the nervous centres with the nerves, which not only induces, but regulates, action. Thus, neither in tetanus nor in hysteria is there deficiency of power either in the nerves or muscles,—as the morbidly increased sensibility, and the powerful spasms and convulsions, show,—but a derangement in its direction and coördination.

In fever, there is a want of steam, or moving power, to use a mechanical illustration; in the neuroses the machinery is out of order: for instance, when fever is fully established, sensibilities of every kind are *blunted*, both those which are called animal and the organic; and there is debility, also, of the voluntary and involuntary muscular systems.

In the diseases of morbid sensibility—epilepsy, tetanus, neuralgia, hysteria, chorea, hydrophobia—either all the sensibilities, animal and vegetative, are rendered morbidly *acute*, or the motor *energy* is distributed to the muscles *irregularly*,

if not too abundantly; as we see in chorea and paralysis agitans: volition would guide the hand to the mouth, but, in consequence of the deranged nervous centre, the hand is thrown in other directions, in spite of the will, from the antagonistic muscles not being under its influence. The derangement of the functions of the perceptions and volition, as well of "incidence as reflection," may be simultaneous; as in hydrophobia, and in some cases of hysteria.

In *fever*, there is abundant evidence of lesion of the *cineritious* tissue, interfering with its peculiar functions—thought, and the generation of nervous energy: in *morbid sensibility*, we have only an evidence of deranged actions in the distribution of nervous influence through the *medullary* white tissue. In *morbid sensibility*, we do not find the faculties of the sensorium seriously interfered with, unless when, in the advanced stages, a degree of fever is superadded, inducing the delirium or coma of congestion; or when, on the other hand, the mental wandering of inanition is produced, as in hæmorrhage or delirium tremens.

Among the diseases which I intend hereafter briefly to discuss are, firstly, ague, cholera, and influenza—allied naturally to fevers, but which I have preferred considering after the diseases of morbid sensibility, inasmuch as, following what I have said upon these latter, and upon the use of sedatives, their treatment will be better understood; secondly, rheumatism, dropsy, and other general affections; and then special diseases of the viscera.

I will not enter here into a definition of AGUE, as I am not writing for those unacquainted with the meaning of the term, but for such as have already learned it from lectures, books, or observation; and under the denomination of ague I shall include remittent as well as what are called intermittent fevers, because intermittent passes into remittent, and *vice versâ*.

Ague is essentially fever; it forms, however, a connecting link between fevers and neuroses, as a considerable degree of morbid sensibility exists in it. Ague is, besides, closely allied to Asiatic cholera and influenza, both of which are febrile diseases, as I demonstrated in 1832, when we had daily opportunities of seeing the former epidemic.

I consider it of the greatest consequence to investigate the connection of those diseases, separated as they are by nosologists. In fact, their close examination for this purpose increases our intimate knowledge of them, enabling us the more easily to form a diagnosis; as a schoolmaster distinguishes his scholars, or, more surprising still, as a shepherd knows the individuals of his flock, though to another person they are "*πάντα ἀμενηνὰ κάρηνα.*" By showing points of essential coincidence in diseases which are separated wide as the poles by nosologists, we shall account for those individual diseases, though antipodal, yet being benefited by the same remedies. Let us just reconsider what are the *essential* symptoms of *fever*, whether, in its course, it assume the form of intermittent or remittent, synochus (typhoid) or typhus; and what are the symptoms

which it is of consequence to remove, and what are the efficient means of doing so.

The most urgent symptoms are those of debility of body, or of body and mind together. Let us not allow our judgment to be obscured by the numerous and varied *non-essential*, though sometimes even epidemic, super-additions: as in one case, or set of cases, there will be costiveness, in another diarrhœa; in one case full pulse, in another weak; in one case hot skin, in another cool; in some sets of cases accidental inflammation of one part, in others of another: all of which *non-essential* super-additions must, notwithstanding, when they occur, receive their due share of attention, as aggravating the fever. But the patient will recover from the fever, if we can relieve his debility of body and mind: that debility we have shown to be caused by an overloaded state of the nervous centres; and we uniformly see that the only successful means of relieving them consist in diminishing the injecting force when the pulse is strong, and, at the same time, increasing the contracting action of the capillaries by antimony, mercury, salines, bark, and other sedatives; indeed, even when the pulse is not too strong, these substances have an influence, and are often of most essential advantage when the pulse is really almost gone, by their immediate constringent effect on the internal capillaries.* It is, then, evident

* A curious and, to persons of experience, a familiar instance of this is what takes place in patients asthmatic from valvular disease of the heart, causing great and alarming returns of congestion of the lungs, with at first violent action, and then almost annihilation of the action, of the heart; blue lips, semi-

that the pulse, which was so long considered as an indication for the use of bleeding, or sedative medicines, is, taken alone, often no guide at all.* In

stupor, and painful struggling for breath: with death shortly ensuing, if not prevented by remedies. The administration of stimulants by friends has been useless, because the vital powers of the organs—the heart and lungs—are too much sunk to answer to them; nothing can save life but relieving the congestion of heart and lungs: this has been done innumerable times by bleeding; but this is out of fashion,—and, besides, the author has often enough clinically shown that it may be generally (he will not venture to say always, because he does not believe it) dispensed with by the administration of an emetic, an antistimulant. The effect appears magical; the sudden emptying of the stomach gives room mechanically to the heart to act; and the tartar emetic or ipecacuanha, circulating to the capillaries of the lungs, makes them act too.

* There are so many exceptions to the general rules respecting the pulse, that, although every one feels the pulse, it requires long experience to avoid being misled by it. In the first place, as traced above, increase of frequency and force (hardness) is produced by inflammation: when the inflammation is in an external part, the pulse is usually strong; when the inflammation is in the internal organs, there is not so much evident force, the pulse is small and hard, sharp, wiry; and this wiry feel may be very small, yet still evincing a degree of force in the contraction of the heart from its morbid sensibility, though the organ is felt contracting on a small quantity. Now, we must be on our guard that this same, or even a greater degree of, internal inflammation may exist, and yet, as shown above, from depression of the vital powers,—as, for instance, when the lungs are gorged in peripneumony,—the pulse may feel quite feeble, from the blood not being arterialised, and therefore not stimulating the heart to contract. In such a case, sedative depletion, by allowing freer circulation through the lungs, will increase the stimulating properties of the blood, and raise the pulse and vital powers. Here we ascertain the condition of the organs by auscultation, the colour of the lips, and other symptoms, and decide in opposition to the pulse.

cases of fever, the necessary practice by *sedatives*, from having been hitherto unexplained, has always been erroneously called *indirect* practice. I do not admit this term, and never practise indirectly: my indications are always founded directly upon *physiology*, as I have explained them to be up to this point.

We must again separate clearly in our mind phenomena from causes; for instance, rigors, cold shrunken skin—the cause of which was said by Cullen to be spasm of the extreme vessels; the

On the other hand, various neuralgic states produce a frequent and strong pulse, which, though ordinarily an evidence of inflammation, indicating blood-letting, must be disregarded, as depletion would be injurious. In these instances we must be guided much by the previous history of the case; and be cautious not to be misled by the symptoms of pain, if the patient be nervous, and if the various usual accompaniments of the inflammation, which is simulated, do not present themselves. Thus, in hysteria, symptoms sometimes mistaken for pleuritis (see p. 366) or peritonitis arise. In the hysterical affection, less obstinate constipation and less dryness of skin exist; the tongue is generally less dry, though it may assume almost any appearance; but the pulse in hysteria is less wiry than in peritonitis: the same may be said of the pulse, skin, and tongue, in the assemblage of hysterical symptoms resembling pleuritis. In inflammation of the heart, which is so often unfoundedly dreaded by hysterical patients, the pulse is soft, like the pulse of acute rheumatism, as the inflammation renders it weak, so that it allows of distension, and has not power to empty itself. When we find the pulse of natural frequency, full and hard, we may suspect organic disease of the heart; for unless that exist, the pulse is either full and soft, or frequent and hard, or frequent and soft. There is a frequent soft weak pulse, with dilatation of the left ventricle: but the practitioner must make himself acquainted with the peculiarities depending on the diseases of the heart itself, as one means to prevent his being misled by the pulse.

contracted state of the latter is, however, mere effect, not cause: convulsions also are the mere result of morbid sensibility, and have no direct connection with the fever; on the contrary, they have been empirically considered by experienced men rather favourable in some cases, as in the eruptive fever of variola.

What are the steps from the invasion of the fever-*poison** till the development of fever? The first is a debilitating influence on the nervous centres: the mind is at this time clear, though languid; the pulse is small, the skin cold, and the limbs tremble, or are convulsed, from the morbid sensibility of the nervous centres,—evinced also by pain in the head and spine. From the weakness of the circulation, therefore, all the external capillaries contract, not by spasm, but by their natural contractile action, through not being sufficiently injected; the blood is con-

* The author uses the term poison advisedly. Poison differs but little from nutriment; the most virulent is composed of the same elements as bread—carbon, hydrogen, oxygen, and nitrogen—only in different proportions. There is poison in the malaria of the marsh-vapour which produces ague fever; the same amount of common vapoury moisture, no matter what the temperature, will not produce the ague, unless the mysterious poison of the marsh be combined. The malaria of the atmosphere in some parts of Rome in the autumn is poisonous, until the first heavy shower, towards the end of September, washes it away. The atmosphere of a crowded church or ball-room produces no fever; but a similar collection of people in a court-house produces fever when the poison, generated by unhealthy, dirty prisoners, is mixed with it. And yet this poison, like that of strychnine, woorara, or small-pox, the cobra-di-capella, or hydrophobia, is but carbon, hydrogen, oxygen, and nitrogen.

sequently congested in the internal parts of the trunk, producing nausea, and other disturbance of the primæ viæ, augmented by the morbid sensibility of the nervous centres, sometimes causing vomiting and diarrhœa. Sometimes, in hot climates, fatal congestion of the lungs takes place immediately, as pointed out by Sir Ranald Martin, in cases denominated sun-stroke, because it had erroneously been supposed that it was the brain which had been the suffering part, from the sudden stroke of insensibility caused by the dark blood sent to that organ.

Now, it is in this first stage of fever that, if the dose of poison has been sufficient, death has been known to occur, and that very suddenly, not only in the "Bombay fever,"—in which the patient became at once cold, and died in the first state of chill,—but also, as it has been stated, in the severe yellow and other fevers, and cases just alluded to, in which patients have died at once, without any reaction or rallying; thus, in the same way, soldiers have dropped on parade, and died almost immediately: the heart having been unable to propel the blood to the brain, fatal syncope or asphyxia has ensued.*

* From the histories of fevers, and from observation, it is apparent that the poison of continued fever is generated by animal matter, as in crowded ships, gaols, or houses; the poison of ague and remittent fever by vegetable matter, possibly some cryptogamic species, as those fevers prevail chiefly in situations where these species are met with, such as marshes and uncultivated places. When marshes are drained and cultivated, the cryptogamiæ are destroyed, and agues are not generated. The tremendous remittents of hot climates appear chiefly where the ground

This stage of *depression* may last for minutes, hours, days, or weeks, as evinced in the ephemeral continued fever, in regular agues, and in those irregular agues vulgarly called "dead or bastard" ague, to be described hereafter.

The next stage of fever is commonly named the hot stage; but as that designation is totally inapplicable to typhose fevers, I prefer the term relaxed, as that implies the actual state of prostration of the nerves and capillaries, which is so evident, and which I consider the proximate cause both in typhoid and typhus. The severity of this stage will depend entirely upon the dose of poison and the state of the constitution; whether, for instance, the individual will return to a state of health immediately, with but a slight degree of languor for a few hours after the chill "ephemeral fever;" or whether the phenomena of the hot fit of an ague, or of a continued fever, will result, owing to the poison having been sufficient to cause the more permanent relaxation of the capillaries of the nervous centres.

It has been previously shown how sedative influence ultimately produces relaxation, which state now ensues in the nervous centres; and it will depend upon how much they are relaxed, whether the fever will be hot or otherwise. If too much relaxed to allow of their secreting nervous influence, as when the fever is typhous, the circulation and respiration will not have power to produce a full pulse and hot skin; if otherwise, we shall have flushed hot skin,

is at times covered with water, and where, after the rains have subsided, it remains half-wet, abounding in rank and decomposing vegetable matters, as we find especially amidst uncleared woods.

as in continued fever and in the reaction of ague. But in either case the skin will be reinjected; for even in typhous fever, though the heart be weak, the superficial capillaries, having lost their tone from deficiency of nervous influence, relax, and are even by the weak heart refilled with a dusky blood. And a similar state may be seen in some agues, where, after the chills, there is a typhous state, and a livid colour of skin, with dreadful languor, as may be observed in individuals with ague in the Pontine Marshes.* Thus, even in ague, the student must not expect to find always the *hot* stage of the nosologists.

These are the only two stages of fever and ague. There is no third stage of ague: the sweat which succeeds the hot stage is nothing but an indication of renewed secretion by the capillaries, which, after having lost their tone, and having been consequently in a relaxed, distended, non-secreting state, renew their secretion on being restored to a normal condition; and, of course, as they are returning from a relaxed state, they will pour out fluid sweat at first, until recontracted sufficiently to secrete insensible perspiration—a mere vapour.

It has just been mentioned that the ague exists frequently without showing the hot stage; in fact, the patient remains from day to day in a continued state of depression, with a languid circulation, cold livid skin, and the sensorium more or less oppressed. It is very common for patients in this stage to pre-

* This is seen remarkably in that district: many of the inhabitants walk about in a livid, or sallow, semi-stupid state.

sent themselves at the hospital, and, when questioned, not to be able to give any account of their symptoms, as is also the case with them when they apply during the cold stage: in either case, the practised physician will see at once that he has before him the subject of ague. Sometimes the patient with irregular ague, as just described, will answer at once, when asked what is the matter with him, that he has the "dead ague," the name given by country people to this state of disease, which they know originates amongst agues; and which they also know sometimes turns to regular ague, that is, with rigors ("shaking") and sweating. In such a case, when I have asked a patient who did not use the term dead ague, "Have you the ague?" the answer has been, "I wish I had; I should be much better if I could shake out" (outright).

It is an interesting subject for a student to watch the effect of a tonic, such as bark or arsenic, on one of these lingering cases, as the uniform evidence of improvement is, that a paroxysm of regular ague is produced as a first step towards the cure.

I became acquainted with this circumstance in the first year of my pupilage. A patient was admitted into the hospital with *cough*, looking very ill and sallow; he was ordered some calomel, and a squill mixture, with a blister to the chest. The effect of the calomel, the comfort of the hospital, and change of air, was, that the next morning he felt better, and was soon after attacked with a fit of regular ague. This was an early and useful exemplification

of the "larvatæ, or masked agues." Plentiful doses of bark (quinine had not then been separated) cured the ague and cough together.* Men of experience, especially in aguish districts, have seen all the modifications of these larvatæ, such as intermittent aguish apoplexy, aguish paralysis, aguish sore eyes, aguish rheumatism (called intermittent

* A lady consulted me on account of troublesome cough, uncertain as to expectoration, occasionally rather dry, and sometimes producing towards evening difficulty of breathing, which lasted generally through the night until nearly morning, when profuse perspiration came on, on account of which she and several of her friends apprehended tubercular consumption, some of her brothers and sisters having died of that disease; other persons told her it was spasmodic asthma. The tongue was very slightly coated, the pulse above 100, and the skin rather dry: these were some of the symptoms of consumption; but the stethoscopic signs of either asthma or tubercles were absent, and I remarked that the colour of the skin was rather dusky and sallow. As she had been my patient before she went abroad, I asked if she had not had "the fever" (ague) in the West Indies, whence she had returned about five months. She said she had, and had not felt quite strong ever since; upon this I decided that she had caught cold (catarrh) upon the dregs of an ague, and therefore gave her quinine to cure both together, and a little mucilage with squills and syrup of poppies to pacify the cough when troublesome, and allowed her to go into the country. In about a week she returned, saying she felt much better, *but* had had a regular fit of the ague the day before. I desired her to double the quantity of the quinine, and assured her that she would be well in another week. She objected that a mutual medical friend had told her she must leave off the sulphate of quinine, as it was not safe to take it with such a cough. By following my directions, however, she was quite well in ten days, and has continued so now for some years. It is scarcely necessary to observe that dry cough is a frequent concomitant of ague, independent of catarrh.

neuralgia,* &c.), all which are well described by Macculloch.

* In the last note I gave a case of masked intermittent; I may now offer one as a caution against confounding inflammation with neuralgia. A gentleman, aged forty-five, caught cold, which was followed by a cough and severe pain, shooting from the right eye to the back of the head, which was aggravated when he coughed or walked, and at those times extended to the top of the head; pulse generally about 100, hard. When this state of things had existed for some weeks, his medical attendant called in a celebrated veteran physician, who prescribed guaiacum for the pains, considering them rheumatic. After this he was cupped on the neck to fourteen ounces, without relief. In about a month he found the sight of the eye weak; the pains became excruciating, especially periodically from one o'clock a.m. till six, and he got *no sleep;* even during the day the pain would not permit him to read or write. Another physician was now called in, who administered anti-neuralgic medicine and laxatives for about three weeks unavailingly. The gentleman's ordinary medical attendant consulted me at this period, and I recommended bleeding, considering that there was chronic inflammation of the membranes at the base of the brain; but the patient refused to allow it, partly on account of feeling so weak, but principally because he had had an increase of pain after the cupping, though I expressed my opinion that that was merely because the cupping had not been sufficient. My diagnosis was soon confirmed by the occurrence of paralysis of the eyelid and of all the muscles of the eye except the trochlearis, producing squinting (which may be accounted for by the root of its nerve lying about a finger's breadth out of the line of those of the other nerves, the fifth and seventh, where the inflammation ran); there was also a degree of deafness, besides numbness and pricking in the side of the nose, cheek, lip, and teeth. A consulting surgeon was now called in on account of the eye, who recommended blisters and mercurial medicines, but without success; as, however, he coincided with me as to the propriety of bleeding, the patient at last gave way to our united entreaties, saying that he thought himself too weak to bear it, but that, as he could not exist under the pain, he therefore consented

Ague frequently degenerates into continued fever; and I must add a few words upon the nature and variety of the degeneration. When the fever is of the simple continued kind, synochous, with hot skin, the ague is called a remittent; when it is of a typhose low character, it assumes the form I have described as dead ague.

Ague constitutes the link between fevers and neuroses; but in ague, besides the neuralgic state of morbid sensibility of the medullary tissue, we have abundant evidence of the febrile plethoric congestion of the cineritious tissue also; so that a compound treatment becomes necessary,—different from that of the neuroses, as well as from that of fevers. The sedative treatment which suits fevers suits agues, and more especially the irregular ones; for those irregular dead agues, or remittents, which are deteriorated agues, will be brought to the regular state, as just alluded to (if not cured), by sedatives with quinine: and this is also the case with influenza and with cholera, which are both closely allied to the ague. The regular agues, which approach more closely to the neuroses, will be, like them, cured by tonics alone; and, like the neuroses, bear stimulants much better than fevers, remittents, influenza, or cholera, which are curable by sedatives, of course requiring the addition of tonics, especially in convalescence. In

to lose "a small quantity of blood." We, however, got away about twelve ounces; which relieved him so much, that he did not object to being bled again the next day, and repeatedly for some weeks, and occasionally for five or six months, until he was quite well, as he has continued ever since. The eye and its muscles have recovered their functions; but there long existed a disagreeable extra-sensibility in the skin of that side of the face.

cases of fever, and in all kinds of ague, influenza, and Asiatic cholera, there is an internal congestion of the viscera, involving the nervous ganglia, which is relieved by sedatives; though in regular *ague* and *cholera*, from peculiarities which may be explained, stimulants are borne with more or less impunity,—for, though they do *no good*, they do *no harm* unless pushed to excess. It is not surprising that persons who adopt any *exclusive practice* cannot account for or see how far an *opposite treatment* may be harmless, though useless.

In regular ague, constitutional morbid sensibility is prominent. There exists, it is true, a great degree of congestion of the nervous system, as well as of the viscera, during the paroxysm succeeding to the infliction of the malarious morbid poison; but rarely is real fever produced. There is the pyrexia, equivalent to what occurs with inflammation, or in hysteria or indigestion, but seldom actual fever—not that loss of power in the capillaries of the nervous centres which prevents the generation of nervous influence; for in ague, stimulants, unlike the effect they have in fever, do not produce the coma of plethora—the nervous centres being little injured, only debilitated, are relieved by the stimulant narcotic tincture of opium;* and consequently fresh temporary energy is communicated to the capillaries, even in the hot stage, by which they resist the heart's injecting force. Thus we may explain the apparent inconsistency of using venesection and laudanum

* In the medical writings of last century, there is abundant testimony to the use of laudanum in ague in the hot stage; but not in the cold or choleraic stage.

simultaneously in ague, which has been recommended by some. The venesection, which we know produces the best effects, is not to relieve inflammation, but congestion; and hence is not often necessary, except, for instance, to relieve some organ, as the brain or lungs, which may be evidently suffering during the paroxysm, through its having been previously in a morbid state, as we see in the hemiplegic modifications of ague, which form an exception to the use of laudanum. In the latter, the paroxysms are accompanied by coma and paralysis; the brain having been previously unsound, though the pulse is weak, as in the state of debility after apoplexy and wounds of the head; and as the aguish congestion passes off, the hemiplegia or coma passes off also, until the renewal of the periodic paroxysm.

Previous to the visitation of CHOLERA in 1831-2, before I had an opportunity of personal observation, I was led (by reading letters from India, and books) to make a too-limited estimate of the other symptoms of cholera, and to refer chiefly to the affection of the stomach and bowels (old English cholera morbus) as the cause of the collapse. When, however, I encountered the enemy hand to hand, I saw at once that it was a febrile disease, both as regards its epidemic and miasmatic origin; and that it was almost, if not altogether, a fever of a fresh type; and I often thought of what the great Sydenham candidly said of the difficulty which he experienced in his first encounters with new epidemics. I inculcated, therefore, a treatment in cholera similar to that success-

fully adopted in fever and ague, and which was carried out with marked success by some of my medical friends in London, Paris, and elsewhere.

I consider cholera an essentially febrile disease, whether it assume the remittent or continued form; and that it is not *a new disease*, but the same described by Sydenham in 1669, and subsequently by Morton and Frank—the same which occurs in Madras, Bombay, Bengal, Italy, Russia, England, and elsewhere; and when, as above, I use Sydenham's terms, "fresh type" and "new epidemic," I do so not as implying a new disease, but, as he does, a modified form of a disease, according to the "constitution of the epidemic in the year in which it occurs;" just as he speaks of the great peculiarities assumed by the identical disease small-pox at different periods.*

* Cholera is a disease of functions, not one of anatomical organic lesion; and the pathology is similar to that of fevers. At first there is no organic change, but an affection of the system conveyed through the nerves; subsequently, during the disease, if it last long, complications may arise, as those of the thoracic or abdominal viscera or brain; neither of them, any more than in fever, being essentially connected with the disease, though Broussais, Clutterbuck, and others, have said otherwise of fever: in these cases, of course, after death, morbid lesions are found, but not uniformly the same, though in particular years considerable uniformity exists; as in some years, in epidemic fevers, the bronchial membrane is chiefly affected, as remarked by Sydenham during the epidemic fever of 1685, which he denominated "febris nova;" and which was also the peculiarity of the epidemic fever of the year 1831, in London (see p. 259). In other years, disease of the intestinal mucous membrane and its glands prevails, as described by Broussais and other Continental writers, and by Jenner; whilst in some seasons and localities disease of the liver accompanies the fever. But if a person were to die on the first day of the disease, who had been sound up to that time, no visceral morbid

Invaded as we have been, and are likely to be, at various times by visitations of Asiatic cholera, it is incumbent on all those who have had experience in the treatment of it to communicate the result to mankind. More especially is this due to the members of the medical profession, many of whom, though now highly qualified, were not of an age, or in a position, on the former occasions of its ravages, to have witnessed them, or to have profited by what they saw. There are, besides, a number of the more experienced who can scarcely feel satisfied as to the proper mode of treatment; for, from the partiality with which it attacked some places, while portions of other districts entirely escaped, it has remained almost unseen by numerous persons of extensive practice.

There exists also a source of danger from erroneous directions put forth with the weight of imposing authority; as, for instance, those from the Board of Health, published in the *London Gazette* of the 6th October 1848, and elsewhere, in which the instructions given are inefficient, and partly erroneous. In pointing out what I know to be useful in the way of remedies, these errors will be made sufficiently evident.

But, as it may be asked upon what authority I express myself so confidently, I may be excused for

change would be found. Thus, in cholera, various visceral lesions have been observed and described; but these had existed before the attack: when the viscera have been previously healthy, and the patient has died quickly, nothing has been found except appearances of congestion, and that fur upon the mucous membrane of the intestines which resembles a very furred tongue.

stating, that I have grown gray in the service of medicine. It is some years since other professional engagements, more especially that of the University of London, compelled me to migrate from the London Hospital, one of the best medical schools in Europe, where I had taught for more than twenty years. Hundreds of medical men, who were my pupils during that period, are now practising in London and various parts of the world. The fourth edition of *First Principles of Medicine* was translated into French and German, and reprinted in the United States of America; so that, this being the sixth edition, there are several thousand copies of the work in the hands of the profession, containing the views upon Cholera which are here again advocated; and I have not yet met, either in conversation or in print, with any attempt to controvert them. In a matter of this nature, upon which such conflicting opinions are advanced, it seems necessary to offer some kind of credentials, which must be my apology for so much otherwise apparent egotism.

Cholera is a species of *fever*. This is already granted by some; to others, who hear it for the first time, it may seem a startling assertion: and, until they are convinced, it will of course be difficult to induce them to use the proper remedies, namely, fever-medicines; and to avoid what are useless, if not hurtful, *i. e.* stimulants, including caloric.

Ague is a kind of fever, so is small-pox; the cold shivering produced by internal inflammation also, such as pleurisy, is a febrile state. How different is that first accession of these diseases to what occurs afterwards! yet not more unlike than the

first cold stage of cholera to the second or *febrile* state, which at first was not recognised, because so many died in the previous cold stage; and even in those cases where death did not occur until the febrile heat had commenced, the medical attendant, being generally a novice in this disease, supposed that this (in reality febrile) heat was only the beneficial result of the stimulants he had been administering, and was surprised when the patient died within a few hours.

The cold stage of what is called "fever and ague" is as like cholera as may be,—cold surface, shrivelled skin of hands, livid face, crampy pains in the limbs, pain in the stomach, headache, faintness, nausea or vomiting, and sometimes diarrhœa,—in which latter case, of course, little or no urine is passed, as in cholera.

At the accession of small-pox fever, the patient is violently sick, with cold shivering, and pains in the stomach, back, head, and limbs.

A patient with suppurative inflammation of some internal organ,—the liver, for instance,—will become pale and cold, with the hands and feet cold as ice, his teeth will chatter, and the whole frame shiver; he will also have pains in the head and back, and faintness. In such cases as these, the medical man, having previously known the existence of the inflammation, which has arrived at such a height as to produce these symptoms, does not attempt to relieve the patient by hot brandy and water, but rather strikes at the root of the disease, the inflammation, by what are called fever-medicines—antimony and salines, with leeches, &c.

When the shivering, sickness, and pains preliminary to small-pox commence, will the practitioner, if he be aware of the nature of the case, as from others of the family having it, give hot brandy and water? Will he not, on the contrary, try to mitigate, by fever-medicines, the feverish symptoms which he knows will supervene?

In the cold stage of ague, it is well ascertained that nothing cuts short the shivering, and other miserable sensations, so effectually as an emetic, without the aid of any artificial external heat, or internal stimulants.

Thus we see, that when medical men are thoroughly acquainted with a disease, they follow in many instances that practice which, although called indirect, is the most efficacious. Such indirect treatment I know to be the most successful in cholera, the appropriate treatment for this disease being:

Water, half a pint.
Tartar emetic, two grains.
Sulphate of magnesia, half an ounce. Mixed.

The dose is, for an adult (from fifteen years upwards), a table-spoonful every half-hour; for a child of a year and a half or two years, a tea-spoonful; and for the intermediate years, a proportionate dose.*

* It seems almost superfluous to remark, that these minute doses of neutral salt do not act as a laxative on the bowels (though, with respect to this passage, one journalist remarked that, for cholera, Dr. Billing prescribed *purgative* doses of Epsom salts!); they may influence the kidneys, the secretion of which is uniformly suspended in true cholera. This, however, is not the object; the saline sedative is given to coincide with the antimony (tartar emetic)—the best-established of febrifuge medicines—in counteracting the febrile disease.

External heat is useless. I have found the attendants scalding their hands in applying flannel wrung out of hot water, bags of hot bran, and other fomentations, without effect; these I have always put aside, and, generally, by the time the patients had taken the third dose of the mixture (if not before), they have described a sensation of warmth creeping over them. The first or second dose usually begins to allay the nausea and diarrhœa.

I am not so absurd as to assert that this treatment is infallible, there being of all diseases, as scarlatina, small-pox, jungle-fever, or cholera, *different degrees;* from that which *kills* in three or four hours, to that which *never confines* the patient to bed: one individual will be so *slightly* attacked by cholera as to be able to *walk about* during the whole course; a second *dangerously*, but still *within* the reach of *medical skill*, and *without* which he will *die;* a third *mortally*—the dose of the morbid poison of the epidemic imbibed by the patient being so deleterious that no human aid can avail, any more than if a cannon-shot had passed through his body,—the violence of the attack resembling the severe epidemic fevers of hot climates, wherein soldiers have been known to drop down on parade, and die in a few hours.

Cholera patients should be allowed to *drink freely of quite cold water;** it is the only beverage

* The uniform desire for cold water in cholera is an example of natural instinct which is thwarted by man, in his wisdom; while every thing hot, both as to caloric and stimulants, is often poured into the patient. In confirmation of the propriety of cold water, we may refer to the successful treatment by cold

agreeable to them, and is a sedative useful in relieving the sickness and other symptoms. As soon as the urgent symptoms are checked, it is beneficial to give a few grains of calomel, because the liver suffers similarly to what it does in ague. Disulphate of quinine, two grains or more every fourth hour, also, should be early administered, the disease being analogous with ague; but as long as the skin continues dry, and warmer than natural, as alluded to above, half a dose of the fever-mixture should also be given each time with the quinine.

The diet should be nutritious, but light, as the tone of the stomach is greatly depressed; at first nothing is better than milk mixed with water, arrowroot, or gruel, given cold, until the patient's own sensations make him prefer them warm, which is evidence of a return to a more healthy state; in this respect the patient's own wishes must be attended to.

Dry friction seems to be the only useful external application.

When the fever-medicine cannot be quickly obtained, it is well to be acquainted with a ready substitute. The following, which is in almost every dwelling, will be found to have much influence,

water alone, published by Dr. Shute in the *Lancet*, 1832, vol. ii. p. 774; and I may add a simple case of one poor artisan, whom I found in his own dwelling convalescent from cholera, who said that, finding the frequent motions very troublesome, he remained almost permanently on the commode; and, feeling excessive thirst, drank "gallons" of cold water, until, after some hours, the complaint "worked off:" had he been scientific, he would have said, was "eliminated"—although effected without podophyllum, jalap, or castor oil.

though it certainly is not so efficacious as to allow us to dispense with the saline antimonial mixture, if the latter can possibly be procured.

Half a pint of water.
A large table-spoonful of common table-salt.
A large table-spoonful of flour of mustard. Mixed.
The doses the same as of the former.

Mustard is a well-known emetic; but it is not because it, or tartar emetic, or ipecacuan., or sulphate of zinc, in large doses, produce vomiting, that they give relief, but because the emetic substances and salines, in divided doses, have a sedative effect on the nerves and capillaries of the primæ viæ, that antagonises the influence of the epidemic poison which produces the phenomena of cholera, ague, and other febrile states.

Several other prescriptions might be given, containing metallic and other salts and emetic substances, used successfully by various practitioners; but it is unnecessary to enumerate them, as they all act on the same principle.*

* For the purpose of demonstrating the mode of treatment recommended, I may add a couple of cases taken from my note-book; the first having all the marked symptoms of the worst form of cholera from which patients can recover.

March 14*th*, half-past ten p.m. W. H. M., aged 40, had been out attending to business, and rode in an open carriage from about three till five p.m., in good health and spirits, as remarked by his wife. About six p.m., attacked with pains in limbs, back, abdomen, chilliness and coldness of the skin, with frequent vomiting and purging; supposed to have had thirty watery motions up to the present time; the matter passed like barley-water or thin gruel, with white farinaceous-looking sediment; no urine; thirsty, but tongue clean, moist, and cool; pulse 110; very feeble, countenance cadaverous, skin livid (blue-black),

The "sal volatile," recommended in the manifesto of the Board of Health, is not hurtful as to the medicine itself, but inefficient; and "hot water,"

hands cold, and the skin shrivelled; fingers crooked like a bird's claws, and in pain from cramps in hands, arms, feet, legs, neck, and trunk, both back and abdomen; voice shrill; complains chiefly of the cramps, cold, and nausea. Ordered antim. tartariz. two grains, magnesiæ sulph. half an ounce, in half a pint of water; a table-spoonful to be taken every half-hour.

Two a.m. (three hours from last visit). All the symptoms relieved: no sickness, only two more motions of the same appearance; cramps gone from hands and arms, and less in the trunk—still in the legs; hands less cold, does not now feel chilly; began to feel warmer along the back after the second dose, *i. e.* little more than half an hour after commencing the medicine, though the previous efforts of his attendants with *hot flannels, bags of hot bran, &c. had not produced the slightest effect*, and were thrown aside by me on my first arrival.

15*th*, eleven a.m. All the symptoms relieved; pulse full, soft, 76; still rather thirsty, and skin warmer than natural, and dry; tongue clean, rather whitish; has had refreshing sleep within the last hour—none before; feels only weak; no cramps, but pain in muscles on motion; only three motions like the former during the last nine hours, amounting to about two pints; none for the last three or four hours; no urine; slight nausea after the last dose of the medicine—let him take only half a table-spoonful every two hours, and five grains of calomel immediately.

Six p.m. One yellow, fœtid, feculent motion, and nearly a quarter of a pint of natural urine.

Eleven p.m. Has had some sound sleep, feels comfortable but weak; and muscles feel tired, and rather painful after the cramps.

16*th*, mid-day. Feels well, but weak; pulse 84, full and soft; skin still warmer than natural. Ordered to continue the mixture every four hours, with sulphate of quinine. The recovery progressed rapidly.

Having alluded to the very slight cases, I may subjoin

if given with it, is positively injurious. The next thing there recommended, "*hot* brandy and water," is also injudicious as a general direction: as it must be known by every person, medical or not, that hot brandy and water is inconsistent with fever-medicines in most feverish disease. But Brunonianism is again in the ascendant (see p. 283). If the patient does not die in the cold stage, a quantity of brandy in his inside may add to the fever when he arrives at the warm stage; and practitioners who formerly witnessed the cholera will recollect having sometimes seen a patient begin to get warm during such treatment, as if benefited by it; whereas this incipient warmth indicated the commencement of the second stage of the disease, and not relief from the disease,—for the patient precisely at that period died, to the disappointment of all around him.

one.—Called at ten p.m. to a lady. She had been attacked in the morning with a shivering, slight nausea, and diarrhœa; about six watery motions (with white sediment), unaccompanied by griping; no cramps, but some pain in calves of legs; the shivering continued, and she took a hot bath without any relief; she then went to bed, and could not get warm until after drinking a great many cups of mixed tea (a sedative), when profuse perspiration came on, with relief, in which state she was at my visit. There had been a dry heat before the perspiration, but even then a tendency to shivering; and she remarked, that upon stretching out the hand, or even turning the head round, there was a sense of shivering produced (morbid sensibility, independent of temperature). I recommended her merely to drink some more cool tea if thirsty; and, in case of any return of the diarrhœa the following morning, to take a dessert-spoonful of the saline antimonial every half-hour. It did return, with nausea, and the second dose removed it entirely.

One of the instructions of the Board is, "*in a word, to do every thing practicable to procure a warm general perspiration until the arrival of the medical attendant.*" Did the writer of this ever see cholera? In it no human means *can* directly procure a warm general "perspiration." The first change, whether beneficial or otherwise, must be into a gradual restoration of *dry* warmth, not *perspiration*, which, as shown above, causes many to be deceived as to the operation of stimulants. The other directions, although not incorrect, are obvious truisms: "to keep the feet dry, the chambers ventilated, not to drink to intoxication, to wear flannel next the skin in damp, cold weather." There is also a caution against "the use of cold purgative medicines, except under medical direction,"—as if the English were in the habit of using such medicines—senna, colocynth, or salts—as part of their diet! Then there is the common fallacy of confounding *post hoc* with *propter hoc*,—when one event follows another, assuming the former to be the cause of the latter, where there was merely precedence of time. For instance, cholera has occurred after "a hearty meal:" wherefore must strong men,—sailors and others,—with good appetites, after working hard, go to bed supperless for fear of the cholera?

"Vegetables and fruit" are interdicted, although a most useful and healthy part of our diet, and articles which physiologists show, from the formation of our teeth, we were intended to consume; if, indeed, it were not enough for our guidance that a bounteous Providence has given them to us as a useful admixture

with animal food for the preservation of our health. Because some poor creatures, who could not afford better diet, had fed upon "plums and sour beer" previously to being attacked with cholera, "fruits of all kinds, though ripe, and even cooked, and whether dried or preserved," are forbidden, as well as "green vegetables, whether cooked or not." Whereas, on the contrary, good vegetables and ripe fruit, by preserving a healthy state of the secretions, will rather give strength to resist an epidemic influence. "Pickles," too, are forbidden, though the antiseptic properties of the vinegar and spices used in their composition will tend rather to prevent than to promote cholera in disease.

Having stated what is essential as to the practical treatment of cholera, I may add a few observations on the theory of the disease, and the analogy between it and ague.

It would be difficult for any person unacquainted with the phenomena of "fever and ague" properly to understand this subject.

What is called "the fever," so well known in India, beginning with chills and shivering (rigors), followed by intense heat (after which, in favourable cases, there is perspiration, with relief of symptoms), pursues occasionally a different course; for, as we also see here in common ague, sometimes the sweat does not come on, but the skin remains hot, in a state of continued or remittent fever. Who, that has seen much of the cholera, does not recollect some cases with this routine? Again, "the fever" of India, when it goes through the ague stages,

does not, like our agues, continue for weeks; a second, or at most a third daily paroxysm, is usually fatal in the severe cases which the physician cannot check. Who has not seen patients die in cholera after they had become quite hot, that fever-heat exciting fallacious hopes? There was an epidemic, the "Bombay fever," recorded more than half a century ago, which is said to have destroyed the patients in the cold stage; and it was inferred that, had the patient lived, the hot stage would have come on. Who will decide now whether that was cholera or remittent fever, or which is which? for, though called fever, the description agrees with cholera. Whoever has had much experience in ague, has seen all the modifications of cholera; the cold stage, with convulsions (spasms) = spasmodic cholera; ague, with nausea and diarrhœa, and, of course, little or no urine = the purging cholera; ague, with livid blueness of the skin, and shrivelled fingers, like a drowned person = blue cholera; ague, passing into continued fever = another common termination of cholera, as I have shown at p. 434.

One of the most successful modes of treating ague used to be to give an emetic in the cold stage, followed up, of course, in the intervals by bark (now quinine) or other tonics, with calomel, purgatives, &c., *pro re natâ*. I have taken occasion to show my clinical pupils that bleeding, according to the old system, in the cold stage, is perfectly safe, and analogous to an emetic as to efficacy; I have not frequently resorted to it, as the emetic answers the purpose, but have merely bled the patient, by leeches or other-

wise, when requisite, between the paroxysms. It is pretty well known how valuable an adjunct to medicine bleeding has been considered in cases of cholera; but the evidence is complicated, from the variety of treatment which has been adopted in conjunction with the bleeding. There is, however, unquestionable evidence recorded that patients have been raised by venesection from a state of collapse, which we know, by experience, scarcely any medicine, except antimony, could have acted upon; and in which, on opening a vein, "the blood, from its tarry state, has scarcely oozed forth; but, by rubbing down the vein, it has trickled out by degrees, and at last flowed, with relief."*

It would be quite beyond the limits and scope of this work to proceed much further with the description of cholera; but in Dr. James Johnson's *Medico-Chirurgical Review*, April 1832, ample and valuable information on the subject will be found. At p. 627 there is a note by the editor especially worthy of notice, showing that the gruel, or rice-water, evacuations which constantly occur are not specific, but are merely the result of all the bile and fæces which had been in the intestines being carried away; for, as he says, "*ex nihilo nihil fit*;"—and I may add that, so far from a "discharge of bile completing cure," the discharge of bile is merely the ordinary event, evincing remission of the disease, or convalescence; and a renewed diarrhœal paroxysm of cholera would soon wash that away too. This clear-sighted and

* Communications from the late Dr. Tindal Thornton—then in the Indian service at Trichinopoli—and those of others of his pupils, to the author, previous to 1832.

experienced physician also inculcated the use of sulphate of quinine, as I have done, on principle.

A large proportion of severe cases of Asiatic cholera, if taken in time, may be cured by acting upon the principle of relieving the internal congestion by the methods recommended; unless, indeed, —analogous to what takes place sometimes in continued fevers,—the individual have received a dose of the epidemic poison so powerful, that it will certainly prove fatal, despite any mode of treatment. If the blood has begun to coagulate, the patient is dead, to all intents and purposes, even whilst breathing and speaking, and the heart acting. I have heard the sounds of the valves of the heart just before death in cholera, when I am satisfied clots were already forming in the ventricles. At this stage, of course, neither sedatives, stimulants, bleeding, nor any thing else, can produce an effect. The slight or moderate cases of cholera have a tendency, like ague, to remit of themselves; hence, whatever treatment had been adopted, the prescriber used to think he had cured them: and thus I have been repeatedly told by a practitioner that he had found the right thing to cure the cholera; but the next time I met him, there was a diminution of confidence in his specific. Any person, however, who will treat the disease on principle, may defeat it by a variety of weapons, only using them with energy,—antimony, all kinds of salines, acetate of lead, sulphate of zinc, common salt-and-water, even cold water, lemonade,* or calomel; but the last, if used

* *Case by W. G. Maxwell, M.D., Calcutta.*—"Previously to the time when I was attacked by cholera, I had for ten years

in the quantity necessary to be sedative, may afterwards produce severe specific action on the mouth.*

Stimulants in moderation do little harm, except that of augmenting the secondary fever; as in many cases of cholera, which might have been safely combated by the sedative constringents, the hot or febrile stage would have been scarcely percepti-

and more been treating it, and trying to cure it, in others; but when my own time was come, and I lay prostrate, then did I feel how little I knew of the disease. I had lost my patients under every treatment that I tried; and I had also seen cases *recover* which I had given up, and *placed on litters to be brought to the next halting-ground for interment.* These would have no covering, but would have the *cold, damp air of night* blow on them, and they recovered.

"It was by *chance* that I fixed on citric acid (lemonade) for myself. It was standing amongst many other bottles on the table in my room, and I fancied it as the very thing I had an *internal longing* for.

"I took more than two ounces of the crystallised acid (equivalent to three dozen of lemons), in copious repeated draughts, which refreshed me and allayed the dreadful thirst; I passed urine, and recovered."—*Medical Times*, Dec. 9, 1848.

This case is the *beau idéal* of empiricism; but I wish to turn it to account, as an illustration of the principle of action of a sedative astringent on congested primæ viæ, and, by contrast, the inutility of hot applications.

* Dr. Ayres, in his communications in the *Lancet*, November 1848, states that he has not found salivation to result when he has treated cholera by calomel; and he quotes numerous cases in confirmation. This does not agree with the reports of other practitioners; and as we know that salivation occurs occasionally some time after mercurial medicine has been discontinued, I feel it safer to employ antimony, which I have experienced to be more efficacious, although, as mentioned above, I have also used calomel with it sometimes.

ble if stimulants had not been used freely during the collapse.

Considering, then, the constringent effect of the various sedatives—antimony, mercury, lead, neutral salts, acids, and alkalies—we can understand how, as they ultimately coincide in the indication of cure, they have been adopted by different persons to effect the same purpose; and each, finding some particular substance efficacious in certain cases, has subsequently used that in preference to others.

These observations on cholera were printed as a *brochure* of a single sheet in 1832, and have also been published at each subsequent attack of the epidemic, and circulated amongst the profession. It must be evident, however, from the publications in the periodicals, even on the last invasion, that the profession are not agreed upon any decided plan of treatment. But the author cannot resist the temptation of introducing here a recent confirmation of his doctrine, contained in a letter addressed to a friend of his, Dr. Daldy, from a gentleman engaged in the practical treatment of cholera:

"Cholera Hospital, Wapping,
"*August* 21*st*, 1866.

"Dear Dr. Daldy,—In replying to your very kind note, I may state that, at present, I have only treated twelve cases of cholera (and all in collapsed stage) by Dr. Billing's method,—that is, with tartar emetic and Epsom salts. Of these, eight have recovered, and four have died; or, a mortality of 33·3 per cent. In addition to these, I have treated others with quinine from the first (which I think compatible

with Dr. Billing's theory*), with somewhat similar results; but some of these are still under treatment. In the few cases where camphor has seemed to do good, it has acted as an *emetic*. How any one can watch cholera, and not acknowledge its similarity to fevers, I cannot imagine.

* * * * * *

"Yours faithfully,

"W. Bathurst Woodman."

It is scarcely necessary to remark, that 33·3 per cent would be a small proportion of deaths, even taking the slight and severe cases indiscriminately. Thus, in the report on the epidemic cholera in the army of the United States in 1866—published in the *British Medical Journal*, Nov. 2, 1867—it is stated that the proportion of deaths, on the average, in all sorts of cases, was 50 per cent. And no wonder; for we find that the reporter, Assistant-Surgeon Woodward, states: "As to the question of therapeutic "agencies, it cannot be said that any new light has "been shed upon the existing obscurity of the

* Precisely so. The employment of quinine, which I have inculcated in this work in neuralgia, rheumatism, and congestions of the viscera in aguish disease,—in which I am supported by Continental writers,—suggests an analogous indication in cholera, in which I have employed it as an adjunct to antimony and other sedatives, but without depending upon it entirely. Dr. Woodman's suggestion is, however, very valuable, especially as he has tried it singly; and on the first return of cholera I should be inclined to use it more freely, as I do in remittent ague. I may observe that the followers of Rasori designate quinine a contra-stimulant=sedative; which was the evident effect of the camphor above-mentioned.

"subject by the army experience. The chief "modes of treatment employed are indicated in "the appended reports, and the general tendency "of the facts recorded must be to direct atten- "tion rather to hygienic precautions, intended to "mitigate the violence of the epidemic, than to "methods of treatment which have hitherto, un- "happily, proved so *unsuccessful.*" In the report, there is a great deal of untenable hypothesis about water; and immunity from the epidemic in a certain situation is attributed to the men drinking distilled water, or rain-water from cisterns, instead of the water of the Mississippi; whereas it may be fairly inferred that the exemption was because a cordon was placed to prevent them going down to fetch water on the low banks of the river, where assuredly the choleraic influence from the soil was rife.

Now, after four visitations of cholera,—in 1831-2, '48-9, '53-4, and '66-7,—let us read the Report lately published in another of our medical journals, which concurs with the American.

"In the direction of preventive measures only has "a single step in advance been taken, by the com- "bined effort of the Medical Department of the Privy "Council and the great body of the London phy- "sicians; in the direction of successful treatment, "the great experience of the pestilence last year "in London has not enabled them to make even "a single step: on all sides there is the same "confession of ignorance and helplessness, so ap- "pallingly impressive in previous epidemics; the "same repetition of the same methods, the same "futile experiments, and the same fatal results.

"Perhaps we are wrong in saying so absolutely, "that no advance has been made; for indeed it "is something to become clearly conscious of our "ignorance, and something more to make public "confession of it. It is true the number of those "who have achieved this something, and who "plainly and practically admit that drugs are use- "less, and worse than useless, as remedies for "choleraic collapse, is small: but it is an increas- "ing number; and in its number we think we "descry the dawn of endeavours after modes of "treatment which, whatever may be their short- "comings, will at least have the sanction of science "and common sense. There can, we apprehend, "be little doubt but that, in a vast multitude of "cases, the fatal issue has been hastened by 'treat- "ment:' calomel, opium, strychnine, sulphuric acid, "and castor oil, as well as injections into the veins, "are chief among the countless number of agents, "the powers of which, if we have read the litera- "ture of cholera rightly, have been sorely abused. "It is therefore something, as we have said, to "testify as follows: 'The clinical history of the "present epidemic also shows that medicine is still "as helpless as it ever has been in controlling the "course, and reducing the fatality, of the fully "developed disease. . . . . Medicine has not yet "discovered the means of rescuing an individual "from the advanced stages of cholera.'* Referring

* *Eighth Report of the Medical Officer of the Privy Council*, 1866, p. 367. (Report by Mr. John Netten Radcliffe on the Sources and Development of the present Diffusion of Cholera in Europe.)—*Blue-Book.*

"to cholera in Malta during 1864, it is stated in "the Sanitary Report of the Army Medical De- "partment (pp. 344-5) that 'the Pharmacopœia "and medicine-stores are well foraged, but to no "good end,' and that 'the experience of the epi- "demic tends to the inference that no known system "of treatment hitherto adopted has but the slightest "pretensions towards cure.'

"These conclusions have obtained practical ex- "pression at University College, London, where, "during the recent epidemic, most of the cholera "patients were treated without drugs, and where, "after various plans had been tried, the non-drug "treatment was the one most in favour.* The "Royal College of Physicians not only implicitly "abandons the use of drugs, but declares itself "helpless. The Lords of her Majesty's Privy "Council consulted the College respecting the issue "of instructions to captains of merchant-vessels "'how they should act when proper medical at- "tendance cannot be procured, so as to provide for "the health of their crews against attacks of cholera.' "The reply of the College (dated July 4, 1866) "consists mainly in the recommendation of hygienic "and precautionary measures, their directions for "the treatment of cholera itself being contained "within five lines, which are as follows: 'The "patient should be strictly kept in the recumbent "position, he should be allowed to drink water "freely, and should be abundantly supplied with

* What a frightful statement! Of course, if a man does not know what to do, he is wise to do nothing, lest he should do damage.—A. B.

"fresh air. Warm applications should be used to "the feet and legs, and a mustard poultice should "be applied to the pit of the stomach. Cramps "may be treated by rubbing the affected parts "with the warm hand.' Here is the sum total of "advice which the collective wisdom of a Select "Committee of the Royal College of Physicians in "1866 can offer the Lords of her Majesty's Privy "Council, concerning the treatment of cholera. But "surely even this advice is better than the pre-"scription of medicines which experience proves "to be useless, not seldom injurious, and generally "more or less distressing to the patient. Thus it "appears, according to the confessions of both the "civil and military medical authorities, the instruc-"tions of the Royal College of Physicians, the declar-"ation of the most authoritative writers, and the most "recent practice in London, that no further approach "to a discovery for a cure of cholera has been made "in 1866 than was made when England was sur-"prised by the great epidemic of 1832."—*Medical "Press and Circular.*

Notwithstanding the above statement, my views as to the pathology and treatment of Cholera have been published more than thirty years, and the writings in which they are contained have been read by thousands of the profession, and the principles therein inculcated adopted by many practitioners. But it is rather difficult to catch the attention of inconsiderate persons, some of whom have taken thirty years to begin to understand the cause of the *sounds of the heart*, or that inflammation is not *increased* arterial action (p. 78).

During one of the incursions of cholera (1848-9), at a consultation with a medical friend upon a case of lung-disease, I asked, "Why did you let your neighbour C—— (a surgeon) die of cholera?" "Because I could not help it. I have lost all confidence in medical treatment for it;—by the way, I have just left a patient who is dying of it." I said, "You once had the charge of one of the cholera dépôts, and probably know pretty well how long he will live." "Yes; certainly not beyond midnight" (it was then 5 p.m.). "Then, according to what you say, nothing can make him worse off than he is. Will you try my plan?" "Yes, with pleasure." I gave him the prescription printed at page 445. We had to meet again the following day at the same hour; and as he entered, I said to him, "Well, when did the gentleman die?" He smiled and said, "I have just left him walking about his room." One case, it may be said, does not prove much. But it is one out of a great many similar, such as those referred to at pp. 448-457.

In relation to medical treatment, I may mention that, during the epidemic cholera of the year 1866, I visited one of our large hospitals, and there saw about a hundred cholera-patients lying in rows,—some dying or dead, some recovering, —under the care of three unexceptionable professors of medicine. The first patient I examined was taking a dose of podophyllum daily—a step in the right direction, as being a sedative, independent of the vexed theory of "elimination." The next, a patient of the second professor, was taking a drop of creosote night and morning—not very efficient, but not injurious. The third pro-

fessor's patient was taking "*mistura rubra.*" Guess, reader, what that active and efficient remedy was: a little gum in water tinged with brown sugar! The assistant who went round with me said that he believed it was on the French *médecine-expectante* principle, *pour passer le temps* until special symptoms should be developed! Could such practice be denominated *secundum artem*, even although it were inculcated at University College? (See p. 461.)

Now a few words upon contagion. It is quite clear that cholera, and all other febrile epidemics,—measles, typhoid, scarlatina, variola, or whooping-cough,—after they arrive, are communicable from one *person* to another; but it is not by contagion (notwithstanding the statistics thereupon) that they are propagated from one *country* to another. At different periods, varying from seven to one hundred years, or more, the epidemics return in force. We had no recognised cholera from 1669 to 1831. If the epidemics depended upon contagion, they would not reappear when once they die out; but—as I infer—they are generated by some inscrutable electro-magnetic influence in the earth, uncertain in its wanderings and progress, except in one respect,—that the *epidemics uniformly travel from east to west*, not in a direct line, but zigzag, like a ship tacking against the wind; or—a more consentaneous simile—like the zigzag forked lightning,—as exemplified in the map of the progress of cholera given in the *Lancet* and other publications in 1832. I have never met with records which proved, or with one man of experience who asserted, that any epidemic ever travelled from America through Europe to Asia. During the epidemic of 1831-2, when the

cholera started from the ground, like a demon-sprite, in different distant localities in succession—here and there, from the Equator to the Pole—it nevertheless still bore to the west. The epidemic will be, of course, most rife in the unhealthy, crowded parts of low populous places, such as Bethnal Green, Old Ford, Wapping, Broad Street, or St. Giles's. It is in these places that there is most dirt on the surface, and numerous cesspools beneath it—both promoting malarious infection.* In such districts, when the epidemic *has arrived*, it will, of course, spread most; but it does come *without human intervention.*

In connection with this (see p. 459†), and other hygienic considerations, a great deal of unnecessary fuss has been made in respect to water-supply—enough to prevent people from drinking any, if they could do without it, and thereby to ruin the water-companies: the well-known truth being, that water itself is always the *same*, a definite compound of oxygen and hydrogen, whether it falls from the clouds and runs in rivers, or is drawn from land-springs. It may be, and is in the two latter cases, *mixed* with accidental impurities; and there is a nasty idea put forward of the quantity of sewage which gets into the Thames, and into all rivers which have large towns and population on their banks; it is said, also, that land-springs are more or less tainted by cesspools,‡ so as, in case of

* *Public Health: Ninth Report of the Medical Officer of the Privy Council* (John Simon, Esq., F.R.S.). With Appendix. 1866.

† What a grand idea is that of the whole Mississippi being charged with cholera-sewage, like the Broad-Street pump!

‡ On the contrary, a cesspool is a little turret of brick-work, on a brick and mortar foundation, which holds its contents like

cholera, to become deleterious. In general, it is but an infinitesimal, homœopathic quantity of drainage, not even a *soupçon* (as not being perceptible), which enters into the composition of the ordinary water-supply,—which is as pure as that which used to be drunk by our sailors, taken by the watering-boats from the river "above bridge," or by those inhabitants of London who at the same epoch were supplied by the Thames Water-Works, at London Bridge; or as the water drunk by peasants, brown from peat-moors, or muddy from rain-water wells or foul cisterns;—and I assert that the definite compound of oxygen and hydrogen, from these various sources of supply in common use, is not, *per se*, injurious. But water is a convenient mode of diverting the attention of a public dissatisfied with their care-takers, whether governmental or medical: as the docked tail of Alcibiades' dog was to the Athenians. The market-gardeners were at one time worse off than the water-companies, because people *could* live without "*fruit* and *green vegetables*," then (1848) under the ban of the wise investigators of the causes of cholera.

I do not mean to say that, at the present epoch, the Thames water at London Bridge—which is an infusion of dead dogs and other nastiness, washed backwards and forwards by the tide—is not very unsavoury; but it is more so from the products of

a cask,—and they cannot get into the land-spring; for if it permitted percolation, the water of the spring would immediately fill the cesspool, so as to render it useless. When the cesspool is full, it is not the modicum of cabbage-water and soap-suds, nor even of ordure, which may escape, that does any mischief; but the noxious effluvia of the dirty human beings who live over it, predisposing them to be affected by epidemic influence.

manufactories than from sewage: for, take some water from the river above Teddington (Tide-end-town), when not muddied by rain, and you will find it clear and drinkable, without perceptible taste or smell—though the river has received the sewage of I do not recollect how many large towns in its course: and it is nearly the same with the Seine at Paris, though a smaller river, which *labitur et labetur* in *one* direction; as well as at other cities which have not (on account of the *auri sacra fames*) been built on reflux tidal rivers. Even the muddy Tiber is not unwholesome; though, as the ancients did not know how to filter it, they went to the expense of bringing mountain-water by aqueducts: as we shall be obliged to do, unless the *manufacturers*, who have already spoiled the angler's sport, be compelled to utilise, or at least to hold back, their filthy products.

In any case, a good charcoal filter will supply a pure oxygen and hydrogen water from the muddiest ditch or stream in the kingdom; and there are many large towns or cities that could afford the moderate tax which would furnish, if necessary, an aqueduct for pure water, made, like the Roman, of brick,—or, in England, of iron pipes.

We have in some years suffered from another epidemic scourge, the influenza, called "la grippe" by the French, which is somewhat akin to cholera (minus diarrhœa), or rather, perhaps, is of a mixed nature, between the cholera or ague and typhoid (Sydenham's "new fever"); commencing with aguish chill and depression, and passing on to fever, with catarrhal complication and great prostration. The symptoms

seem not violent, and yet the disease is frequently fatal. This may be rapidly cured by an emetic, followed by saline antimonial medicine, and, as soon as the febrile state is checked, by quinine. I have only to observe, on the subject of bleeding in influenza, that it is seldom necessary, except when the epidemic is complicated with internal inflammation of the lungs and bronchial tubes, or other parts (as it has been in many cases); and then the patient will run great risk of dying, if he be not bled. This I mention particularly, because I have so often heard it asserted that the influenza does not bear bleeding or "lowering" treatment.*

* Of this I may offer one or two examples. A young woman presented herself as an out-patient of the London Hospital, with influenza of forty-eight hours' standing, flushed and chilly, with headache, pain in the chest, and soreness of throat. I took the opportunity of showing the pupils the antiphlogistic treatment of influenza: sent her directly to the clinical ward, had her bled to 16 oz., and gave the saline antimonial mixture and calomel. This treatment my assistant followed up with the addition of leeches to the chest. She recovered speedily.

Another case is that of a particular friend, who is in the habit of what he calls curing himself—which I translate, taking the wrong medicines, so as to render his case more complicated, before he sends for me. He wrote to me a note during the prevalence of the influenza: "I have been taking * * * * for two days; nevertheless, I am so much worse, that you must come and do something decided for me." I found him labouring under an aggravated attack of *influenza*,—flushed, catarrhal, with headache, incipient short cough, and pain at epigastrium. I took immediately a pint of blood from the arm, and gave him a quarter of a grain of tartar emetic and a drachm of Epsom salts in an ounce of water every two hours, for the first twelve hours. With this treatment, and sundry doses of calomel, rhubarb, and magnesia, which he afterwards took in addition, without

To illustrate further the nature of this epidemic fever and its treatment. A friend of mine came to dine with me; and, when we sat down, I observed that he placed himself with his back close to the fire,—very unusual with him,—and immediately took a glass of wine. I asked, "What is the matter?" "I have been shivering for more than two hours, with nausea, and feel too ill to eat." "Then it is of no use for you to sit there; it would not warm you if you were to sit on the fire, as the clown did last night" (we had been at the pantomime). I wrote with a pencil the prescription for a saline antimonial mixture every two hours, and dismissed him home to bed. Next day, he told me that the second dose took off the sickness and chilliness, and that he was all right, though still rather languid.

A few days after, I saw a patient with feverish hot skin, splitting headache, and painful dry cough, though he had combated the influenza the evening before by abundant brandy and water. Of course Dr. John Brown would have said that he had not taken enough!

Having so far discussed the real, practical, clinical treatment of diseases, inflammations, fevers, and neuroses, as produced by evident external causes, let us proceed to investigate some of the hypotheses, dignified by the name of theories, respecting the intimate pathology or proximate cause of disease.

my directions, he speedily recovered from the influenza, which is said not to bear "lowering" treatment.

The effect of the antimony and salts on cases of influenza, without local inflammation, is to take off the painful chilliness and nausea, exactly as in the case of cholera related at p. 448.

The hypothetical propositions of the author, which he has endeavoured to bring down to demonstration, are :

1. That DISEASE is some *alteration*, not of the fluids (or "humours"), but of those *actions* which depend upon the nerves, and which, when perfect, constitute the health of the animal (p. 19 *et seq.*).

2. The immediate effect of excessively lowering the power and energy of nerves locally, or of the nervous system, is inflammation or congestion of the capillaries (the first step towards inflammation), or fever, or neuralgia (called irritation), &c. ; and subsequent alterations, acute or chronic, in the metamorphic modifications of the blastema influenced by the nerves (p. 76).

But this opinion is inconsistent with the humoral pathology revived by some living authors,—a doctrine rejected and exploded as long ago as the end of the last century, and which included the opinions of the old women who were collectors of herbs, such as cardamine pratensis, tussilago, rumex, borago, or malva, which they sold as infallible "sweeteners of the blood," and which their contemporary doctors called "antiscorbutics."

The last time the author was present at the Royal Medico-Chirurgical Society, he heard a paper read which inculcated the doctrine that, in cholera, the *blood* is poisoned by something which induces all the symptoms, and which must be eliminated naturally, or by purgation. This is inconsistent with sound views of pathology and therapeutics. The patient is poisoned, doubtless ; but the blood is not in itself

poisoned or altered, though it may *carry** the poison to the *nerves:* there has never been any detection of poisoning of the blood itself. In the most virulent cases of cholera, plague, small-pox, typhus, or other acute disease, whether blood be drawn early or late, no microscopical, chemical, or other investigation can detect any alteration in the nature of the discs or other constituents of the blood. The chronic disease, scurvy, which was always the sheet-anchor of the humoral pathologists, evidently arises simply from a want of supply of one of the constituents of the animal, not poison. In other diseases, the fault is palpably in the solids. The blastema (a solid as soon as exosmosed), under the *disadvantage* of *deficient nervous* energy, imperfectly goes through its usual metamorphic changes. Even in cancer-patients the blood is not unnatural, but the blastema-cells *are*, and thus continue the disease. But in cholera we are told that there is a poison in the blood, which must be "eliminated;" and even that the *symptom* diarrhœa is *curative*, as it "eliminates" (carries off) the poison: and therefore castor oil and other purgatives are recommended, to assist in scouring away this poison,—as if it were not going off as fast as possible, except in those cases where, from peculiar spasm of the sphincter ani, or cessation of peristaltic motion, the patient is found after death with the intestinal canal full of this eliminating fluid—which had so far missed its aim of "elimination." How does it happen that a little tartar emetic, or citric acid, or a dozen other things, not purgatives, but which, on the contrary, stop the "eliminating" diarrhœa, cure the

* See p. 110, Halford "On the Poison of the Cobra-di-Capella."

cholera? In fact, in my opinion, it is not as a purgative that castor oil acts beneficially—and it really does act beneficially, though the reason adduced for its doing so is incorrect. The advantage of castor oil depends upon the sub-acrid, somewhat nauseating quality, and its sedative action on the nerves; it acts like sulphate of zinc, minute (not purgative) doses of sulphate of magnesia, and other things, even cold water: all of which may cure cholera, provided the practitioner does not rely upon stimulants, or the heat of baths or drink—these do neither good nor harm, but go for nothing, unless in outrageous doses, when they do mischief secondarily.

We have now to consider some other special diseases. Notwithstanding that RHEUMATISM exists in joints of which, as pointed out by Bichât, the fibrous tissue constitutes the major part, I do not consider that the arthritic diseases, rheumatism or gout, depend upon a lesion or inflammation of that tissue in particular, as is often supposed. The fibres of the tendons of muscles, the fibrous tissue of ligaments, and cartilage, must be viewed together with the connecting areolar tissue and the accompanying nerves and blood-vessels; and we shall be then led to conclude that, however important they are to the animal economy, by serving as the basis or characteristic material of individual organs, they are second to the highly important areolar tissue and the arteries and nerves in the production of pathological phenomena. By this explanation the student will understand how it happens that the comparatively lowly organised structures, ligaments, fasciæ, or

articular capsules, precisely like the more highly organised skin and mucous membranes, are so intimately connected pathologically with the general condition of the individual. He will not wonder that indigestion should produce a tendency to rheumatism or gout, or that either may suddenly attack a vital organ, constituting what is called metastasis, and thus prove rapidly fatal; or that cold and damp, or alterations in the electrical states of the atmosphere, should cause or increase disease, before even the ordinary senses have been able to apprise the individual of the change; making a rheumatic patient a living barometer, as he has been not inaptly called.

Thus, a person apparently in good health, but not strong—*i. e.* whose nervous energy is below par, from whatever cause it may arise—if exposed to a current of damp or very cold air, or chilled whilst perspiring, will be attacked by rheumatic or neuralgic pain; or inflammation of some internal membrane, in the form of catarrh, bronchitis, or pleurisy. Some persons are led to suppose that rheumatism, being inflammation of the fibrous tissue, as it is called, though it spreads to the integuments, is something quite peculiar, quite different in its nature from inflammation of other parts. When it is considered, however, that it is the same inflammation as exists in other tissues, the same lesion of nerves and blood-vessels, the symptoms being modified in consequence of the nature of the peculiar tissue, the practitioner will be led to a rational practice, according to the principles already laid down for the treatment of inflammation in any part of the body. In every instance, he has but

to reflect upon the proximate cause of the disease under consideration, and the constitutional condition of the patient; for he will have noticed in how many instances of disease bearing the same name we have had to operate with different means, and according to what, in a superficial view of the subject, might be looked upon as opposite principles.

There are forms of rheumatism which it is impossible to distinguish or separate from neuralgia, so direct is the connection between the nerves and rheumatic disease. Indeed, all rheumatism commences with lesion of the nerves of the part: to which it may be objected, that in *acute* rheumatism the other tissues are red and swollen. Even so. At p. 85, it was shown how inflammation, as of the eye or other part, begins in the nerves. The process of rheumatic inflammation begins by functional, if with no physical, derangement in the nerves, and spreads, owing to the diffusion of the nervous tissues, and their influence on metamorphosis, through the skin, muscles, sheaths of tendons, endocardium, or pericardium. This affords an explanation of the phenomena, and of the utility of the remedies employed: many neuralgic cases are curable by tonics, while most are relievable at all stages by narcotics and sedatives. Men have been always prescribing for diseases by name, with little better guidance than Thomas's *Practice of Physic*, or some such book.* One bleeds always in acute rheumatism, another never, or scarcely ever; one gives emetics and quinine in all cases, another mercury, another colchicum; one man finds digitalis, or potash, or

* This was written in 1838.

citric acid, or nitrate of potash, of great use in rheumatism, another stares at his assertion. From what has been already said on the subject of inflammation, it may be deduced why and in what cases these remedies suit: why, for example, digitalis and bleeding will procure sleep better than opium when the brain is plethoric and feverish; and why, on the other hand, wine and other products of fermentation will procure sleep with more certainty than narcotics, when there is a state of inanition.

We used to bleed in acute rheumatism (rheumatic fever), more especially if the external redness and tenderness of the joints were combined with oppression at the chest, indicating pericarditis (even before auscultation was known), or if there were symptoms of meningitis.

We did not bleed in acute rheumatism, unless emetics and other treatment failed, if there was *only external* pain and swelling, and if the patient were not strong, lest there should be *slow convalescence*, as any one may expect if a patient be bled unnecessarily.

But, on the other hand, we feared internal inflammation, "metastasis," and lest there should be *no convalescence* at all, but, for want of bleeding, death. If a patient has severe endocarditis or pericarditis, you may either have death soon with fever, supposed to be from neglect of bleeding, or a lingering death from destroyed valves, adhesion, and enlargement of the heart (morbid preparations of which may be seen on the shelves of every museum), with dropsy. But now we can generally trust to the free use of antimony and morphia, *vice* bleeding. The

influence of sickness from tartar emetic (half a grain or a grain given every half-hour) is almost as speedy as that of bleeding; and this should be followed by quarter or half-grain doses of acetate of morphia every four hours, to produce perfect tranquillity: the antimony to be repeated afterwards also, according to circumstances, with the morphia, from one-sixteenth to one-eighth of a grain, or more, of each.

As metastasis to the brain (meningitis above alluded to) is not common, I may here quote one or two cases. At a clinical visit, I found a patient who had been taking the saline antimonial medicine with colchicum, for acute rheumatism, sitting up in bed confined by a strait-waistcoat, having become suddenly maniacal in the night. He had severe headache, his skin was very hot and dry, and his pulse harder than usual in acute rheumatism. I decided immediately to bleed him from the temporal artery: first, because it was getting the blood most directly from the affected part; secondly, because it would have been difficult, what with his violence and the strait-waistcoat, to have bled him from the arm,—and, besides, I wished the pupils to see the method of bleeding from the artery, which is seldom required. We took away thirty ounces before it made any impression on him or the pulse; when he became a little quieter, and lay down. He then had forty drops of laudanum, soon after which he fell asleep; he slept for seven or eight hours, and awoke tranquil, complaining only of lassitude: one effect of the bleeding had been to reduce the rheumatism of the limbs, and he got well in a few days. Perhaps he might have done well without bleeding; but even now I should

scarcely, in such a serious state of the brain, trust to medicine alone. *Apropos*, my clinical clerk told me afterwards, that some months before, whilst I was out of town, a similar case had occurred under the care of one of my colleagues, which was not bled; the patient died, and most unequivocal evidence of arachnitis, with effusion of serum and inflammatory lymph, was found *post mortem*.

In acute rheumatism—that is, where there is redness and swelling of the wrists, ancles, or knees —we should never neglect to examine the chest, and inquire about it; for the patient will scarcely ever complain of the heart, even when it is affected, in consequence of his attention being drawn off by the severe pain in the limbs. Conviction has been at last forced upon the medical world, that in rheumatic fever (acute rheumatism) the heart almost uniformly participates in the disease, though short of pericarditis or endocarditis. Formerly "metastasis" to the heart used not to be said to have taken place until symptoms of serious lesion of the organ were evinced. The peculiar pulse of rheumatic fever declares the state of the heart. It is irritated sympathetically as in other acute diseases, hence the pulse is more frequent; but being also affected by the rheumatism of its nervous, fibrous, and serous tissues, it is weakened in its action; hence it does not empty itself, and the full, soft pulse is the result,—full, because there is much blood; and soft, because the action is not energetic.

Opiates are essentially useful in every case of rheumatism, in order to procure sleep, because sleep

restores the nervous system; tonics are beneficial, as already explained, by their influence on the nerves; in acute rheumatism, emetics operate favourably as sedatives, diminishing the action of the heart, without debilitating it. Blisters relieve the articular inflammation; antimony or colchicum, with salines, in doses short of producing nausea, when circulated to the capillaries, act like the tonics commonly so called, as already explained. Veratria and the allied alkaloids, rubbed on the skin and absorbed, produce an anodyne effect directly on the nerves of the part, and the hypodermic injection of morphia sometimes gives immediate relief.

Bleeding, though formerly much resorted to, is not necessary in acute rheumatism, even when the heart is inflamed; the way to calm its action is by morphia, at the same time treating the capillary inflammation by antimony united with quinine, to cure the nerves.* This is the safe and certain mode of treating acute rheumatism. Most of my readers must have seen the tedious sufferings of patients, and the depression of the system, under the various ordin-

* One patient, who had previously been a martyr to sub-acute rheumatism, called rheumatic gout, and who was much reduced by colchicum,—having had two or three attacks of rheumatic fever in the twelvemonth for several years,—was greatly benefited by these remedies, and restored to comparative health. Whilst under the author's care, he had three several times pericarditis and endocarditis, discoverable by the stethoscope, and accompanied by acute pain: he always recovered rapidly from these attacks by the administration of antimony and quinine, with the acetate of morphia, in free doses, that is, as much as six grains in the twenty-four hours, for many days.

ary routine practice: one professor using alkali in large doses, with or without colchicum; another, colchicum, with or without mercury and neutral salts; another, nitrate of potash in large doses; another, acids in large doses; and all these, frequently, without any opiate to relieve the miserable state of suffering.

In lumbago and other recent cases, blisters frequently give immediate relief; and in chronic local rheumatism, the moxa cautery does so sometimes, as does acupuncture; but the latter is gone out of fashion, as being less efficacious. As to external applications, one Professor, Dr. Herbert Davies, recommends blisters of cantharides to all the affected parts—which certainly has a very satisfactory success, by the local relief of the capillaries of the part, the ordinary effect of blisters and leeches—without the administration of drugs internally; but, then, the quantity of cantharides which is absorbed, and consequently circulated through the kidneys, acts as a medicine, apparently diminishing the usual morbid redundance of red sediment (uric acid) in the urine, whether that influences the cure or not.

In referring rheumatic inflammation to the nerves, not to the blood, I have only gone a step farther than some who call certain kinds of it neuralgia. The exciting cause of rheumatism is usually cold and damp together; intense cold alone will seldom produce rheumatism, if the atmosphere be dry, unless the individual be weak; but if the skin have been perspiring previously, so that it or the inner garment is damp, rheumatism results. Warm damp does not produce it. A cold fog or rain will

produce the effect, though the person has not been previously perspiring. Moisture appears to exercise a peculiar effect on the electric state of the nerves; but if the parts be warm, that influence is counteracted,—it is the cold and damp together which are noxiously sedative. Every person can recollect illustrations. The softer and more vascular tissues are not so easily contracted to a noxious degree as the dense fibrous tissue; hence the latter is the first to suffer from the sedative damp and cold; and then the mischief spreads to areolar and dermoid tissues. For the *modus operandi* of cold in producing inflammation, *vide* p. 174.

It is generally acknowledged that GOUT and RHEUMATISM are closely allied, but not that they are identical—as they really are. Either may be brought on by external influences; but much more easily, or by slighter causes, when the system—that is, the nervous system—is predisposed.

The reason why gout is not so usually admitted to be induced by external influences, is because that modification of rheumatic disease is so "constitutional," that it recurs on much slighter, less palpable exciting cause than rheumatism. They are both, in general, essentially connected with indigestion; but, in the gouty form, the indigestion is more often acquired. It is, however, well known that temperate persons have gout, who have had naturally a feeble nervous system and weak digestion; and it is a great mistake to suppose that utter abstemiousness will cure gout in such weak habits. Abstemiousness, with exercise and medicine, may restore the digestive

organs, and cure gout which has been brought on by intemperance in a naturally strong frame; but abstemiousness will never restore strength to a weak constitution, nor cure what is vulgarly called "poor gout," *i.e.* that which has come on in weak constitutions, or poor individuals, without excess. There is no gout more cruelly severe than that of the poor Scotch and Irish, whose frames are debilitated by the non-nitrogenous food oatmeal and potatoes, and whose digestion is frequently weakened by occasional desultory abuse of "raw" spirits, such as undiluted whisky.

Enough has been said to explain why gout has been the *opprobrium medicorum* and *remediorum*. Medicines can scarcely work miracles on bad constitutions; and persons who have gout in their system, and continue luxurious habits, will, of course, experience returns of the disease, whatever may be the skill of the physician, or the nature of the remedies employed. Gout is inflammation, and the treatment thereof has been fully explained—sedative, antiphlogistic, and narcotic, during the fit; subsequently tonic, including that best of tonics, relaxation of the mind, with exercise in good air—in a word, not a London life.

It is always asserted that it is difficult or impossible to establish what is the distinction between GOUT and RHEUMATISM—even by those who declare them to be separate diseases; but that is because there is no real difference: for rheumatism in the great toe is gout, more painful and tender on pressure than in the other joints of the limb, on account of the fibrous tissues of that joint being nearer the surface; the same may be

said of the fingers. Gout in the knee is rheumatism; but because the patient has had rheumatism in the great toe, called gout, it is called gout in the knee. They are both generally acknowledged to be associated with indigestion, but more especially gout, as usually occurring in patients who overload the stomach, whether it be a strong or a weak one; and that is the reason why, according to Cullen's accurate observation, gout is preceded by *affectio insolita ventriculi*—the uneasiness in the stomach which the mere rheumatic patient does not always feel, because rheumatism comes on from stronger exciting external causes, whether the stomach be weak or overworked, or not. But, then, why is it that "gout" comes in the great toe? Because rheumatism can come there from slighter external causes than elsewhere. A person whose constitution is tolerably good will have rheumatism in the great toe, from walking in a tight boot, or from a much reduced temperature; but the debilitated nervous system of the gormand or of the feeble patient will, under similar circumstances, induce a greater degree of inflammation of the capillaries, which is then called gout.

Rheumatism and gout both begin in nerves injured by cold, with or without damp, or by luxation* or bruise; then, the capillaries dependent on them having their contractile powers and action diminished, inflammation, rheumatic or gouty, commences, visible or not visible according to degree and position; but if the damage is only to the nerve, without the capillaries participating,—that is,

* How often do we hear of rheumatism or gout brought on by a sprain!

without inflammation,—it is called cold rheumatism, or neuralgia, or neuralgic rheumatism—which latter is now a common expression. Few persons are aware how easily the nerves become damaged, when predisposed by debility from chronic disease, old age, bad diet, or other cause of want of tone in the system. Vigorous persons are not affected by even severe and long-continued atmospheric influences; they can sit in open carriages, or at open windows, with impunity. But when the system is not robust, a current of cool air, not felt or attended to, blowing for some time on the side of the head, may, in the course of three or four hours after, show its effect on the nerves by a bloodshot eye, rheumatism in the side of the face, or a hot pain ending in the redness of erysipelas, or even in meningitis; or, as I have many times seen, exposure of the chest to a current of air will produce pleurisy; or of the abdomen, peritonitis; or of the knees, ankles, shoulders, elbows, or wrists, rheumatism; or exposing the great toe, if not to cold air, yet to cold sheets in bed, —or merely cold feet from sitting still, with want of circulation of the blood in them,—may end in rheumatism (gout). Cold acting on the nerves of the loins produces lumbago. It is well known that cold bathing in the sea frequently produces giddiness and transient loss of recollection, and it is not unlikely that this may have been sometimes the cause of swimmers being drowned, by a want of power of volition—wrongly attributed to cramp.

In Hilton's work upon *Pain and Rest*, there is much interesting matter on the subject of the communication between external and internal parts by

means of the nerves. Light is thrown upon the operation of blisters and other counter-irritants, and the effect of hot or cold applications to a surface, although it is not in continuous connection with the diseased internal part,—thus the action is explained of blisters, sinapisms, or fomentations to the chest or abdomen for pleurisy or peritonitis; for though the viscera are quite separated from the parietes, the peripheral nerves of the latter are connected with those of the former at their origins, and thus materially influence each other: and it is the same with respect to the internal and external nerves of the head, of the knee, and of other parts.

It appears that gout, rheumatism, and neuralgia are shades of the same disease *neuralgia* —though divided into four: *gout; acute* (or *subacute*) *rheumatism; chronic* (*cold* or *neuralgic*) *rheumatism;* and *neuralgia;* the first two degrees visible by more or less redness and swelling, on account of the implication of the vessels of the soft parts,—the third and fourth, unless swollen, not visible, in consequence of the vessels of the fibrous tissues only being involved, or in some cases the vessels of the neurilemma only.

That gout and rheumatism are identical is clear from the fact that the most experienced and best practitioners have been obliged to coin a fifth compound name for the cases of "*rheumatic gout*," in which they can make no distinction and draw no line.

The therapeutic effect of friction in cold rheumatism or neuralgia, or the fact that shampooing allays it, shows that the disease is in the nerves. No one would think of rubbing a joint, when red and

painful from acute vascular rheumatism, as it would increase the inflammation and pain; and yet, how constantly we see persons inconsiderately rub the side of the neck with rubefacient liniment for inflamed glands, thereby often increasing the pain, and, what is worse, the inflammation; and a gland which, if let alone, or merely protected by soap-plaister, would have soon subsided, is made to swell more, and perhaps to suppurate. Neuralgic cold rheumatism is usually relieved by warmth and friction; but when that is not the case, which is an evidence that the capillaries of the contiguous parts are becoming inflamed, we often find that the cold douche gives relief, as in the neuralgia or rheumatism of old sprains: but the cold stream of water should never be continued after it begins to give pain. It may be agreeable and necessary to apply the cold water several times in the twenty-four hours; but too much at a time will do harm instead of good: for by an excessively sedative influence on the nerves, the tendency to inflammation is increased, instead of being diminished—a state equivalent to chilblain.

We have here been considering merely the effect of cold in producing neuralgic rheumatism,—that is, simple continued pain and stiffness; but neuralgia is produced by other noxious influences on the nerves, as, for instance, malarious poison, equivalent to what induces ague; and in these cases we find that the disease, whether neuralgic inflamed eyes, or headache, lumbago, sciatica, or visceral pain, is not continuous, but more or less steadily intermittent or remittent. Tic douloureux comes into this category.

Rheumatism, then, is neuralgia, and neuralgia is

rheumatism. The term neuralgia used to be by many confined to tic douloureux and other intermittent severe pains in the nerves of a part, which scarcely ever evince any redness or swelling—the usual concomitants of (inflammatory) rheumatism; nevertheless, in both cases the nerve-tissue is the part affected. It had long since been observed and recorded by Macculloch* and others (see p. 344 *et seq.*), that purely nervous diseases (neuralgias), general or partial, are similar to each other pathologically: the general being called ague, or intermittent; the partial, aguish neuralgia or tic, such as, besides tic douloureux of face or other part, aguish or intermittent quotidian (neuralgic) sore eyes, ophthalmia, and even intermittent quotidian hemiplegia, intermittent splenalgia, or hepatalgic quotidian, neuralgia of the spleen or liver. A most interesting case of intermittent splenalgia—ague of the spleen alone—occurred to the author a few years since. A gentleman shooting wild fowl on the marshy banks of a lake in an aguish district—having been long exposed to the cold damp air, in a small open boat, without exercise—was taken, at half-past five in the afternoon, with so much shivering and uneasiness in the abdomen as to compel his return home; soon after which, however, he felt no more inconvenience until the following day at half-past five p.m., when he was suddenly seized with intense pain in the left side (the spleen), which lasted about an hour and a half, and suddenly ceased, leaving him feeling quite well. These fits, of the same nature and duration, returned

* Macculloch's work on this subject is very interesting and instructive (*Essay on Remittent and Intermittent Diseases*, 1828).

(quotidian) daily for weeks, without any further inconvenience, except the hour and a half of pain; he did not lose appetite or strength; and, being much in society, he used, when the fit was over, to dress and go to evening parties, or to the theatre. Whilst it lasted, the pain was so agonising as to compel him to throw off the coat and lie on the bed, which shook from his contortions: yet the pulse never varied from seventy-two; there was no dyspnœa or other symptom but severe pain—which lasted just the hour and a half, when he used to rise up as if nothing had happened; there was no loss of appetite, nor derangement of the primæ viæ—in fact, he felt quite well except during one hour and a half in the twenty-four, commencing at precisely 5.30 p.m. The clock on the mantel-piece was several times put back about half an hour; but, whilst standing before the fire conversing, the moment the true time arrived, he made an exclamation, bent himself forward, holding his side, and ran to the bed or sofa. This state of things had continued for many weeks before he came to be under my direction. He had been under the care of a physician, one of my former pupils, who gave him quinine in doses increasing from three to five, and then ten grains, three times a day. As that had had no effect, I increased the doses to fifteen, twenty, and at last thirty grains, at the same intervals; and the disease then gave way in a remarkably periodic manner. One Saturday, the fit lasted only an hour—it continued so all the week till the next Saturday, when it lasted half an hour—it persevered so till the following Saturday, when it did not return, nor has it returned since. He had

been taking the thirty-grain doses for more than a week before they told upon the disease.

As above stated, if the powers of the constitution be low, the application of simple cold will induce neuralgia of all degrees, the greatest being tetanus, of which there are cases on record; minor damages are, neuralgia, rheumatism, severe lumbago, or sciatica, or pain and stiffness in knees, ankles, shoulders, elbows, or wrists, disabling one or more of these parts, and so the patient, whilst they last. Amongst the causes of the powers of constitution being low, old age is a very decided one; hence the proneness of old people to cold rheumatism, as well as to other chronic affections, which all begin in the nerves, and end with the secondary loss of power in the capillaries, as dropsy, hæmorrhages, paralysis, chronic diseases of the viscera, and death.

Now, as to treatment. Neuralgia is to be cured by tonics, rheumatic neuralgia by tonics, gouty neuralgia by tonics (*vide supra*, TONICS), combined, according to circumstances, with sedatives, stimulants, and narcotics. Quinine (*olim* Jesuit's bark) is the one thing needful—in quantity, as it may happen, to the amount of from six, or nine, to ninety grains per diem, as in the last case mentioned. It cannot poison. Beginning with two or three grains, or more, three times a day—that is to say, every eight hours (not three times in eight hours, as three times a day is sometimes construed)—the dose may be repeated more frequently, and increased indefinitely, as required to influence the disease; with good living as to food, and as much fermented liquor as is rational, *i.e.* as will not produce the slightest degree

of feverishness. Next to good diet, good sleep is necessary, without which medicine and food are unavailing; and this is to be obtained by acetate or hydrochlorate of morphia, beginning with one-half or one-third of a grain every night, increased to two-thirds, or to a grain, or more—much more, if required. In addition to these, if the bowels do not act moderately (but daily is by no means necessary), an occasional blue pill, or a grain of calomel, with five grains of compound rhubarb pill, may be given: a little mercurial medicine is useful, to keep the liver in order, when a patient cannot take exercise; or arsenic, which—being, as before mentioned, equivalent to quinine and mercury united—is most valuable.

In acute rheumatism, with swollen red joints,—which is not inaptly called rheumatic fever,—the saline antimonial mixture is to be given every two hours at first, or more frequently, so as to produce some nausea; and then in diminished doses each time that the quinine is given. We must give morphia also, not merely at bed-time, but three times in the twenty-four hours; and, besides, be on the watch for pericarditis, or endocarditis, in which case the more free use of it is indispensable,—a grain or upwards ought then to be given every fourth hour, until the symptoms relax; and afterwards every eighth hour. The morphia allays inflammation of the heart better than any other medicine or other means. Of course, due attention must be paid to the idiosyncrasy or tolerance of opiates in different patients. A moderate attention to the bowels is also requisite; but, I should say, by no means induce purging, or give colchicum.

The old treatment of rheumatic fever was cruel: the patient was purged and griped with colchicum and salts; harassed by motions when movement was intolerable; and seldom indulged by the relief of an opiate, from the fear of stopping the catharsis. Acute rheumatism being so evidently inflammatory, simple, straightforward antiphlogistic treatment was resorted to,—it was considered, indeed, the only thing safe,—and the patient's sufferings were ignored.

The soothing treatment by morphia and saline antimonial, with quinine—which is a treat to the patient—is more efficacious, and is much assisted by blisters.

Afterwards—and, indeed, it is so even still—the antiphlogistic treatment was continued in a modified form, influenced also by chemical theory or hypothesis, on which account some gave profuse doses of alkalies, and some of citric acid, according to their "indications of cure;" not considering that either of these, or saltpetre—another favourite nostrum for acute rheumatism—and other remedies, did not act chemically, but simply as sedatives—which I have endeavoured to explain; they are useful, but not sufficient alone.

In point of fact, nothing is more agreeable or more efficacious, in acute rheumatism, than plenty of lemonade, with repeated doses of acetate of morphia in the saline antimonial mixture; but the cure will be greatly accelerated by from ten to twenty, or more, grains of quinine per diem.

I have here laid down a rational, intelligible, and efficacious treatment for acute rheumatism; but many of my contemporaries, from relying solely on the alkaline or acid treatment mentioned in the pen-

ultimate paragraph, have been egregiously disappointed. The patients do not die, indeed; but the disease lasts so long, that now we find physicians asserting that acute rheumatism has a definite duration (like the exanthemata); and as the cases are not fatal (unless destroyed by colchicum or other mismanagement), and as they do not know how to relieve them, they relinquish their *useful*, simply sedative —though not anodyne—medicines, which do a certain amount of good, and they drift into the inert "no-drug" or "do-nothing" treatment, by camphor julep, or the sugar-and-water *mistura rubra* given for cholera (see p. 464): and the poor patient goes unrelieved, until the rheumatism wears itself out, or leaves him crippled for nobody knows how long. What do they mean by rheumatism lasting a definite time? It holds to no definite number of days, like the exanthemata, but will last for weeks, or for months, if injudiciously treated—or, for that matter, for years —and is then called *rheumatic gout*.

The weak, do-nothing practice of the profession affords the key to the success of homœopathy, with its infinitesimal sugar-plums—the greatest combination of folly and humbug that ever existed. Originally the waking dream of a monomaniac—"*similia similibus!*"—followed up by knaves and imbeciles, it is an illogical, deceptive attempt at a short cut or "royal road" to therapeutics. If any person with ordinary reasoning powers will spend his time in analysing it, he will discover its palpable sophisms of *non causa*, *petitio principii*, and *ignorantia elenchi*—if common sense were not sufficient to expose its nakedness.

I have known a few regularly educated men who

have wandered from the right road; but when they were pupils, they neither showed power of mind, nor ever acquired a thorough knowledge of their profession. Not, however, that all the homœopathists are weak-minded; quite the contrary: as more than one of them, as I am well informed, had the cunning to tell their patients, when first introduced to them, that, though they preferred homœopathy, they were acquainted with the old fashion, having graduated in it (which was true); and that they would treat them in whichever way they chose. This is having two strings to your bow, with a vengeance. Of course these patients, having been inveigled into the trap, submitted to be guided by the charlatan; who, if really qualified, has it always in his power to secretly prescribe proper medicines, instead of the homœopathic.

But I undertake to show our regular practitioners how, from want of skill, they play into the hands of the homœopaths. After a patient has been kept under drugs for weeks, months, or years,—perhaps a mere *malade imaginaire*, after all, who is the best of all patients, as he never gets well, but does not die,—he at last, through his own dissatisfaction, or by the advice of friends, applies to the homœopath, who, if he be one with two strings, and has talent, soon sees through the case, and, by regulated diet, good food, air, and exercise, and no medicines (that is to say, by infinitesimal globules, equivalent to brown-sugar mixture or mint-water), restores the patient to a state of comfort such as he has not felt before. In my young days, I have known cunning old "regulars" (before homœopathy was in-

vented) cure such cases by properly regulated diet, and bread pills ("*pil. micæ panis*"), or camphor julep; in other words, they did what the homœopath has done latterly—*let* the patient get well by setting aside the drugs which were "harassing his vitals." Again, patients with trifling ailments of lungs, liver, kidneys, intestines, uterus, or bladder, or "*rheumatic gout*," are over-physicked with wrong medicines, starved and weakened, and kept from exercise until they are unable to take it; and they have been going on with *secundum-artem* treatment for months or years, until they are, by some happy chance, introduced to a judicious physician, or to some homœopath, who cures them by *letting* them get well by the *vis medicatrix Naturæ*, at the same time regulating their diet rationally.

The regulation of diet is one of the chief homœopathic means of success. I have had patients at various times, who were constantly coming back to me with indigestion, or affections of the kidney, and other secondary results of indigestion, because they would not submit to restraint in their diet, when explained to them in a common-sense way; but who afterwards were benefited by Parisian or other homœopathists, merely because they obeyed directions, as to food and wine, when they were backed by the superstition of charlatanism.

As to the diet of rheumatic patients, let them eat and drink, if they can; but if they cannot eat solids, keep up their strength by milk variously prepared, and other light nourishment, and stimulants.

With chronic neuralgic rheumatism, more or less quinine must be continued unremittingly for months,

or even for years; and iron combined with it is often palpably efficacious, such as the syrup of the phosphate of iron—the phosphate, as tending to supply the phosphorus of the nerve-tissue; at least, that is the theory. Morphia must be given at bed-time, if there is a want of sleep; but sedatives are not required in chronic cases. A dose of calomel or a blue pill is useful occasionally, especially if the opiate, when exhibited, appears to check the secretion of the liver—which is by no means always the case. The treatment here inculcated is especially applicable to the peculiar remittent facial neuralgia of the fifth pair, called tic douloureux.

When I was a student at the London Hospital, Dr. Yellody—an excellent practitioner, and an industrious contributor to the *Medico-Chirurgical Transactions* (as I can vouch for, having assisted him in the dissections necessary for his papers)—prescribed for his acute and chronic rheumatic patients scarcely any thing more than a grain of opium three times a day; and no practice that I saw at that time was more successful.

The use and abuse of colchicum is injurious—nay, dangerous. I have been called to see a patient sinking and dying of inflammation of the mucous membrane of the bowels—dysentery artificially produced by colchicum—which no opiates or other means could assuage.

The treatment of acute rheumatism and gout (rheumatism) by colchicum, or eau médicinale, was deleterious to the individuals who resorted to it, either spontaneously or by advice; its powerful sedative, antiphlogistic properties knocked down the inflam-

mation (and sometimes the patient also, as just mentioned) so quickly, as if by magic, that the patient ceased to have any wholesome dread of the return of the attack, as he could get rid of it on the comparatively easy terms of violent vomiting and purging for a few hours; and, therefore, before his stomach had recovered its tone, he returned to gormandising, if so addicted; or, at any rate, if a temperate man, he would not resort to the proper means of restoring or establishing digestive power, by bismuth, quinine, &c.,—even if he or his adviser knew them. And so the rich sensualist underwent more frequent attacks, until he died of dropsy, from diseased kidneys or liver; gradually becoming unable to walk, or to write with a pen on paper, though perhaps he could write on a table with the chalk-stones in his knuckles. There is most indigestion in the gouty rheumatism, as evinced by the loaded urine, the gravel, and the chalk-stones (urate of soda),—the kidney not being able to secrete all the undigested matter sent to it by the stomach.

There is a great deal of ingenuity wasted in devising rules for the diet of gouty patients, and other dyspeptics. It signifies little what kind of good food is eaten, or what kind of fermented liquor is drunk, if not too much of either; and if the stomach be put in order by tonics, such as bismuth, silver, iron, arsenic, or mercury, in proper doses, never omitting quinine.

Apropos of diet in gout, a relation of mine, æt. between fifty and sixty, had gout usually, more or less, about once a year, and, unfortunately (as he was a sportsman), sometimes about the 1st of September.

When his physician—a mutual friend—died, I was obliged to take him in hand; and, on the first occurrence of gout, rather surprised him by permitting him to drink wine the second day, and, moreover, by selecting port, which, though he preferred it, he had not been allowed to touch for twenty years; the next thing was to interdict soda-water (the orthodox antacid), not because I cared whether it was alkaline or acid, but because I had observed that at dinner he took more fluid than was suitable for his weak digestion; for, besides a fair allowance of sherry or madeira, he habitually drank at least two enormous tumblers of soda-water poured upon about a quarter of a pint of wine; so that, with his food, he drank nearly a quart of liquid, besides soup —which, I opine, is too much dilution for the gastric juice (pepsine) of one meal. I limited his wine-and-water (spring water) to two small tumblers, which he afterwards scarcely consumed, because, as I had calculated, he missed the allurement of the carbonic-acid gas. I gave him no medicine, except two or three nauseating doses of saline antimonial the first day, and afterwards two or three grains of quinine three times a day; none of the usual calomel, colocynth, and vinum colchici. He thought I let him off very easily. I only stipulated that he should continue the quinine for a month at least: all which he, being very orthodox, obeyed. He sent me a brace of birds, of his own shooting, at the end of the first week. Moral: He never had the gout again during the seventeen years that he lived.

The pathology or proximate cause of cold, rheumatism, neuralgia (partial or general), is different

from that of rheumatic fever. In the former, the fault is not in the capillary system—the disease is confined to the nerves themselves; we have no metamorphic formation of poisonous urea—the urine is rather inclined to be limpid and abundant; the discharge from a blister has not the acidity described by Dr. Garrod in acute rheumatism; and there is no acidity in the perspiration, when there is any perspiration. The nerves themselves are the seat of the malady, and the remedy is quinine, with abundant nutrition, and morphia as required; friction, warmth, warm and vapour baths, and mild counter-irritation assist.

There is an acute *cold* rheumatism, or neuralgia, sometimes suddenly induced by exposure to cold, which, like rheumatic fever, attacks the whole frame, trunk, and extremities, or a large number of parts, at once,—but the distinctions drawn above hold good both as to pathology and therapeutics.

Having so repeatedly and confidently recommended quinine, I must caution my readers that they may possibly be disappointed in prescribing it, either on account of its being adulterated, or in consequence of another chemical being substituted for it. Thus, upon one occasion, when I spent about three months of my vacation close to a provincial town, finding after some weeks that sulphate-of-quinine pills obtained there, which were used in the family, had not the usual effect and efficacy, I took the liberty of sending two samples of them to two of our most skilful analytic chemists, who reported that they contained no quinine! This I told to the chemist who had supplied them, and he confessed that the pills were made with muriate (hydro-chlorate) of cinchonia.

This is one of the benefits of the improvement in chemical processes, in consequence of which we get leather tanned in twenty-four hours, which formerly took twenty-four days, and was twenty-four times better for keeping out the wet; and in consequence of which the cinchonia, which formerly (like glycerine) was a waste product, is converted into a valuable article of trade, though not of medicine.

This substance looks and tastes so like sulphate of quinine as not to be distinguished without analysis.

Since that time, unless I am within reach of my own London chemist, I use Parisian sulphate of quinine, because the French government exercises a parental though arbitrary surveillance over the medicine and food of its subjects which would not be tolerated by Englishmen, however good for their *constitution*. For instance, in Paris the butcher is obliged to label his meat according to the "category," as they call it, of quality; and I have seen the inspector of milk turn about thirty gallons of un-categorical milk into the street, where it ran down the gutter, as an evidence of protection to consumers, and a warning to cheats.

In self-defence, the chemist told me that the wholesale manufacturer had assured him that the cinchonia was only one-sixth *weaker* than the quinine, and that he might use it accordingly. My answer was Socratic: "Do you think that, if I prescribed arsenic for ague or tic douloureux, you might employ iron instead of it, on the plea that it is only one-sixth weaker as a tonic; and put six drops of iron wine into each dose, instead of

five drops of arsenical liquor? There is as much difference between the properties of quinine and cinchonia, though they come from the same tree, as between arsenic and iron, or between arsenic and antimony, which exist in the same mine." Again, in further defence he said that, to his certain knowledge, a medical man (!) in large practice used the muriate of cinchonia instead of sulphate of quinine.

Quinine can be given very conveniently in pills for those who prefer it so. It is by no means necessary to prescribe it with acid, or with any liquid which dissolves it,—in fact, I think it is better and less disagreeable given in any ordinary fluid, such as milk, water, or wine—the latter the best, when wine is indicated: thus, ʒj or more may be put in a bottle of wine—a wine-glassful to be taken night and morning, or three times a day; it should be shaken up, as the quinine is not soluble in wine or water.

A pendent to this case—that of the substitution of one medicine for another, through absolute ignorance—occurred to me in or about 1817, when hydrocyanic acid was beginning to be used as a medicine, and when I was doing the physician's duty of the Eastern Dispensary: one of the patients told me that the sour medicine he was now taking did not relieve his indigestion nearly so much as what I had ordered him at first, which was diluted *prussic acid*. I asked what he meant by sour, and he said it tasted like *lemon*-juice, and had not the same *smell* as the first.

On referring to Mr. Godfrey, the veteran apothecary—of the old school, "*in practice before* 1815"—for an explanation, he said that, as his prussic *acid*

was expended, he had given the man diluted sulphuric *acid* instead!

Erysipelas commences in the nerves. Cold air does not produce the inflammation, unless the part have been previously warm and damp, and then a continued stream of cold air will produce erysipelas. Slight erysipelas of the face or ear is frequently produced in this way, and is called by the peasants a "blight."

When erysipelas is about to appear, the part becomes painful long before there is any redness; it begins, in fact, with lesion of the nerves. It is well known that severe burning pain long preceded any blush or other evidence of the erysipelatous inflammation in shingles (herpes zoster), or the eruption of herpetic eczema.*

* I once had an interesting exemplification of this fact; being called to see a youth with superficial inflammation of the arm, supposed to have been brought on by a liniment. It was erysipelatous inflammation of that kind which on the waist is called shingles (herpes zoster), and which is exactly portrayed in Willan's plate. The application could not have produced it, as that was a mild soap liniment; but the interesting fact is, that the severe incipient pain of the erysipelatous disease, commencing on the Monday, was supposed to be rheumatism, and the arm rubbed; and no redness was perceived till the Wednesday, when the liniment was blamed. In this way I have known leeches to be falsely accused of bringing on erysipelas of the face, having been applied to the temples for the severe pain and heaviness of the head belonging to the incipient stage of the erysipelas. It is true, that in some individuals with "irritable skin," or in elderly people, the bite of a leech, the prick of a pin, or the bite of a non-poisonous insect, particularly if the injury be where the tegument is lax, may produce a degree of erythematous inflammation, but not genuine erysipelas.

The treatment of erysipelas must be precisely similar to that of acute rheumatism: at the commencement, nauseating sedative medicines, to cool the inflammation; morphia as required, and mercurial or other incidental medicines, and quinine, throughout; and, moreover, after the attack is cured, there should be a steady perseverance in quinine, to prevent its recurrence, when the constitution is so inclined. An old friend of mine in the country, who had been suffering for years from repetitions of erysipelas in the legs, and who was almost disabled, came to my house on a visit, and had an attack there, which I treated and cured as above described, and dismissed him with the above directions. Only one slight attack occurred about six months after, which was treated as directed, followed up by quinine, and never after recurred, though he lived many years. The treatment of boils or carbuncles is precisely the same, with good living in all to support the nerves. As for external applications, nothing suits acute rheumatism, gout, or erysipelas, so well as vinegar and water in equal parts; boils, the same, until they break, and then glycerine or honey on chamois or kid-glove leather. There is an old superstition against applying lotions to gout or acute rheumatism, lest the disease should be "struck in," or drawn to an internal part; but we know now that rheumatism of the heart is not metastatic, but sporadic. There used also to be a superstitious objection to admitting cool air to patients in the exanthemata, lest the rash should be driven in; but we now well know that if the rash goes in, it is not driven in, but falls in from collapse, as in the case cited at page 326.

This circumstance of inflammation resulting from cold and damp has been commonly attributed to *checked* perspiration; because it had been thoroughly ascertained, empirically, that perspiration had preceded the injury. But the reason is as has been stated—that the perspiration acts merely as an adjunct to the cold. In ague, we know that the nervous system has been injuriously impressed by malaria, which is also a well-authenticated cause of rheumatism, resembling ague in phenomena as well as in cause, being often intermittent; and, to carry the analogy to the treatment of erysipelas, there is none more efficacious for either than that old one of Haygarth's for rheumatism—"emetics, followed by bark" (quinine); and he repeated the emetics if the symptoms were obstinate. It is still better to *keep up* an antimonial influence.

It will be said that malaria exists in hot climates. True; and observe how careful Italians and natives of other warm climates are to avoid night-air. Their nights are often, comparatively speaking, piercingly cold, and the air consequently deleterious; whereas our night-air is not so. The sedatively poisonous effects of cold and malaria are powerfully increased by their acting together.* Pleurisy and peritonitis arise in the same way; and pleurisy, as well as pericarditis, is not so often "metastasis" as has been thought, but an inflammation synchronous with the rheumatism.

Now, on the other hand, we must be on our

* Pleurisy is one of the most common diseases of Madrid—a warm climate; and it is produced whenever the east wind prevails.

guard, as there are cases of apparent neuralgia (neuritis) which are *chronic* inflammation of serous membranes, and which I have cured by active antiphlogistic treatment, as if they had been but a day old, though they had existed for many months. Those that I have seen have occurred chiefly in the meninges of the brain, or in the pleura or peritoneum. How are they distinguishable from neuralgia? By their accompanying obscure pyrexia, *malaise*, altered temper and appetite, frequent pulse, and generally bad sleep (p. 443, *note*). The difficulty of diagnosis is increased by the circumstance that the meninges are supplied principally by the fifth pair, the seat of tic douloureux.

I may in this place bring forward some further exemplifications of the principles of applying remedies. Without referring to what has been said upon delirium tremens (p. 351 *et seq.*), it would be difficult to understand how, in some cases, genuine narcotic or hypnotic medicines fail of procuring sleep. I have before mentioned, that when digitalis, a sedative, is indicated, it acts as a soporific, whereas opium in that case would fail; sometimes, on the other hand, when fully indicated, a stimulant will procure sleep.

Thus, in a case of sub-acute cold rheumatism (recent severe neuralgic sciatica), extending down the leg, with pain on pressure, which the *secundum-artem* treatment, by colchicum, calomel, and low diet, had not relieved, and in which, moreover, morphia had not procured rest,—for, the night before that on which I was consulted, it had been tried in a full dose,

and failed,—finding the patient's pulse frequent, but moderate as to strength, the fauces relaxed, and the tonsils swollen and rather purple,—showing a debilitated constitution,—I ordered bark (cinchona) and soda, instead of the medicines previously used, and some wine at dinner; and instead of the morphia, half a pint of strong ale at bed-time. The patient slept well; and the next morning the tonsils were of a good—that is, an arterial—colour, and less swollen. The rheumatic pains were much relieved within thirty hours after the change of treatment. Such cases may be considered the triumph of principle: both the rheumatism and sore throat were considered, as inflammatory diseases, to require antiphlogistic remedies, with which morphia was consistent; but being accompanied with debility, *stimulants*, by supporting the nerves of the part, proved *antiphlogistic*, and therefore procured sleep. It may be said that this was a case of rheumatism of the sciatic nerve, curable, on Haygarth's plan, by bark (cinchona). Be it so; but the practice adopted was unique (and deduced *à priori* from the principles I have laid down): I gave wine and ale to cure inflammation, evinced by pain on motion and pressure, frequent pulse, restlessness, and a recent sore throat in addition; because the pulse was not hard, the tongue was not foul, and the skin was not dry. Students ought to learn to prescribe on principle, and not empirically to apply a nostrum, as colchicum, to a disease, because it has the name of rheumatism. If diseases could be so labelled, the practice of physic would be as easy as some young gentlemen, judging from the little attention they

pay to the clinical opportunities afforded them in the hospitals, seem to think it; but they bitterly regret this in after-life, when they incur the responsibilities of practice.*

We may contrast with the last-mentioned case one in which a *sedative was* required, followed by the same tonic treatment with bark.

An old friend and pupil asked me to visit his child, about whom he was very anxious; it being much sunk from a large suppurating tumour of the submaxillary gland, from which there was an erysipelatous inflammation spreading across the lower part of the face. The application of leeches the day before had not checked—but, by increasing the debility, seemed rather to augment—the malady, as the inflammation was spreading. In this case, tonics were absolutely necessary to give power to the capillary arteries (to increase their action); but we could not wait for the slow operation of tonics, as the erysipelas would have spread; I therefore gave an emetic, and requested the parent to mark how its action would produce a paleness in the

* On this score, such a book as Thomas's *Practice of Physic* is the bane of the profession. A young practitioner, for instance, who at the hospital has been looking more after amusing surgical cases, than "slow" medical ones, as soon as he gets into practice (licensed to kill or to cure *secundum artem*), is sent for to a patient, who tells him he has got rheumatism. Without knowing the various circumstances detailed in the last few pages, he applies to his "Thomas," and finds a long list of prescriptions; but which is he to choose?—colchicum or potash, guaiacum or citric acid, mercury or opium, quinine or saltpetre? The patient has told him the disease, but he cannot find the ticket to suit the medicine. Which is the more to be pitied, he or his patient?

then increasing boundary of inflammation. The *emetic* did stop the inflammation *without debilitating;* and the tonics, with nourishment, prevented the renewal of it; so that there was only the trouble of the tumour remaining, which had suppurated before I saw it. Some calomel was also given, as part of the tonic plan, to act on the capillaries, not as a purgative—the child having been much purged before.

It may be asked why I made this distinction, and gave a sedative instead of a stimulant, as in the preceding case. The former was neuralgia of the sciatic nerve, and was not likely to be augmented by an increase of the force of the heart, especially if sleep could be procured, which was our object; the inflammation of the throat was of the livid kind, called passive, and the pulse moderate, so that the state of the nerves was more to be considered than the *vis à tergo*. The second case was not neuralgic, but inflammatory—relaxation of capillaries, evident to the eye, which the *vis à tergo* would have increased, as may be deduced from the instant good effect of taking it off by lowering the pulse by the sedative (emetic); and this shows the great value of emetics as a substitute for bleeding in cases where bleeding would be required if it could be borne; and it shows also how powerfully emetics must assist bleeding, where it could not be efficient without them. This mention of bleeding is old-fashioned, but to seniors it will be intelligible.

Here, in two words, is the epitome of the treatment of erysipelas before mentioned,—emetics and tonics. Tartar emetic, to check the inflammation,

which—being of asthenic character—though it might be benefited by leeching or bleeding for the moment, would nevertheless be increased by depletion, and a tendency of the disease to return be induced—as is known by experience. Quinine and other tonics, including calomel in moderation, take away tendency or disposition to relapse into disease; and the latter, by its tonic effect on the liver, promotes the digestion, and consequently the strength of the patient, who should be well nourished after the attack. Practitioners well know that it is the nature of erysipelas to return from time to time, as frequently as gout, or even more so, and thus to undermine the constitution. I can assure them from experience that the plan laid down will eradicate erysipelas, tonics being persevered with in the intervals, and modified according to circumstances.

It may be well to repeat the caution against being deceived by symptoms arising during the administration of a remedy (tonic, stimulant, or other), which are frequently ascribed to, though not really depending upon, that remedy. It is often observed that after a patient, especially a child, has taken a purgative on account of indigestion or acidity, he becomes even hotter before the bowels are relieved; but this is merely the effect of the transit of the acrid matter through the intestines, equivalent to that heat and flush which is produced by the acidity of indigestion in children, which commonly relieves itself by vomiting. In some cases of debility, especially in convalescence from acute diseases, as measles, scarlatina, or fever, &c., quinine or other tonics are absolutely necessary to prevent the occur-

rence of a strumous state; but as heat of skin constantly supervenes in these cases from weakness of the digestive system, it requires the confidence of practical experience to persevere with that stimulant and tonic (thought by some to be "heating") treatment which will strengthen the feeble organs, and prevent the recurrence of the heat, or other symptoms; but this must not be done empirically.

Several years ago, one of my pupils, just before commencing practice, asked me to examine his chest with the stethoscope. He feared hypertrophy of the heart, because he had constant, annoying, forcible palpitation. On inquiry, I found that he had pain after eating, without acidity; and sluggish bowels, without deficiency of bile. "You have been over-anxious about your examinations, and have got atonic indigestion." "So I thought at first," he replied; "but as I have tried *every thing* for that, and lived very regularly and sparingly, and taken no fermented liquor, I begin to fear hypertrophy." My prescription was, "Go home, eat and drink, and take half a wine-glass of vinum ferri three times a day, and no purgatives; and when you come again this day week, I will examine your chest." He called on me in a week to say that he was well, and laughed when I asked him if I should examine his heart. Now comes the empiricism. After some three years, he consulted me about one of his patients, who had "symptoms exactly like his own, but the vinum ferri did no good." "You have not yet mentioned the sex." "A young lady." "Is she very pale, then?" "Quite the contrary," &c. "Have you forgotten our clinical

wards?" "Oh, I suppose you would recommend a drachm of cubebs three times a day, and a grain of calomel about twice a week:" to which I assented. He called on me in about a month to let me know that, by persevering in those remedies, the action of her heart had become as "regular as a pendulum."

STRUMA, or scrofula, is a disease of cold and damp climates; it is not in the first instance an inflammatory state, but a morbid deposition in the follicular and lymphatic structures, depending on debility of metamorphosis; and these depositions cause obstructions, which, acting like foreign substances, become secondarily the cause of inflammation in the glands and follicles.

The treatment consists in suitable diet, air, and exercise, to promote the strength; the diet should be of the most nutritive quality, and especially animal food, with wine and fermented liquors. The medicines which have always been found most useful are tonics; but the alkalies have a peculiarly beneficial effect combined with the tonics. This has been attributed to their tendency to act as solvents of the deposits; but it is rather from their action being analogous to mercury, as tonics to the capillary system; and it must be taken into account, that they are metallic oxides, and most likely part with their oxygen to promote healthy metamorphosis. The tonics are those which we have already discussed. Before quinine was known, the established treatment for scrofula was cinchona bark with alkalies (carbonate of soda or of potash), three times a day;

occasional doses of some mercurial; and a fair allowance of wine. To promote the reduction of the tumid glands and other swellings, iodine (iodide of potassium) is considered preferable to mercury; and it does act more quickly, and does not salivate; but it sometimes irritates the primæ viæ, and produces a degree of emaciation. Before it was introduced into practice, mercury was used, with the other means mentioned above, with great success; not given so as to affect the mouth, but every third or fourth day, so as to promote the secretions and act on the capillaries.

As just stated, iodine is now pretty generally preferred to mercury; but, though it does not salivate, it is a more debilitating medicine if given incautiously. Cod-liver oil has considerable influence in this disease; it acts beneficially on the primæ viæ: but its chief use is, that it affords considerable nutriment. One caution is especially necessary in scrofulous disease,—not to resort to any active antiphlogistic means for the inflammation of tumours and sores which occur, lest the constitution be debilitated and the strumous diathesis thereby increased.

On account of the necessity for avoiding any thing debilitating, many persons are afraid to use antimony; but, as I have frequently explained, it is any thing rather than debilitating, when fairly indicated, and used with judgment; in certain scrofulous inflammations, such as strumous* ophthalmia, its powerful anti-inflammatory effect is conspicuous, given in minute doses of from one-eighth to one-

* See communications from Dr. W. Price, and Mr. Cheshire, *British Medical Journal*, June 25, 1864.

sixteenth of a grain three times a day, or even in larger doses for a short time, provided it does not take away the appetite, or produce nausea; and thus, by its influence on the capillaries, it becomes a powerful adjunct of stimulant antiphlogistic treatment.

Strumous swellings ought never to be rubbed, but covered with some mild plaister on thin leather; or if iodine or other substance be applied, it should be without friction, which irritates those tumours; and when they suppurate, they ought not to be opened artificially, if that can be avoided, as the smallest puncture of a lancet leaves a permanent mark,—whereas even a large hole, which the natural process makes, will close up so as often to leave a perceptible mark not much bigger than a pin-hole.

We have now to inquire into the nature of DROPSY, which is an undue deposition of watery (serous, sometimes fibrinous) fluid by those capillary vessels of the serous membranes and of the areolar tissue which, in a healthy state, supply merely sufficient to keep those parts moist.

Dropsy is an overthrow of the hystological relations of one or more parts of the frame; a perversion of the functions of those minute tissues or structures which were the object of physiology and general anatomy, until the latter was superseded and left behind by hystology, in consequence of the greater insight obtained by the microscope, and animal chemistry, into the secrets of nutrition and detrition, secretion and excretion.

In considering and speaking of the minute objects of the microscope, it is difficult to realise a

correct estimation of the extreme minuteness of several of the subjects of discussion; take, for instance, the blood-discs or corpuscles, the ultimate cells of pus, or the cells which go to form epithelial membrane, and the secretions.

Dropsy is inflammation ("leucophlegmasia") or congestion (p. 81): the proximate cause of the acute or chronic being the same—a weakness, and consequently a giving way or enlargement, of the capillaries concerned.

I cannot agree with those authors who consider congestion to exist only in the veins, and to differ from inflammation in the cause being mechanical. We know that a mechanical obstruction in the circle of the blood must cause congestion as surely as damming a river-stream, and that not solely in the veins; but there are causes of dropsy which do not act mechanically, and mechanical causes which produce venous congestion for a long time without dropsy resulting: as it is not until the capillaries themselves are congested, in consequence of relaxation from loss of nervous energy, that the exosmose of dropsical effusion commences, which occurs often when there is no mechanical obstruction—as in acute anasarca from cold,* which, as its name implies, is inflammatory, and occurs in robust persons, like *acute* hydrothorax (sometimes misnamed empyema), from pleurisy; or acute ascites,

* I once saw in hospital a strong man, the guard of a mail-coach, who, a couple of days after being exposed during the night in a snow-storm, was anasarcous from head to foot; which all subsided in two or three days, merely with rest and a couple of warm baths.

from peritonitis. Chronic anasarca will occur from chronic uterine and other affections in the young or old, or even from a bad compound fracture of a limb.

I hold relaxation of capillaries to be sufficient for the explanation of the phenomena of dropsy; and in like manner as I denied arterial action to be increased in inflammation, so I deny that it is necessary to refer, as many do, to a diminished action in the absorbents as a cause of dropsy. The action of the absorbents is uniform; it is not necessary to suppose any alteration as to absorption as a cause either of inducing or removing dropsical effusion; for, considering the action of the absorbents to be uniform,—merely to take up and carry off what is presented to them,—it is evident that, in case of too great a quantity of fluid being poured out, the absorbents will not be equal to the task of taking it up fast enough. But when we act upon the capillaries, so as to check their exhalations, we know that the absorbents, continuing their function, will gradually carry off the overplus of effused fluid; and that we can restrain the effusion from capillaries in two ways—either by constringing them, or by allowing less fluid to go to them. But, though a common expression, we know no demonstrable mode of *directly* altering the action of the absorbents.* The

* Indeed, the only mode in which we undoubtedly affect the function of the absorbent—and that is *indirectly*—is evinced by some of the phenomena occurring in the experiment of the introduction of a poison by incision or injection into the cellular tissue or serous sacs of an animal, or even into its stomach. It has been noticed, that an increase or diminution of the plethoric

medicines which are commonly *said* to *increase the action* of the *absorbents*, act on the *capillary* vessels so as to check their deposition: and this is the true account of the removal of dropsical swellings by the action of mercury and other medicines, which cause an alteration in the action of the capillaries, so as to stop their depositions; or by such medicines as elaterium, which, by causing evacuation, actually diminish the quantity of fluid supplied by the exhalants, whilst the evacuation increases the current in the absorbents.

It is surprising how many medical men are unacquainted with, or afraid to use, elaterium: some not having, perhaps, in early clinical life witnessed its effects, and hearing that they are great, they think they are violent,—which, however, is incorrect, *if it be judiciously administered.* If the eye

state of the animal affects the rapidity with which the poison is absorbed, or produces its poisonous effects. Thus, if it be bled after the administration of a poison in either of the above-mentioned modes, poisonous effects will be evinced earlier than in another animal which has not been bled. On the contrary, injection of warm water (98° Fahr.) into the veins of the animal under such circumstances retards the operation of the poison. In opposition to the opinion that, in such experiments, the rapid operation of the poison arises from absorption being in any way accelerated, it might be stated that, by depletion, the animal is weakened, and that consequently a smaller quantity of the poison then suffices to produce the pernicious results. It is a well-known fact, that in persons who did not labour under disease, but who had been bled whilst in health as a preventive (in former times so much in vogue), the absorption of chyle was so greatly increased, that their robust, plethoric state became augmented, and fat accumulated in most parts of their frame. It certainly appears that the function of absorption, or that phenomenon evinced in the living body called endosmose, is, according to

be made to weep by an actual injury, such as sand, or a blow, or other cause of inflammation, the effect is very different from the weeping produced by holding an onion before it. The analogy is perfect between the operations of these two substances: the elaterium, like the onion, produces a weeping from the exhalants of the bowels, which carries off dropsical fluid without the slightest injury to the membrane of the intestinal canal. Elaterium is not a purgative similar to jalap, colocynth, gamboge, aloes, or croton oil, which act on the peristaltic motion. It purges by causing a deluge of fluid secretion from the intestines, like choleraic discharge; and—except in dropsy, when there is an abundant supply ready—if it be given as a common purgative, for want of that supply of fluid, the dry

physical laws, modified by the nature and quantity of the fluids contained in the system of elastic arteries and capillaries, and the veins—the diminution of whose contents facilitates the emptying of the absorbents into them, and, of course, quickens the flow in the absorbents; in other words, increases absorption. This increased current in the absorbents, through the depletion of the blood-vessels, is an admirable adaptation of the structure and function of parts of the living body to the intended end. How wise a provision for the more speedy reparation of accidental loss of the fluid parts of the machine!

The knowledge of these facts suggests the immediate utility of depleting remedies—diuretics, salines, emetics, and purgatives, as elaterium, in dropsies even not ostensibly inflammatory; hence the utility of depleting remedies combined with tonics, in dropsy; and the reason why, in cases of poisoning in the human subject, bleeding should not be resorted to for checking the inflammation of the viscera until the whole of the poison has been voided or extracted from the stomach.

pumping produces great distress and gripings, as has often been experienced by persons who have resorted to it as a forlorn hope when the other purgatives had failed. It is just as erroneous to fear employing elaterium to relieve the chest and other parts of a patient who is oppressed and suffocating with dropsical effusion, as to fancy that a water-logged ship could not bear the action of the pumps which draw the water from its hold. Some of my medical friends into whose hands this will come, will recollect having seen, after consultation, the effect of elaterium in evacuating the fluid.* It is to dropsical cases that elaterium is peculiarly applicable, and not to those where merely purgatives are indicated; in fact, if *elaterium be continued as a purgative after the dropsy has been removed, there being no water to be pumped, it begins to distress the patient, who, up to that time, had felt decided relief from it.*

Dropsy is never a primary disease, but a symptom—a state of debility of the nervous system (and consequently of the capillaries), worn down by

* The author was upon one occasion consulted about a case of dropsy by a practitioner of experience and great intelligence, in extensive practice. The case was one of aggravated chronic bronchitis, with hepatisation of a portion of one lung, of twenty years' standing, from pneumonia. On former occasions the patient had been relieved by ordinary medicines, expectorants, and diuretics, and especially by mercury, which had taken off the congestion of the lung. This time they all failed, and he was sinking. Dropsical all over—face, limbs, and abdomen; and the lungs becoming œdematous; urine nearly suppressed.

Under these circumstances, the author proposed elaterium, as affording the only chance of pumping out the fluid. The experienced practitioner very candidly confessed that he had not used it, but was most willing to see its effects. Three-quarters of a grain was

disease of some organ, and increased, as in organic disease of the heart, liver, or lungs, by mechanical obstruction of the circulation. The partial sudden effusions which sometimes take place from inflammation of a serous membrane, as from the pleura, constituting the empyema of Laennec (which is not the empyema of Cullen), should rather be called inflammatory effusion than dropsy.

Dropsy may be induced by any protracted disease, which, by morbid sensibility or slow fever, robs the secreting organs of their nervous energy, as the kidneys, skin, and intestines, but particularly the kidneys and skin: when they cease to secrete, the redundant fluid oozes from the capillaries, which are not merely overloaded, but weakened in consequence of the deteriorated state of the nervous system; and *unless* we can restore energy to the nervous system, and check *exudation*, by giving tone to the capillaries, we in vain resort to tapping, or diuretics, or cathartics, such as

prescribed every second day, with five grains of compound colocynth pill (the use of which is to send the watery discharge downwards; otherwise, the elaterium usually causes more distressing vomiting, which adds nothing to the efficacy of the remedy). Each pill evacuated about a gallon of fluid from the intestines, with relief; acting even indirectly as a diuretic: for after the second pill, the kidneys being relieved from congestion, began to secrete naturally. The œdema of the lungs diminished, and all the symptoms improved; so that by the time he had taken eight or nine doses, he began to be fairly convalescent. This medical friend most frankly acknowledged his obligations to his two new acquaintances—the doctor and the elaterium, saying that he had remarked a decided progress after each dose of that medicine. What a clever clinical teacher he must have had! This gentleman was quite willing and able to learn, if he had had a chance!

elaterium, to *evacuate* the dropsical fluid, as it will speedily *reaccumulate*.

Thus dropsy is not to be treated as an isolated or single disease, except when for a time, in order to prevent a patient from being overwhelmed by the fluid in the cavities, we turn our whole attention to getting rid of it, either by tapping or by profuse evacuation, as by hydragogue purgatives or diuretics, and other medicines. Large doses of jalap with supertartrate of potash is a very hydragogue cathartic, but bears no comparison with elaterium.

We are all now "wide awake" as to the probable existence of Bright's disease of the kidney in every case of dropsy, and there is a prejudice against using mercury when this exists; but I must say that I am never deterred, even by the chemical evidence of that disease coexisting, from using mercury in moderation, if fairly indicated by liver-disease, chronic bronchitis, or other affection demanding mercury. When we see a patient with dropsical swellings, our great object must be to cure the disease which produced the dropsy—the latter being but a symptom.

It is true that both are sometimes cured by attending to the one symptom alone, as when dropsy is the consequence of inflammatory disease of the lungs, pericardium, or liver; in which case squills and digitalis are employed as diuretics, along with purgatives to evacuate the fluid by the kidneys and bowels; some form of mercury being at the same time used, under the supposition that it promotes absorption. Here, although the whole attention be given to the symptom of dropsy, the treatment is also applicable to

the local affection; and in such a case the primary and secondary disease may be cured together. By referring to local inflammation as the origin of some dropsies, we can understand how, in many cases, the abstraction of blood* by leeches or otherwise, formerly resorted to, became sometimes a most useful assistant in the cure, from the mere effect of taking off the injecting force of the heart, when the heart and capillaries did not balance in power; as, for instance, when other diuretics failed, from the congested state of the kidneys, bleeding by venesection or leeches used often to prove the most powerful of diuretics, as it has been sometimes a most efficient adjunct to cathartics; but we have seen above that elaterium is as efficacious, or even more so.

On the other hand, in dropsy of broken-down constitutions, as well as in inflammations with failure of the vital powers, by reference to the influence of the nervous system in giving strength to the capillaries, so as to enable them to contract, and resist the distending force of the heart, we can understand how tonics,—and, in some instances, stimulants, as wine, the tonic action of which has been formerly explained,—increase capillary action, and restrain the effusion, when evacuation would injure the patient; so that dropsy, like inflammation, is cured by opposite treatment, according to the state of the constitution.

* One of my old masters, when the question of paracentesis for ascites arose, used always to try first the effect of a dozen leeches to the epigastrium, repeated according to circumstances, and thereby sometimes cured the ascites, which is frequently accompanied by a degree of peritonitis. The reasoning respecting elaterium is applicable here.

A fruitful source of dropsy is disease of the heart—organic alteration, especially imperfect valves or contracted openings, with hypertrophy; the effect of the hard pulse from hypertrophy being to cause over-distension, at the same time that the capillaries, from diminished nervous energy, are weakened; for the obstruction or regurgitation from imperfect valves causes pulmonary congestion, and consequently deficient arterialisation of the blood, as well as cerebral congestion,—both of them diminishing the generation of the nervous energy; from which result capillary congestion, evinced by dyspnœa, livid lips, tendency to coma or mania, diminished secretions, dropsical effusions.

In those cases where the cause is an organic alteration which cannot be removed, we must be cautious in not endeavouring to do too much at once by over-active treatment, as the strength must be supported, though depletion be necessary. Whatever increases the action of the heart, except where there is a weak right auricle, as explained by Dr. Daldy (*op. cit.*), by adding to congestion, diminishes the vital powers; so that there must be a constant exercise of skill to preserve a balance between heart and capillaries. Such mediums as digitalis and hydrocyanic acid will restrain the former, whilst the latter will be much assisted by the tonic medicines which do not stimulate, and at the same time help to support the strength under the operation of the occasionally required evacuants and sedatives, which are too depressing to be persevered with.

This leads us to the *rationale* of another *symptom*

—HÆMORRHAGE from the epithelial mucous membranes*—which, as well as that in purpura, purpura hæmorrhagica, or scurvy, takes place under the same circumstances as dropsy; the exhalants, from atony combined with over-repletion, as in epistaxis, allowing blood to escape instead of serous fluid: and even the capillary exhalants of the serous membranes sometimes allow blood to escape, which we find mixed with the dropsical lymph upon tapping, or after death. Nevertheless, from what we know of secretion by exosmose from the sides, and not from terminal orifices, of capillaries, we can scarcely believe that blood-discs escape without solution of continuity of the capillaries. It used to be commonly said, and is still thought by many, that when blood is vomited, or passed downwards, or coughed up, there has been a "rupture of a blood-vessel;" but though this does sometimes happen, the more common source of the blood is from the network of capillaries, not from vessels of any size.

In amenorrhœa, the (chronic) hysteritis from which it proceeds produces sympathetic morbid sensibility of the stomach or of the bronchi, and, consequently, relaxation and congestion of their mucous membrane, ending in hæmorrhage, sympathetic vomiting or spitting of blood, which

* "Hæmorrhages" are represented in the systems of some nosologists as a distinct class of diseases. I have endeavoured at once to point out their true nature, and thus assist in the diagnosis and treatment of disease. The hæmorrhages, like dropsies, are but symptoms of organic disease, sometimes of the part whence the blood comes, at other times of remote organs.

comes on sometimes periodically ("catamenia vicaria").

There are instances, however, in which "catamenia vicaria" does not result from the uterine disease, as in the case of a girl, æt. seventeen, about whom I was consulted, who had menstruated for two years, and then instead had monthly hæmatemesis. The first thing that struck me was, that—although very pale—she was not chlorotic; her colour was that sallow whiteness which we see sometimes in slow aguish disease, but also—still more to the purpose—with chronic (sometimes malignant) disease of the stomach. I then ascertained that, before any appearance of catamenia, she had, in fact, chronic anorexia and indigestion; and therefore, instead of resorting to emmenagogues, I prescribed dilute sulphuric acid, with sulphate of magnesia, *ter die*, as the bowels were sluggish; this in two or three weeks improved the appetite and digestion, and even the complexion, —the alvine secretions becoming natural. I followed up the treatment with bismuth. The complexion became healthy, the catamenia returned, and she has been quite well for some years.

Chronic hepatitis, or the local inflammation or congestion of the intestines in fever, and other affections, also brings blood from the surface of the primæ viæ. Bronchitis causes spitting of blood, sometimes tolerably copious, without ascertainable rupture of vessel. Now, in all these cases the symptom of hæmorrhage must be combated as dropsy would be, according to the state of the constitution: hence the distinction of active and passive hæmorrhages. The active must be treated by sedative antiphlo-

gistic means; the passive hæmorrhages, such as those at the close of fever, flooding, and many cases of menorrhagia, most directly and safely by opiates,—with astringents,* of course, in both cases. And even after active hæmorrhages are subdued, the patient must not be kept too low, as some strength is required to produce the reparation of capillaries which have been injured, when there has really been inflammation. Cases constantly occur, in which there is no disease but morbid sensibility, and in which the depletion and deprivation of food, adopted through mistaking the symptoms for inflammation, have sometimes brought the patients to death's door, if not over the threshold: and even if they escape with their lives, they may suffer years of debility and discomfort before the stomach can again properly bear the presence of food, or the nervous system recover its tone. How often has it occurred to me to be called in by a young medical man in breathless haste, apprehending the greatest danger, and really in a state of anxiety about a female patient, sometimes after parturition, in one of those "mimose" affections just alluded to, resembling inflammation: when instantly, on looking in the patient's face, and feeling the skin, I have whispered, "There is nothing the matter with her." "But what is to be done?" "Nothing." "But she will die if she goes on in this way." "Not if you abstain from active treatment."

There is an absurd opinion prevalent that hæ-

* In menorrhagia, there is none to be compared with oxide of silver, in quarter-grain doses, never more nor less, in pills. (See Sir James Eyre's work on the subject.)

morrhoids are salutary, and ought not to be interfered with; because, after they have been tied, *i.e.* stopped per force, without the disease which produced them (such as congested liver) being cured, and which was kept in check by the occasional relief of the bleeding piles, disagreeable symptoms have occurred, not from the cure of these secondary piles, but from the *un*cure, as the Germans say, of the primary disease.

Again, a still more absurd assertion is, that hæmorrhoids have an analogy with catamenia, which is utterly false, as the flow from piles is a hæmorrhage of blood which coagulates; but healthy catamenial discharge consists of a secretion or slow oozing of a fluid, which does not coagulate, and is brown—not the colour of blood, either arterial or venous: it is only unhealthy hæmorrhagic catamenial blood which coagulates like blood from piles. Hæmoptysis, which frequently follows amenorrhœa, or occurs about the same time, will very frequently be found to be the commencement of phthisis, and not a vicarious hæmorrhage.

Piles are often cured without local application, or cease by putting the patient in good health, and removing the primary disease of liver, stomach, or intestines, by medicine, improved habits of diet, or exercise; and when piles have been cured in this way, and not by tying them, with neglect of medicine, I have never seen any ill effects from the non-return of the hæmorrhage. Horse-exercise has long been empirically known as a specific remedy for piles, which is only because it emulges the liver.

The relaxation of inflammation, producing increase of secretion from mucous follicles in different parts lined with epithelial mucous membrane, and which is denominated CATARRH, may be combined with fever or not: as in catarrh of the air-passages, diarrhœa, or acute dysentery; it is hence relievable either by stimulants with opium, on the one hand, or by sedative treatment (including bleeding) and opium, on the other. If you ascertain that there is not fever, you may stop simple troublesome catarrh or diarrhœa by stimulants or opium with astringents, either in recent or chronic cases, as in chronic dysentery also; but if there be active inflammation and pyrexia, as in bronchitis, influenza, and acute dysentery, an antiphlogistic (sedative) treatment must be adopted with the anodyne.

PURPURA HÆMORRHAGICA, though by some classed with cutaneous diseases, is—like dropsy—a general affection of the system; an evidence of a constitution broken down by continued disease of liver, lungs, or some other organ; and, therefore, there can be no special remedy for a disease which must follow its leader.

This is not the case with SCURVY, which is a special disease in itself, though artificially produced by bad food—food which does not supply the universal essential basis of all the tissues—albumen. Scurvy has been classed with hæmorrhages, because hæmorrhage is one of its symptoms; with skin-diseases, because a rash of petechiæ and ecchymosis accompanies it. But it is deeper seated than either,

pervading the whole frame, on account of the deficiency of the pervading element—albumen; the humoral pathology and the alkaline pathology do not satisfy me, and therefore I venture here to advance my opinion.

It is not the salt of salted provisions which renders them unwholesome; it is the length of time that they are kept, during long voyages, and in garrisons: a salted round of beef is just as wholesome as a fresh sirloin; where, then, is the fault? I can, perhaps, elucidate it by an anecdote.

Many years ago, some of the members of the Hunterian Society made the experiment of keeping specimens of pathological anatomy in a strong solution of chloride of soda in water, as being very cheap, and free from the inconvenience arising from the rapid evaporation of spirit. We were delighted with the success for a short time; but after a year or so, we found that the preparations shrivelled and lost their shape, so as to be useless; and all muscular parts, especially, became too hard to be cut with a knife,—which would not have signified, but for the change of shape. Under these circumstances, I investigated the effects of long salting on provisions, and examined two casks of ships' provisions which had been in store for more than a year—one a cask of lumps of beef, the other of beef tongues; they were as sound and "sweet" as when packed, but too hard—especially the tongues—to be penetrated by knife or tooth. I tried experiments with the tongues, by soaking them for some days in fresh water, and then slow boiling; but the cook declared, "You might as well try to boil a brickbat tender."

From this I deduce that, the meat being kept in a moist state, and free from putrefactive fermentation, the fibrine and albumen, which ought to be amenable to pepsine, have formed new relations of O.H.C. and N.—which render them refractory as food; whereby the living tissues are deprived of their metamorphic supplies, and become in a state of universal debility and degeneration, as evinced in scorbutic membranes and muscles; for the muscles are not merely unable to contract, but are converted into solid unyielding masses, so that a gastrocnemius muscle, at rest, feels as if the patient were standing upon his toes.

It might be worth while to investigate whether, in the course of time, the salted meat would be converted into adipocere, as we know animal substances are, when kept long under moisture, without putrefactive alteration.

The well-ascertained mode of cure in scurvy is to give fresh vegetables and lemon-juice. I suspect that it is the mucilage of the lemon which contributes to the renewal of albumen; it certainly is not the citric acid: and I have requested a friend, who has an opportunity of treating cases of scurvy, to try the efficacy of mucilage of gum, or of linseed.

In addition to the various observations which have already been made upon diseases of the BRAIN, such as apoplexy, paralysis, epilepsy, and other neuroses, let us take into consideration the nature of convulsive movements. In the first place, whether direct or reflex, they come from the brain, as in either case the action of the voluntary muscles is derived

from that organ; for, whatever share the spinal cord may have in the transmission of simple or reflex action, the impetus to voluntary muscles must come from the brain in apoplectic, epileptic, choreic, tetanic, or other convulsions. This is the case in apoplexy, whether traumatic, or produced by a hæmorrhagic clot of blood, or by inflammation terminating in softening (acute or chronic), in abscess, or in a solid tumour.

In EPILEPSY, convulsions are either direct—from the irritation of a spicula of exostosis, from ossification of an artery, from tumour, or other disease in the brain, or from mental emotion, as fright, or from various circumstances exhaustive of the nervous system; or they are reflex, as from intestinal worms or other visceral irritation, such as hysteria; or traumatic, as from a fractured limb, gun-shot wounds, &c.

From this short enumeration of causes, it is evident that it is erroneous to denominate epilepsy a constitutional disease—we might as well say that toothache is constitutional; but because *post-mortem* examination has not discovered morbid lesion in the brain of epileptics, whose fits were reflex from a distal cause,—even sometimes direct from the brain,—epilepsy has often been thought a specific disease, instead of only a symptom; and absurd, fanciful constitutional remedies have been prescribed for it, such as cardamine pratensis, or valerian; whereas, as was said of dropsy, if you can cure the primary disease, the symptom—that is, epileptic convulsions—will cease. Thus I have cured epileptic fits by expelling a tape-worm from the

intestines by ol. terebinthinæ, or some other anthelmintic; or by expelling a superabundance of ascarides from the lower intestines by ol. ricini; or by curing hysteria with cubebs and other remedies—for I denominate hysterical fits, hysterical epilepsy. These are reflex convulsions; but epilepsy occurs from other sources than any of those enumerated, and in patients in whom the brain is directly implicated. Thus a clergyman, æt. fifty, who had been much harassed in mind and fatigued in body, became subject to epileptic fits, occurring even in the pulpit. After they had existed for about four years, he consulted me. What little food he took, he could not digest; and, under the direction of a provincial Galen, he drank scarcely any fermented liquor. By the use of bismuth, quinine, and a few doses of blue pill, with generous diet, he got rid of the fits in five months, and never had another attack, though he survived twenty-five years.

A gentleman came to London to consult me, from a large provincial city, where he had had the best, and really orthodox, advice. The disease was of some years' standing, and the fits were frequent and severe; he was not, apparently, so much out of health as the last patient, but his digestion was bad, he was overworked in business, and was not allowed stimulants. He got well under similar treatment in a few months, and has not had a fit since—now eight years.

A former pupil of mine, in large practice in the country, came to town to consult me about retiring from practice, on account of epileptic fits, for which he had had some of the best advice in the city near

which he resided; he had taken a variety of the remedies recommended in Thomas's *Practice of Physic*, and his diet had been restricted. I asked him to defer his retirement, and try the above plan, more especially to return to rump-steaks and his former free allowance of brandy-and-water, which had been interdicted. After less than three months' perseverance with this course, he wrote to me that he had had but two very slight fits, that he felt quite well and strong, and that he had resumed driving in his stanhope, which he had not ventured to do for a year before he saw me. He lived about twelve years after this, but never had another fit.

These, however, are functional cases; those depending upon ossific or other deposits are not so curable. There are even many of the milder cases which are pertinacious.

I met a medical gentleman in consultation, who, whilst we were conversing, suddenly became silent, and apparently unconscious, for a few—perhaps ten—seconds; he then smiled and said, "It is only one of my clouds." He informed me that he had been, for some years, the subject of the minor degree of epilepsy; he had never fallen unconscious but twice, though he lived in apprehension of an increase of the disease. He said that sometimes, whilst standing near the fire, he had felt this dizziness, and had stepped back lest he should fall into the grate. He had had, of course, as a medical man, a variety of the best advice; yet, with one exception, his friends had uniformly advised him to be on the *safe* side, and avoid stimulants; and whatever medicines they had recommended, they kept him too low. I advised him

to use a more generous diet, with quinine instead of the medicines above referred to; as he was pale and anæmic, I prescribed iron with the quinine. Under this plan, in a few months, he recovered his health and strength, and has continued well now for some years.

Another medical friend, who had been in the habit of consulting me about members of his family, became epileptic—the fits rather severe, and recurring at intervals of from ten to twenty days, or longer. I had not seen him for more than four months, having been out of town; the epilepsy seemed to be produced by harassment of body and mind,—and he too, I found, was keeping on the *safe* side, and living too low. In this case, instead of the above medicines—as he had been previously in a hot climate, and his liver was sluggish—I prescribed liquor arsenicalis, to do the duty of quinine on the nerves, and of mercury on the liver; and, with that medicine, and good, generous diet, he soon shook off the fits, and grew strong enough to battle with the world.

Nitrate of silver and oxide of zinc, at one time, were the most favourite remedies for epilepsy, and sometimes succeeded, with the help of occasional doses of mercurials, *good diet*, and stimulants; but they often failed from not being well backed by the two latter.

Several elaborate but futile attempts have been made by humoral pathologists, ancient and modern, to fix the guilt of epilepsy upon the blood; but I have given a sufficient number of examples to show that it occurs instantaneously, before there is time

for any poison to be generated or circulated. Some epileptic patients may have diseased kidneys, but the great majority have not; some may have disease within the skull, but the majority have not. In fine, epilepsy is a symptom—an evidence, merely, that the brain is troubled by some irritation, present or distal, which produces morbid sensibility sufficient to excite either immediate or reflex muscular actions, —which actions do not take place in those few cases of hysterical catalepsy which have been mistaken for, and recorded as, epilepsy.

Chorea is frequently placed in apposition with epilepsy, but is totally different from it. The movements in chorea are *not involuntary* or *spasmodic*, though *jerking*. It comes on in childhood, and, if not corrected, may last through life,—of which fact every one can recall living examples: one person has a trick of jerking up his eye-brows and forehead; another, of twisting the side of his mouth and nose on one side. There was an old gentleman, thirty years ago, who used to walk about the neighbourhood of Bedford Square, and who every moment twisted his head round suddenly, as if to see who was coming after him. These cases could have been cured by proper attention and remonstrance on the part of parents or nurses, and frequently without any medicine, though in some cases tonics are necessary,—for, in general, the child who gives way to the morbid sensibility, and gets a trick of gaping, or winking, or twisting the side of the mouth, or a hand, or sometimes of jerking one finger (generally the little finger), if constantly reminded of it, and checked, can be

broken of the habit; but it is sometimes necessary, besides, to attend to an excitable state of the brain and cerebellum. In the aggravated cases of chorea, where the child cannot carry a cup to the mouth, there is no deficiency of volition, but of that co-ordination of muscles depending on the cerebellum; the absurd movements made are not involuntary or spasmodic: when the child wills to move the hand or other part in one direction, there is a morbid sensibility communicated to the roots of neighbouring nerves, which puts antagonistic muscles into action—so as to frustrate volition; but all this will subside —sometimes spontaneously, or, if not, always by attention to the constitution, by good diet, and tonics, such as quinine, iron, and bismuth, with ordinary attention to the bowels, &c. Rare cases of very chronic chorea have been recorded, associated with a coexisting pathological condition of the spinal cord; but these are so very few as to constitute only the *curiosities* of the disease.

Before entering upon DISEASES OF THE CHEST, we must premise the necessary points of auscultation.

Of the natural sounds in the air-passages, there are three only to be learned: those occurring respectively in—1, the windpipe (larynx and trachea); 2, the bronchial tubes; and 3, the spongy lung.

On applying the ear or stethoscope to the trachea, the respiration is heard as if it were blowing into the ear, and much louder than would be supposed from listening to the air passing in and out of the mouth; this is *tracheal* respiration, which I mention, not as a new term, but because I would purpose to

use it, for the sake of simplification, instead of another—"cavernous"—which has been employed to express a morbid state. Thus, if a natural sound be observed in an unnatural locality, it becomes a sign of disease; for if the noise of tracheal (called "cavernous") respiration be heard down in the chest, something is wrong. On listening upon the trachea during speaking, the voice sounds as if it were passing into the ear, and the words distinct: this is *tracheophony;* if they be heard as articulately on any part of the chest, it is a sign of mischief; for, in the natural state, the voice is heard only to resound through the chest, but the words are not heard if the other ear be stopped. This sound is called "*pectoriloquy;*" which term I would discard as unnecessary: it is *tracheophony* heard in an *unnatural* position, thereby becoming a morbid sound—to which it is unnecessary to give another name.*

On auscultating over the large bronchial tubes where they first branch from the trachea,—that is, at the summit of the chest, just where the collar-bones join the sternum, and at the back, at a corresponding level, close upon the spine,—the sound of respiration ("*bronchial respiration*") is heard; only, as much smaller than that of the trachea as might be calculated from the diminution of size of the tube: but

* I am borne out in discarding the term "pectoriloquy" for *tracheophony* by the established usage of "bronchophony" and "puerile respiration," natural sounds which are acknowledged as morbid signs whenever they are found in a wrong place. Besides which, by learning the sound of tracheophony, we are prepared to detect it when it becomes a morbid sign.

still a tubular sound, not spongy, such as the healthy sound of respiration given by the lungs over all the rest of the chest; hence, if *bronchial respiration* be heard in any other position except those two described, something is wrong. The sound of the voice, *bronchophony*, over the upper extremity of the sternum, and at the same level over the back opposite, is somewhat similar to that on the trachea, allowing for difference of size of tube; but *there is not articulation of words.* At the summit of the sternum no words are distinguishable, but only resonance. In tracheophony the sound of the voice, in listening over the trachea, is heard more distinctly with the ear which is applied than by the other; bronchophony is very much the reverse.

Over the remainder of the chest, where the respiration can be heard best, there is what is called the natural *respiratory murmur* of the air reaching the ear through the spongy texture of the lung, not intelligible by description, but to be learned in a moment by listening to it. There are three natural gradations of this, according to age: in young children, say until about three years, the respiration is much louder than in the adult, and is called *puerile* respiration; in old persons it is weaker than in the adult. Now, if any of these respective degrees or gradations of sounds be *misplaced*, it is an evidence of some mischief, as will be shown in the description of each disease. For instance, if in an adult or old person the respiratory murmur be heard as strong as in a child, it shows that something is

wrong; or if in an adult or child it be as weak as in an old person, the same conclusion follows. But it must be observed that there are so many circumstances which cause the respiration to be heard weaker than usual, both in adults and in children, that we cannot depend upon this variety of negative evidence so confidently as we can upon the positive symptom of too loud (puerile) respiration, where that is found to exist.

The natural respiratory murmur is heard chiefly during *in*spiration, which in the adult occupies about one-third of the time of each act of respiration; that is, there is about one-third occupied by inspiration, rather less than one-third by expiration, and then rather more than one-third pause or rest before the next inspiration.

This statement must be modified for different ages and for different parts. Thus, in the child, the lung murmur of expiration is heard nearly as long as the inspiration, on account of the short distance the sound has to be transmitted by the solid parietes of the chest; in adults generally, the sound of expiration does not last so long as the inspiration, and is much weaker, and in some even healthy persons is scarcely perceptible. This, however, applies strictly to the spongy-lung murmur, and must not be confounded with any degree of bronchial sound when a bronchial tube is near enough to be heard. In the trachea, the strength of sound of inspiration and expiration is nearly equal; in the bronchial tubes, the sound of expiration is much weaker, and does not last more than about half as long; in the lungs, its duration is scarcely one-fourth. It is the sound

produced by the current of air passing through the larynx, which is heard (modified) in the trachea, bronchi, and lungs. In the lungs, in the healthy state, the sound is transmitted in the direction of the current during the entire inspiration; the current of expiration being propagated in an opposite direction prevents the sound from being heard except just at the commencement. This statement will be illustrated hereafter by the phenomena of disease; thus, for instance, when the expiratory lung murmur is prolonged in the adult, it is a morbid sign of solidified lung.*

Percussion is another means of ascertaining the state of the viscera of the chest. Pleximeters and

* I do not here enter into any discussion upon the subject of "*consonance*," simply because I confess that, however amusing, I have not yet found any utility in it; I will just give a couple of quotations, and leave it to the reader to judge whether such subject-matter will ever tend to assist practical medicine.

"Let two flutes which are in unison be placed near each other, let a certain note be produced on one flute, and the intensity of the sound will be increased by the *consonating* vibrations of the air contained in the second flute, in a proportion dependent upon the distance between the two instruments."

Another author writes: "If consonance be admitted, how can intensification of sound within the chest be accounted for? Dr. Walshe has offered the ingenious explanation, that such intensification occurs from reflection of the waves of sound towards a focus. The same idea has been less carefully expressed by Dr. Blakiston (who speaks of sound increased by reverberation), and by Skoda and Weber. But Dr. Walshe has given this hypothesis a *locus standi*, and has, we think, made out a strong case for it. But we are not satisfied that it can be considered other than a secondary cause of *intensification* of sound, and we question if it can be applied to more than a limited number of cases."

other instruments have been invented and proposed for this purpose, but are utterly unnecessary. The proper mode is to lay one finger flat and firmly over the part to be investigated, and then fillip on that finger with one, or tap with the points of two or three fingers of the other hand: every part where there is lung (except just at the lower edges, and especially on the right side, on account of the liver), ought to sound nearly as hollow as an empty cask, the spongy texture of the lung being filled with air. But in proportion as the lung becomes denser from disease, either through being loaded with blood by inflammation, with dropsical fluid, or with tubercles, the sound on percussion becomes duller.

I take this opportunity of acknowledging our obligations to Laennec: any man who practised for some years (as I did) before the introduction of auscultation, and who had felt the difficulty of diagnosis in diseases of the heart and lungs, can estimate the blessing it confers, in enabling us to distinguish the varieties of these affections. Compared with what we now know of diseases of the viscera in the chest, the degree of information attained fifty years ago was but "darkness visible." It is ungenerous to detract from Laennec by saying that he has not assisted us much in prescribing: he has done every thing in helping us to distinguish the disease—the application of remedies depends upon our own skill afterwards.

In considering diseases of the lungs, we begin with the simplest, or rather the lowest, degree of departure from the normal state—catarrh of the

lining membrane of the air-passages, or common cold of the chest;—this, when aggravated to inflammation, is called *bronchitis;* and when the minute vesicular structure of the lungs is implicated, *peripneumonia.* These represent likewise the different states or gradations of epidemic febrile catarrh or *influenza*, which, like the sporadic or accidental disease, is sometimes mild, sometimes unmanageable. Catarrh is in reality mild bronchitis; that is, an inflammation of the membrane of the bronchial tubes, though in a minor degree: but it has been usual to draw an artificial line of distinction between catarrh and bronchitis, because the treatment is different,—catarrh, which is a mere *local* disease, being benefited by liberal diet; bronchitis, on account of the higher degree of inflammation and the *constitutional* pyrexia which accompany it, requiring an anti-febrile regimen.

Catrarh is not produced by application of mere cold to the respiratory passages—as by the continued breathing of frosty air, for instance—provided the healthy circulation of the blood be kept up by exercise; but if the person be chilled at the same time, as by sitting in an open carriage without sufficient clothing, catarrh will result; or, under any circumstances, the continued breathing a damp and cold atmosphere will lower the vital tone of the membrane, so as to induce inflammation. If the chest be excessively chilled, either from the simple cold alone, or, still worse, if the surface of the skin and the clothes be damp from previous perspiration, or wet by rain, the probability arises, that—besides merely catching a cold, viz. catarrh of the membrane of the nose and of the bronchial

tubes—pleurisy, or peripneumonia, inflammation of the lungs, or severe bronchitis, will be induced. The feet being wetted, and afterwards allowed to remain wet and cold, is a well-known cause of catarrh and of quinsy; not because there is any direct communication or sympathy between the feet and the fauces, but because cold feet, above most things, bring on that chilly, reduced state of the nerves of the frame by which the nervous energy is diminished to a degree favourable for the production of inflammation, and then the cold air applied to the fauces and bronchi acts deleteriously upon them.

When the vital energy of the membrane has been in this way over-exhausted, if the individual rest for some time in a warmer atmosphere,—more especially if the warm air of our open fires be incautiously inspired,*—the vessels of the membrane become over-injected, red, and swollen: this is the

* Many persons think they have caught catarrh from exposure out-of-doors in very cold weather; whereas it is this subsequent application of heat to a chilled membrane which produces the mischief: precisely analogous to the cause of chilblains, which, it is well known, are produced by bringing the hands or feet too suddenly near the fire after exposure to cold. The lungs are naturally adapted to breathe cold air without injury; but the sudden application of artificial heat, by running up to a fire and breathing heated air, produces a chilblain state of the air-passages. Medical men often suffer from this cause, being obliged to undergo frequent changes of atmosphere in entering the heated rooms of patients in winter; these evils may be partly obviated by turning the back to the fire. It must, however, be observed, that either chilblains or catarrh may be produced by the depressing effect of long-continued cold, without subsequent extra heat; as mentioned above, when speaking of the catarrh from damp cold.

first step of catarrh, which may pass off in an hour or two, or further symptoms may follow. In this stage a sense of uneasy dryness in the parts affected, producing sneezing, sometimes amounting to pain, is experienced: we can see up the nostrils and into the fauces, and thereby judge of the state of the bronchial membrane lower down, though it be out of sight. Medical men are not usually called to patients at this early stage; but learners may watch for it in the members of their own families, or amongst fellow-students. If the ear be applied to the chest, the sound will be as yet but little altered; or if appreciable modification exist, it will consist of some diminution of the respiratory murmur, from the swelling of the membrane, and an occasional slight "*rhonchus sonorus*" or "*sibilans.*"*

The amount of *cough* is very uncertain, being often rather in proportion to the number of branches of sentient nerves irritated than to the amount of inflammation; nor can we in any case estimate the danger or severity of disease by the quantity of cough; for frequently there is a noisy, troublesome cough

* Almost all these auscultatory terms are derived from Laennec, with slight modification, and will be explained as they occur, by which means they will be more easily remembered than if given in a list unconnected with the pathology. "Rhonchus sonorus" is a slight croaking sound, like snoring, when not loud: it arises from swelling of the lining of the tubes, which narrows them, while, at the same time, a little extra formation of mucus or of pituita causes their partial obstruction at certain points, through which the air forces its passage and produces the vibratory sound. The "rhonchus sibilans"—a hissing or wheezing sound—is produced in the same way, but in smaller branches of the tubes; it is hence a more acute sound.

which is of little consequence; whereas, on the other hand, in some most dangerous inflammations of the lungs, little or no cough is present.

Slight catarrh will frequently pass off after a night's repose. Bathing the feet at bed-time, or a warm bath, if convenient, is useful; and some warm drink, with a small portion of fermented liquor, such as wine-whey or negus, according to the usual habit of the patient as regards diet. Diet should neither be reduced, nor should we countenance more stimulants than usual, or bronchial inflammation may be superadded, with shivering and hot dry skin —in fact, feverishness. If the natural appetite remain, it ought to be satisfied, as a desire for food is evidence that fever does not exist; and keeping the stomach empty, or loading it with slops, more especially with tea, will lower the nervous energy, so as to deprive the vessels of the bronchial membrane of that normal strength which would restore them, and consequently the membrane, to the natural state; or, in technical language, produce resolution of the incipient inflammation. If, either from the severity of the attack, or from bad management, by too much stimulant, or the reverse, the catarrh or bronchitis continue, instead of going off by resolution, the membrane will begin to throw out mucus abundantly in some parts, remaining still unnaturally dry in others; then the *rhonchus* becomes *mucous*, the mucus in the tubes producing bubbles. There is frequently heat and pain in some part of the chest, equivalent to the heat and pain which is felt in the membrane of the nose with cold in the head; part of which is dry, part "running;" but this is not a

dangerous symptom, nor one requiring antiphlogistic treatment, if not accompanied by febrile symptoms. In catarrh or bronchitis the sound on *percussion* is natural.

The *expectoration* in catarrh is *mucus*—that is, an increase of the natural secretion of the parts, which is gelatinous, but not tough, without much taste, and inclined to become opaque; in bronchitis it is *pituita*, an exudation of sero-albuminous, tough, glairy slime, transparent and saline; but inasmuch as catarrh and bronchitis run into each other, the expectoration is frequently a mixture of mucus and pituita;* in severe bronchitis (*olim* peripneumonia notha), it is a mixture of both; whereas, in true pneumonia, it is a very scanty and tough pituita, which, besides being saline, from the salts of the serum of the blood, partially loses its transparency, and has a rusty colour imparted to it by the red particles of blood which are extravasated by the inflammation.

When febrile symptoms are present, the disease assumes the state of bronchitis, or influenza, or feverish cold: there is chilliness, loss of appetite, pains

* These are the obvious properties of the expectorated matters, discoverable by the unaided senses of sight and smell. Microscopic observation of the existence of mucous corpuscles, epithelial matters, &c., most important for the minute pathology of the subject, at present lends no aid to clinical observation. The increased alkalinity of morbid secretion from mucous membranes, now proved by chemical analysis, explains the well-known irritating quality of these secretions. The glottis in acute stages of bronchitis, like the upper lip in schneideritis, or common cold in the head, is irritated by the *acridity* of the secretion, due to the presence of an increased quantity of alkaline salts.

in the back and limbs, and other feverish symptoms, with a dry swollen state of the bronchial membrane, exactly like that which occurs in measles; and these symptoms must be treated by blisters to the chest, more or less calomel, saline* and antimonial medicines, with morphia or other opiate to allay pain and keep down the pulse, to quiet the cough and facilitate expectoration. This medicinal treatment must be pursued notwithstanding any appearance of debility and weak pulse, which occurs in influenza,—and even if the disease passes on into the aggravated state called peripneumonia notha; in which the lips become livid, and the patient is almost suffocated by copious frothy expectoration, mixed with viscid pituita, producing great exhaustion by the harassing efforts to cough it up: even this state calls for the free use of mercurial and antimonial medicine; *nevertheless*, the exhaustion of the nervous system may rapidly become so great, from the deficient arterialisation of the blood, that stimulants—wine and brandy—are imperiously required together with the antimony—thus giving another example of stimulant antiphlogistic treatment. The lung, in this state of disease, becomes highly congested, producing a certain degree of dulness on percussion; and, in addition to the sonorous, sibilant, and mucous sounds in the bronchi, a fresh sound will be heard, "*crepitation*" (like that produced by throwing salt in the fire, or by rubbing a lock of hair between the finger and thumb close to the ear), which is caused by the very minute

* According to my experience, sulphate of magnesia is preferable to any of the salts of soda or potash.

bubbles of air in the lung-cells, charged with serous fluid. This is rather a desperate state of affairs; and, in addition to the remedies above mentioned, we must endeavour to relieve the internal congestion, by increasing the circulation on the surface. The vapour-bath is a powerful means; and as the patient is generally too languid to employ it in the erect posture, Armstrong's plan of putting a light frame over the patient under the bed-clothes, and introducing the hot air from an Argand lamp by a tin tube, is highly efficacious, and can be persevered in for a long time without fatiguing the patient.

When these cases prove fatal, the bronchial membrane is found highly injected, and sometimes softened; and the lung, when cut into, is dark, and gorged with venous blood; and yellowish froth oozes abundantly from the cut surface, sufficiently accounting for the suffocating state of the patient.

Catarrh, from being often renewed and neglected, or from constitutional or local debility, becomes permanent, or degenerates into *chronic catarrh;* this, with some persons, seems almost habitual, and causes apparently little inconvenience to themselves. And an almost catarrhal state is not unfrequently produced by much loud exercise of the voice, as we may sometimes perceive in public singers; but the latter is rather a forced extra secretion than disease, and does no harm; not so chronic bronchitis, which, if neglected, spoils the voice.

Nothing is so efficacious and agreeable as an opiate for relieving catarrh, whether cold of the head or chest; as, for instance, a quarter or half a grain of opium, or equal parts of Dover's powder and

compound squill pill, made into five-grain pills, about every fourth hour. Purgatives and low diet will aggravate common catarrh for the reason adduced above. Popular "saws" are frequently dangerous to adopt as axioms in medicine; but there is great truth in the trite adage, "Feed a cold, and starve a fever."

Chronic catarrh being a mere relaxation of parts, is cured by good living, animal food, and fermented liquor in moderation, with tonic* medicines, and the balsams. Opiates, if they agree with the patient, are as efficacious in chronic as in recent catarrh, and may be combined with other medicines to prevent their producing constipation. Chronic bronchitis, which is known by a tougher and more difficult expectoration, with febricula, requires rest, moderated diet, salines, antimonials, and diaphoretic expectorants, including opium, as in the above-mentioned pills, with blisters and other counter-irritants; and some mercurial, repeated daily, is required to subdue the chronic inflammation in the bronchial capillaries. Little judgment can be formed from the expectoration, as there is often in chronic bronchitis an enormous quantity of catarrhal mucous expectoration superadded.

The terebinthinate gum-resins, and balsams, which have been found useful in the catarrhal states of the urethra and vagina, have the best effect also in chronic catarrh of the bronchial tubes,—and none more so than Venice or common turpentine,

* In the winter of 1857-8, during which catarrh, bronchitis, and laryngitis seemed to be epidemic, nothing cured the catarrh more quickly than disulphate of quinine, from six to nine or more grains per diem.

the efficacy of which is increased by combining it with powdered senega-root in pills. The senega has as much influence on the capillaries when circulated to them as ipecacuanha ; and as it is less emetic, it can be given in larger quantity.

The balsams and cubebs are useful expectorants in chronic catarrh ; guaiacum and ammoniacum are preferable in bronchitis; but it is difficult to cure bronchitis perfectly without a cautious use of mercurial medicine ; and upon every febrile exacerbation, recourse must be had to occasional doses of antimony.

Various kinds of linctus have been resorted to at all times for the relief of the tickling in the fauces ; but a mixture of compound infusion of roses, or water with sulphuric acid, alum, gum, mucilage, and syrup of tolu or lemon, sipped frequently, will be found more efficient, especially if half a drachm of disulphate of quinine be added to each half-pint of the mixture. And there is no mixture more generally efficacious than quinine and citric-acid crystals, half a drachm of each in half a pint of water, to be sipped very frequently. When the fauces, uvula, and epiglottis are in a state of relaxation and irritation, a strong solution of nitrate of silver, a scruple or more to the ounce, sponged over the parts by a probang, affords great relief.

We find occasionally, during convalescence from catarrh of the schneiderian membrane, that small semi-dried crusts of lymph are blown from the nose, with a speck of blood on the surface, at the place at which they were attached, and causing a slight sensation of soreness by their removal. Now, precisely similar little scabs or crusts are coughed up from

the tracheal or bronchial membrane, sometimes with streaks of blood; and frequently the exact spot can be pointed out by the patient. Sometimes these crusts, from having a wider attachment, cannot be easily detached from the bronchial tube by coughing, and remain fixed for a considerable time, until the part gradually heals; the little mass becomes then loosened, and is expectorated.

When a plug is formed, a decomposition of mucus, with fœtid fishy odour, arises before the plug is got rid of, which after severe bronchitis is extremely offensive, almost as bad as from gangrene of the lung. It sometimes happens that, in chronic bronchitis, this plug is for a long time detained by renewals of exudation of plastic lymph, and completely obstructs the tube; and when this occurs, mucus and air accumulate behind, producing dilatation of the bronchial tube; and if the inflammation has been communicated to its substance, and has thus softened it, permanent *bronchial dilatation* is induced; for in that case, even after the local bronchitis has entirely subsided, and the plug has been softened, or dissolved and expectorated, the tube never contracts to its original size.

Sometimes, in rare instances, calcareous concretions, like the "ossifications" in the arteries or heart, are deposited in the lungs, and expectorated; these give rise to a kind of asthma, and most distressing cough, with pituitous expectoration, and sometimes hæmoptysis.

Independently of recent cases of inflammation in the chest, as cough is a symptom of consumption (tubercular disease of the lungs, to which the term

consumption is properly restricted), it always produces, when long continued, an anxiety in the minds of friends; but cough may arise from a variety of causes which only medical men can ascertain, and which even some of them often fail to distinguish, from not having paid sufficient attention to auscultation: besides which, young practitioners are often not aware of the variety of circumstances which may produce a long-continued cough. I have been consulted for severe coughs of some duration, in more than one instance, which I discovered to depend upon a cause at first sight insignificant; as, for instance, a chronic inflammation, with hardened wax, in the ear: and though most persons are acquainted with the fact that irritating the internal part of the ear will produce coughing, these cases had previously passed through the hands of several medical men without this cause being detected; although a degree of deafness existed, in two or three instances, which attracted my attention. Chronic enlargement of the tonsils, and accumulation of a white curdy matter in their ducts, will produce cough; and a relaxed elongated uvula, it is commonly known, induces a most distressing continued cough: and in all these coughs, when long continued, the membrane of the larynx and trachea, inflamed by mechanical irritation, gives out extra mucus, thus producing expectoration, with occasionally even streaks of blood.

Such cases occur both in males and females, giving rise to suspicion of consumption; but the most common cause in females is hysteria, often so slight that scarcely any, if any, discoverable

irregularity or derangement of the functions of the uterus is evident, and yet the resulting morbid sensibility of the bronchi and larynx produces cough, with alarming symptoms, not merely expectoration, as in the cases just alluded to,—and which is chiefly from the continued mechanical irritation of the cough,—but also spitting of blood, the occurrence of which gives additional cause for friends to apprehend consumption. The mode of treatment of the former cases is obvious to all medical men as soon as the cause is discovered, according to the old adage; and, as to the latter, I have found no difficulty in curing this imagined consumption by directly attacking the primary disease with such remedies as turpentine, iron, cubebs, aloes, quinine, and anodynes; with expectorants, &c., to allay the morbid sensibility of the bronchi and larynx; at the same time supporting the strength by animal food and fermented liquors, which are too often forbidden, from the practitioner supposing the symptoms to depend on inflammation, instead of attributing them to the true cause, morbid sensibility; and, on that account, not only resorting to low diet and antiphlogistic medicines, but also to frequent bleeding by leeches or otherwise, which makes the patient more hysterical, and increases nervous irritability.

I have cured the harassing coughs of some neuralgic patients by large doses of sulphate of quinine; the first relief being sometimes as decided, and nearly as rapid, as if it had been effected by an opiate.

I have seen a young female who had been reduced by diet and medicines, including salivation,

for a cough and loss of voice, which was attributed by several practitioners, some of them of note, to chronic laryngitis, but which was nothing more than what I call an hysterical cough, and which gave way to tonic medicines and a generous diet, with exercise in the open air—the patient having been unnecessarily shut up for nearly two years from the air of heaven and from human society. There is no more common error than that of excluding the air from patients who have that kind of cough which is connected with what is called spasmodic asthma, especially those cases which depend on chronic (Laennec's dry) catarrh, and which I find are curable much more quickly provided the patient be sent out to take exercise in the open air even in winter. The cold air is wrongfully accused, and the patient is prevented from going into it, although doing so would best relieve the symptoms.

A medical friend of mine had a continued troublesome cough, causing anxiety on the question of consumption, and consulted me—amongst other points, upon the necessity of using a close carriage instead of his cabriolet. I cured him by merely advising him to turn his back to the fire—as mentioned above—whenever he went into a patient's room (he was in extensive practice); and by recommending a more generous diet, as he had been living rather low through the fear of inflammation.

The disease of the lung denominated EMPHYSEMA consists in what might be called an extravasation of air. It produces a kind of asthma, and when it exists to any extent is very distressing and harass-

ing, by preventing the individual from active occupation or exertion. On examining the lung after death, there is an appearance of air beneath the membrane (pleura), just as in the veal which is blown by butchers. Emphysema is caused by rupture of the sides of the air-cells during violent exertions, or coughing in whooping-cough, or more especially in bronchitis, whilst the bronchi are partially plugged, as above described, and thus cavities are formed in the lungs, into which the air enters; and when there, there is nothing to press it back again, as the air thus introduced balances the atmospheric air in the passages.* When emphysema is large, it diminishes the function of the lung, both by occupying its space and by compressing it, and produces permanent dyspnœa, increased upon exertion. When emphysema is suspected, it is easily detected by auscultation and percussion; the *respiratory murmur* is, of course, *diminished*, and upon *percussion* the sound is rather *louder* ("*tympanitic*"), there being more air; whereas in other diseases, as pneumonia, when the murmur is weaker, the sound of percussion is at the same time and spot *diminished* by congestion: whilst in catarrh or bronchitis it is natural. Thus emphysema is the reverse of other affections as regards auscultation and percussion; the disease here being a superabundance of air which does not pass, there is consequently less sound in the passages—less respiratory murmur on listening, though more resonance

* I must refer the student to writings on morbid anatomy for the description of the different forms of emphysema that have been described. In practice, we may safely include them under one head.

on percussion—being just the opposite of pneumonia and other diseases of the lungs. There is one unnatural sound which will occur in both cases, *i. e. puerile respiration* in the *sound parts* from the extra demand made upon the function in these parts.

Emphysema can be relieved only by rest, avoiding any thing tending to renew bronchitis, and general attention to the health, including *gentle* exercise, sailing in fine weather, an easy carriage, or, more especially, by riding on a quiet horse.

We frequently find in bronchitis, as might be inferred, that the tracheal membrane also is inflamed, and is tender on pressure. In these cases there is a formation of semi-scabs of condensed mucus, like those already described, which are coughed up, more especially after sleep, and their form is seen if the sputum be thrown into water. A little higher degree of inflammation in the trachea and larynx constitutes CROUP; that is, a layer of "diphtherite" (blastema) is thrown out, which on a serous membrane would become organised and permanent, as in pleurisy or peritonitis; but being exposed to the air and to the moisture of the part, it almost immediately loses its vitality, and is detached and expectorated; it sometimes, however, causes suffocation, because this "false membrane," being much tougher than condensed mucus, becomes impacted in the rima of the glottis, and cannot be forced backwards or forwards by the inspiratory or expiratory efforts: besides which, in croup, the muscles of the larynx are in a highly irritable and spasmodic state. I have seen masses of the mucous clots of bronchitis or catarrh expectorated

with ease, four times as large as the shred of false membrane of croup which had caused suffocation. This statement will account for the alarm always naturally felt about croup, and its being called a treacherous disease ;* there are, in fact, usually no urgent symptoms, the slight febricula not exceeding that of common bronchitis. But the occurrence of the croupy cough, or peculiar hoarseness, warns the experienced practitioner of the imminently precarious state of the patient.

A leech or leeches, according to the age of the patient,† a blister across the trachea,‡ and frequent inhalation of warm vapour, is the best mode of detaching the morbid formation, with repeated doses of ipecacuan or antimony to check the inflammation, enough to produce sickness at first, and subsequently slight nausea. Mercury is useful also for this purpose ; but frequently the business is decided, favourably or otherwise, before mercury can produce effect ; there can, however, be no objection to it simultaneously, as it may act in time to be of use. I wish merely to impress on the mind the rapid and uncertain nature of the case, and the necessity for primarily using speedy remedies.§ There is, perhaps, scarcely

* In addition to which, sudden death from laryngismus stridulus—to be hereafter described—has been mistaken and placed to the account of croup.

† Croup, like laryngismus stridulus, is almost peculiar to children ; but it has occurred in adult age.

‡ In order to save time, it is well to put on the blister, and apply the leech immediately close to the edge.

§ One speedy remedy, about which there has been endless disputation, is tracheotomy. I have had it performed twice successfully ; but in such cases a doubt always remains on the

any disease of which it may be more truly said, "Momento cita mors venit, aut victoria læta."

The natural transition is to PNEUMONIA, or real PERIPNEUMONY (*pneumonitis*). The state of lung formerly described (p. 545) was denominated peripneumonia notha (spurious), because, besides the difference in symptoms, however high the inflammation appeared to run, it did not produce solidification of what is called the substance of the lung, but was confined to the surfaces of the air-vesicles and tubes —the lung in fatal cases of peripneumonia notha appearing like a sponge full of frothy fluid; whereas, in pneumonia, the inflammation is in the tissue of the lung, and thickens the membranous partitions of the vesicles until these are obliterated, the spongy texture becoming more and more gorged and heavy ("the state of *engouement*," engorgement), until at last it is rendered solid like a piece of liver, from which it is said to be *hepatised*. Sometimes the product of the inflammation is poured into the air-cells, giving rise, in the first stage, to a state of *engouement*, and, in the second stage, to consolidation, which, from its density, and its resemblance in that respect to liver, has been called "hepatisation." This is the form called gray hepatisation, or induration. But the first-mentioned form has been designated "*red hepatisation*." In this condition there is no effusion into the cells; but the vessels ramifying in the basement membrane of the cells are so

mind whether it has been absolutely necessary or not: no rules for guidance can be given; the practitioner must depend upon his own judgment, or on consultation.

injected, and the cell-walls so deteriorated and swollen, as to compress the walls of the cells together, and thus produce the appearance of consolidation. Instead of a watery or mucous fluid being thrown out on the surface of the vesicles and tubes, as in bronchitis, there is a very viscid semi-transparent pituita, partially stained of a *rusty* tint by the colouring matter of the blood, sometimes in small quantity, sometimes more copious, according to the extent and degree of the inflammation. In the beginning, whilst the air-cells remain partially open, and only "gorged," the air passing through the narrowed passages, obstructed by this tough pituita, causes "crepitation" similar to that before described; and as the lung becomes more solidified, this crepitation, of course, diminishes, until it ceases entirely; and then the sound that is heard is bronchial respiration, the solidified lung conducting to the ear the sounds from the bronchial tubes, which were inaudible in the healthy spongy state of the organ; and there is dulness on percussion.

If the inflammation be cured, or subside, before the structure of the lung be damaged—that is, if it have gone no further than engorgement, not to extreme hepatisation—the swelling of the partitions subsides; and as the cells are thus reopened, the air begins to pass, and *returning crepitation* ("*rhonchus crepitans redux*"), a sign of a recovering state, is heard. But if the disease have reached extreme hepatisation—that is, if the structure of the lung be destroyed by adhesive inflammation of the parietes of the cells—the local mischief is permanent, and there will always be dulness on percussion; and

though the *patient* may perfectly recover, and the rest of the lungs may perform the function necessary to life, none but bronchial sounds will subsequently be heard in that part of the lung, unless some portion between the hepatised part and the ear only reached the stage of engorgement; in which case, upon recovery of the part, natural respiratory murmurs, though weak, will again be heard. Whilst a portion of the lung remains totally or partially impervious to air, the remainder of the lung which is healthy is more expanded at each respiration than usual or natural; consequently, the respiratory murmur is there heard louder than natural (puerile), which is a collateral evidence of disease in the other part,—and therefore puerile respiration always excites suspicion of mischief. It occasionally happens that, in a depressed state of constitution, inflammation of the lung terminates in gangrene, causing an intolerable fœtor of the breath, and commonly proving fatal; but if the portion of mortified lung be very small, it may be expectorated, the part cicatrise, and the patient recover; or, by a slower process, a part hepatised may soften into Laennec's "purulent infiltration," —in fact, abscess,—and be expectorated, and still life preserved. It should also be mentioned, that the majority of instances of gangrene in the lungs are not preceded by painfully acute inflammation, but rather by a low congested condition of the part.

Although we have, above, clearly enough laid down a distinction between peripneumonia and peripneumonia notha, the treatment must be in all re-

spects the same.* There is no danger of confounding these diseases with each other; but severe cases of pneumonia have been mistaken for fever of the typhous character, on account of the prostration of strength, lividity of complexion, and absence or slightness of cough; for in some most serious cases of pneumonia brought into hospital, or even in private practice, the patient may be found complaining of neither pain nor cough; and therefore auscultation should never be neglected in cases apparently of simple fever, especially with typhous† symptoms,

* Thus, take a sketch of one of these cases from the *Clin. Journ.* Lond. Hosp. 1835.

Oct. 10*th.* D. C., æt. 18. A groom. Ill four days with sharp pain on right side of chest; dyspnœa and cough, with difficult expectoration; extensive crepitation on right side; puerile respiration on the left; sleepiness from pain; headache; complexion livid; pulse 120, weak; thirst, anorexia; tongue nearly natural. Diagnosis: pleuro-peripneumony. Ordered to a warmed bed, and V.S. ad ℥xvj. Antimonii potassio-tart. g. ¼; ex aquæ ℥j, omni horâ. Haust. anod. si opus fuerit.

11*th.* Was sick in the night, and afterwards slept several hours without haust. anod.; less cough; still pain in side, and dyspnœa; P. 130, fuller; B. confined.

Ordered—Haust. cathart. statim.
Hirudines xx lateri, quà dolet.
Contin. antim. 4tis horis.

12*th.* No pain, feels only weak; cough still troublesome, but expectoration more free; B. relieved; P. 90, soft; tongue clean; skin soft.

13*th.* Convalescent; P. 84; crepitation ceased, but respiration slightly bronchial.

† For instance, a man brought into the hospital during the prevalence of an epidemic fever.

Nov. 20*th.* Twelve days ill; incoherent; lying supine; P.

any more than in measles or other diseases known to affect the lungs.

The value of auscultation is great also in chronic or in latent peripneumony. I was consulted by a patient who had been ill about two months; he had all the nosological symptoms of advanced consumption,—cough, expectoration yellowish white with a little blood, night-sweats, emaciation, some pain in the side on deep inspiration, &c. Thanks to Laennec, I was able to discover immediately that it was not consumption, but hectic fever from neglected peripneumony; and, notwithstanding the debility, I adopted rather active treatment—free leeching of the side, and saline antimonial medicine, with milk and vegetable diet, which soon cured him.

A gentleman engaged in an active business had

120, *weak;* eyes dull and heavy; complexion inclining to livid; skin dry, but not warmer than natural, with petechiæ; tongue brown and dry, white on the edge; respiration moderate; *no cough*, but *crepitation* in some parts, with rhonchus sibilans, and sonorus, in others; B. confined. Diagnosis: the prevailing epidemic fever, complicated with pneumonia. The imminent indication being to relieve the lungs by depletion, notwithstanding apparent debility, ordered V.S. ad ʒxvj. Haust. cath. statim, et postea mist. sal. antimon. 4tis horis.

21*st*. Much relieved, and moves about in bed; speaks distinctly, but still delirious, and has begun to cough (*the absence of cough on the previous day having been* attributable to insensibility of the sensorium, and to the oppressed and languid circulation); P. 90, *strong*. Skin hot. B. no relief. Rep. V.S., Haust. cath., et mist. salina antim.

22*d*. All symptoms relieved; more cough, but with free expectoration; head clear.

25*th*. Convalescent. Thanks to Laennec!

been for many months affected occasionally with symptoms resembling what is called angina pectoris; difficulty of breathing, or rather sense of distension in the chest, causing him to stop suddenly, from a feeling of distress, sometimes with pain, and making him, when it attacked him in a sitting posture, get up and walk about, from painful restlessness. He had a slight cough only occasionally, looked well and florid, but was getting irritable and anxious, and could not sleep, from uneasiness in the region of the *heart*, which was increased by a deep inspiration, or by sneezing. The pulse ranged from 84 to 100, firm, and rather hard; the tongue was pale; he had no feverish languor, notwithstanding the above symptoms, and that he could not stoop to lift any thing from the floor without pain; he felt well and strong, he said, if it had not been for the bleeding, purging, and other antiphlogistic treatment adopted by his medical attendant, who was a near relation; and he was rather surprised at my inculcating more "drenching," and a number of leeches to be applied at intervals of forty-eight hours for a week. This case was one of "latent" chronic pleuro-peripneumony of the *left lung* (there was rhonchus crepitans, bronchophony, &c.), which had continued in a chronic state from an acute attack six or eight months before: he was soon relieved by the active antiphlogistic treatment. These cases occur not unfrequently in hospital-practice, in artisans who have returned to their work too soon after acute attacks; and were almost always cured by bleeding, sedatives, calomel, antimony, and salines; often even after extensive dropsical symp-

toms had set in,—in another milder case of this kind the patient had been ill for two months, but attending to business all the time, with pain in his chest, dyspnœa, and crepitation, and slight hæmoptysis.* Rest, and a quarter of a grain of tartar emetic every four hours, cured him, as he said, "like magic."

We have next to consider PLEURISY—the inflammation of that serous membrane which covers the lung and lines the chest, smooth as the polished diamond, and lubricated with a slight moisture, little more than vapour,—conditions which afford to motion the greatest freedom from attrition. Damp cold, as in the former instances, will produce inflammation of this membrane; the instantaneous effect of which is, disturbance of its essential function, viz. the ramifying capillaries are distended into tufts, the surface is rendered uneven and dry, the secretion of the fluid necessary for maintaining the softness and lubricity of the membrane—the fine exhalation—is stopped, as in the first symptoms of cold of the schneiderian or bronchial membranes; the dried membranes, rubbing against each other, begin to produce sharp pain of the sentient nerves; and a *friction sound*, which does not exist in health, may be heard on listening at the painful part. The rubbing sound thus produced does not in general last many hours, as the neighbouring parts throw out an

* Hæmoptysis, though we have frequently to advert to it as arising from a congested or inflammatory state of the lung, is so commonly associated with phthisis, that it will be more conveniently considered along with that disease hereafter.

extra quantity of moisture : this effusion—an effort of nature, as it were—gives relief, and helps to prevent *adhesion* of the inflamed surfaces, which often results from the exudation of inflammatory plastic lymph (blastema) at the spots inflamed; and this lymph being moist, there is thus usually but a short period during which the dry, rubbing sound exists. It does, however, occasionally happen that a coarser rubbing, heard and mentioned by the patient, continues for several days. The action of breathing, too, causes so much pain, that the difficulty of hearing the rubbing is increased by the patient taking every precaution to breathe by the diaphragm without moving the ribs, on which account also the respiratory murmur is somewhat restrained. This constitutes one of the distinguishing symptoms of pleurisy; the patient lies doubled up on the pained side, trying to prevent its motion and to resist coughing, on account of the suffering which that act produces; the cough is consequently short, and moreover without expectoration, as the interior of the lung is usually unaffected at the commencement; at a later period, some mucus is expectorated, accompanied occasionally with streaks of blood derived from the parts of lung which have been implicated by the close contact of the inflammation. This trifling escape of blood is seldom taken into account, and by the ancients was even thought a favourable symptom. Prompt and active antiphlogistic treatment, as above described, is equally necessary here, and even a more free exhibition of morphia with antimony than in the other cases mentioned; and a poultice or a folded wet napkin should be applied

while the leech-bites are bleeding, and for some time after.

If the pleurisy has been severe and extensive, the effusion of serum—which is part of the effort towards cure—becomes excessive, and the fluid, accumulating in the cavity of the chest, compresses the lung, and suspends its function, displaces the heart and the diaphragm, with the organs attached beneath it, and distends the thoracic parietes. Sometimes there is pus mixed with the serum; and Laennec, who had a notion that there was always more or less pus, gave the name of *Empyema* to this state of effusion accompanying pleurisy. However, this term makes distinction between the collection of serous fluid thrown out in this way, and the serous effusion of hydrothorax. Thus, when we hear the word empyema, we infer the collateral circumstances of pleurisy and not of dropsy, to which genus hydrothorax belongs.

As soon as any ascertainable quantity of fluid is thrown out, a new auscultatory symptom is usually found; that is, if there be bronchophony arising from increased density of the lung caused by compression by the fluid—or by coexistent pneumonia of the surface of the lung beneath the inflamed pleura—this morbid sound of the voice is accompanied by a tremulous rattle, like the sound made by the performer of punchinello, or somewhat like the bleating of a goat, or rather kid, from which the term *Ægophony* is applied to the symptom. As the fluid compresses the lung (sometimes with a thick layer of inflammatory lymph in addition), a comparatively solid conductor of sound is produced over the bronchial tubes,

sufficient to conduct the voice abnormally, and the vibration of the fluid causes the bleating; but as these two conditions do not always concur on the same spot, ægophony is not always detected.

The height to which the fluid fills the chest must be ascertained by percussion and by the diminished resonance and fremitus of the voice. When the damage is extensive, so much fluid is sometimes thrown into the cavity of the chest as quite to fill one side, compressing the lung, and causing that side to *bulge* out, in the muscular interspaces between the ribs, larger than the sound side. Thus the practitioner combines with percussion the use of the senses of sight and touch, to determine the physical derangement of parts. This large quantity of fluid will in many cases be gradually reabsorbed; but much patience is required, and there is difficulty in supporting the strength of the patient. Sometimes it requires from nine or ten months to two years, or more, to get rid of all the fluid; and I have heard ægophony twenty months after the pleurisy, though the patient ultimately quite recovered. In such cases, the side has not *shrunk* much, and the slowness of cure has proceeded rather from debility of constitution than from the amount of lesion; but commonly, after the whole of the fluid has been reabsorbed, as the surface of the pleura has become rigid from plastic inflammation, the lung cannot expand to its original dimensions, and one side of the chest is left smaller than the other.

In some cases, whilst the lung was compressed, the pleura has become so thickened and condensed as not in any degree to reëxpand by the efforts of un-

assisted nature; and such patients may be seen with the side quite collapsed, producing a laterally curved state of the spine: some of these individuals enjoying tolerably good health with little more than one lung. Dr. Little has lately published an interesting volume on this subject.*

Sometimes during pleurisy, at the lowest part of the pleura, where the sac assumes a narrow wedge-shaped form, a considerable quantity of lymph is thrown out, which, not becoming entirely organised, may lead to suppuration in that position. The abscess thus formed may either point externally, or make its way through the lungs, and the patient recover. I have witnessed both fatal cases and recoveries of this kind, some of the latter very tedious, producing harassing cough, emaciation, and hectic, leading to apprehension of tubercular consumption; but though we may have all these symptoms, the situation is a pretty certain guarantee against tubercular deposit, as in that disease the part affected is almost certainly at the apex of the chest.

The operation of tapping the chest is sometimes performed, but is a much more hazardous and unpromising operation than paracentesis abdominis, and should not be done unless as a last resource, and when there is apparently danger of suffocation. As mentioned above, much patience and perseverance are required in supporting the strength of the patient by regulation of diet and tonic medicines; no active means can hasten the removal

* *On Spinal Weakness and Spinal Curvatures: their Early Recognition and Treatment.* By W. J. Little, M.D., &c. &c. 1868.

of the fluid; and, especially, any empirical attempt to promote absorption by a too free exhibition of mercury, will do more harm than good, by breaking down the constitution.

Whooping-cough is a disease which, save the absence of eruption, bears a close analogy to the exanthemata, more especially to measles; it is a specific fever, with, however, a specific local internal bronchitic affection, equivalent to the tonsillitis accompanying scarlatina, or the muco-enteritis of typhoid fever. Like all diseases which are combinations of fever and local inflammation, patients may die before the peculiar character of the disease is developed; or it may escape notice from slight or anomalous varieties. Thus, sometimes, in scarlatina maligna no rash is seen. When small-pox is raging, some patients will die of collapse or other cause before the rash appears; on the other hand, small-pox may be so slight that it would have escaped notice, were it not that, from other children in the same family having the disease, it was sought for and detected. Similarly, children may die of this disease of the lungs before they have arrived at the stage of whooping; and, again, I have seen children with the remarkable state of disease called whooping-cough, who did not exhibit the special symptom, while the others of the family whooped strongly.

The way in which the disease comes on is peculiar, and shows constitutional affection. The cough does not usually begin, like a bronchitic or catarrhal cold, in the daytime; but the patient, being rather languid

and uncomfortable through the day, begins in the evening to cough for some time in a dry, unsatisfactory manner. The sleep is usually disturbed in the early part of the night, but rest is obtained towards morning; during the two or three following days, and perhaps a third, the same thing ensues, the cough not coming on till towards night; afterwards it occurs in the daytime, and sooner or later the peculiar whoop is heard. It will be found that the degree of illness is in proportion to the bronchitic symptoms; if they are severe, with much cough and dyspnœa, there will be hot skin, head and back ache, and other febrile accompaniments. The state of disease consists of dry bronchitis, like that of measles; and the danger resides in the liability of the inflammation being communicated to the vesicular texture of the lung, producing pneumonia.

These symptoms are most effectually checked by an emetic, and kept down afterwards by expectorants, selected from the class of emetics, in small doses; in fact, the same treatment as for bronchitis or influenza. Children who have predisposition to cerebral disease may have it developed by the combined influence of fever and obstructed circulation. The spinal cord may also suffer in this disease; for, like all fevers, it is accompanied by so much disturbance of the nervous system, that some have been inclined to class it with the neuroses. The derangement of the nervous system requires that quinine should be administered even before the first febrile stage has passed off; and frictions along the spine have been long established as efficacious. The tonic effect of change of air is as remarkably beneficial

in this disease as in ague or remittent; yet neither ague, remittent, nor whooping-cough belong to the neuroses.

The state of the air-passages in whooping-cough is unnaturally dry; but it has been said that the fit of coughing terminates with an expectoration of an abundant pituitous matter: this is not correct—for the glairy fluid which is thrown off does not usually come from the *chest*, but from the fauces and salivary glands, and frequently from the œsophagus and stomach, when the cough produces retching and vomiting. The violent succession of expirations is caused by a sensation of wanting to expectorate, because the state of dryness and irritation of the bronchi produces the same feeling as if an irritating powder or fume had been inhaled. The whoop is merely the long, violent redrawing the breath after the chest has been emptied of all the air that can be expelled; just as a kind of whoop is produced when a person has a violent fit of coughing, from salt or other acrid matter "going the wrong way" into the windpipe. It is easy to satisfy oneself that the glairy phlegm does not usually come from the chest; for in few cases, at any period, not even just before the cough comes on, nor during the cough, can any mucous *râle* be heard in the chest. During the cough, no sound is heard except the whoop; for the rapid cough accompanies expiration, no chest-sound exists, and the inspiration being a whoop, that alone is heard. But after the fit of coughing is over, the respiratory murmur is again perceived, with no morbid sounds except those belonging to bronchitis, such as rhonchus sibilans. No mucous *râle* is perceived until

a later period of the disease; a muco-pituitous expectoration then often exists, seldom abundant, apparently affording relief,—when, as it is said, the cough becomes loose.

LARYNGISMUS STRIDULUS is a convulsive disease of infancy, which has been sometimes called *spasmodic croup;* it is, however, totally different from CROUP, which has been already described. It has also been denominated the *crowing inspiration* of children. In laryngismus stridulus there is no inflammatory or diphtheritic state of the larynx; the disease is in the medulla oblongata and nervous centres; it is, in fact, a *species of tetanus.* In the attack, which is always sudden, or at least with such slight disturbance of the health of the child as not to have excited sufficient anxiety to cause the parent to apply for medical advice, the child seems uneasy, begins to cry, and gives a long, deep inspiration, like the whoop of whooping-cough, at the same time stiffening and throwing itself back in a state of opisthotonos, and generally turning in at the same time the great toes and thumbs. This, of course, produces alarm; and in some instances the child dies in a state of asphyxia (like the *asphyxia of tetanus*) before the medical man can arrive; and many of these cases have been set down to the account of *real croup.* This is no more a disease of the *larynx* than it is of the *great toes* or *thumbs*, which are simultaneously affected with spasm. It is not even necessarily complicated with cough; for it is the muscular structure of the glottis which is thrown into spasmodic action, causing contraction of the

rima glottidis: and the acute sound is the long-drawn breath during the tetanic spasm. When the child, as is often the case, has a recurrence of the fits, the strain of the glottis causes it to be hoarse, and to cough a little; but this cough is a secondary consideration.

It has been said, by Dr. Marshall Hall, to be an epileptiform disease; but it is not so: there are not *clonic spasms* as in epilepsy, but a *tonic tetanic* opisthotonos. An analogy has been drawn between the whoop of laryngismus stridulus and the scream which sometimes accompanies an epileptic attack; but those who have heard both will acknowledge the difference.

The disease, like epilepsy, has been attributed to all the sources of irritation which produce reflex spasm; and doubtless, like tetanus, it has been produced by various exciting causes in a predisposed constitution; but no one has ever developed the nature of that obscure predisposition which causes one person to be affected with locked jaw, for example, in consequence of a cause which in numerous other cases produces no such effect.

Doubtless, teething, worms in the intestines, exposure to extreme cold, and other circumstances which irritate the nervous centres, bring on laryngismus stridulus; there is no one specific cause, any more than there is one specific cause of tetanus or epilepsy; and, moreover, no precise organic change in the nervous centres has been demonstrated to belong to laryngismus stridulus, any more than to tetanus or epilepsy. In moderate cases, the child's intelligence is not diminished; nor is disease of the lung, of the

larynx, or of the air-passages, a necessary part of laryngismus stridulus, though sometimes concomitant.

The treatment of the disease consists in soothing and supporting the child—most liable to attacks from six to sixteen months old; in avoiding to irritate it with purgative or other active medicines; in giving moderate mercurials, if the liver require them; a little castor-oil, if the bowels are confined; if there should be feverishness with the attack at first, an emetic is indicated and useful: we must, in fact, give merely what the constitution seems to demand, and, especially if there be much restlessness, some anodyne, such as syrup of poppies, Dover's powder, or morphia. If any tooth is distinctly presenting, it should be liberated; but we should by no means "lance the gums freely," as it is commonly expressed—such extensive cutting adds to the irritation of the nerves. In weak children, some solution of iron, with the syrup of poppies, is often indicated; but the treatment above all should be soothing, combined with tonics, nourishment, and *ne quid nimis* of active medicines, blisters, or leeches; too much or too hot bathing is exhausting, but repeatedly putting the legs up to the knees in warm water is very tranquillising to the nerves; so, also, is gentle and continued friction along the spine with some anodyne liniment.

Some children have congenitally an extremely narrow glottis, and, when affected with even a slight cold, make a kind of crowing or whooping noise. I have met with several instances which gave great alarm to the parents from an apprehension of croup, until the cause was explained. In one instance, the occurrence of these attacks lasted till the age of six

years, the sound gradually, however, diminishing in force as the larynx grew larger.

The HEART, like all other parts, is liable to inflammation, which occurs much more frequently than was supposed before the discoveries of Laennec. It is sometimes, like the lungs or pleura, attacked with inflammation, merely accompanied by pyrexia; but there is generally more or less acute rheumatism produced by the same cause, just as pleurisy and acute rheumatism are sometimes simultaneously produced by the same causes.

The predisposing causes of rheumatism and inflammatory disease, and inflammation of the heart in particular, are certain constitutional, climatorial, and local influences, habits of diet, occupations, &c.

The exciting causes of inflammation of the heart are the same as those which immediately precede an attack of acute rheumatism—cold and damp, as before explained. Heart-disease is often ascribed to metastasis; but though this may occasionally be the case, in general the limbs and heart are simultaneously affected: the apparent succession of the external and internal phenomena is due to the fact that the acute rheumatism in the external muscles and limbs is so painful as to mask the state of the heart; and therefore it is necessary always, in cases of acute rheumatism, to auscultate, and make special inquiries as to the state of that organ, which may also be inflamed. On the other hand, I have been called to cases of cardiac inflammation where the heart-affection attracted the whole attention, the coexisting rheumatism having been comparatively

so slight that it was not mentioned until inquiry was made about it. But heart-inflammation may happen without rheumatism, as well as rheumatism without it. The rheumatic inflammation is, however, usually the source of pericarditis, as proved by innumerable adhesions, of which many have been found *post-mortem* that were not anticipated, frequently associated with Bright's kidney, but with no evidence of the one having produced the other, they being merely coincident.

The parts inflamed are—sometimes the muscular structure, causing *Carditis;* but more commonly the investing membranes,—inflammation of the external serous covering, analogous to the pleura, giving rise to *Pericarditis;* and that of the internal lining, including that of the valves, producing *Endocarditis.*

When the external membrane is inflamed, a *rubbing* sound is at first produced, as in pleurisy, which, as observed in that disease, in general soon subsides, and for the same reason. This rubbing sound may be detected at various periods, from six to thirty hours, and later, after the attack. A slight rubbing sound or murmur may also accompany the systole in a variety of cases where the heart is pushed out of its natural position by empyema, tumours, curvature of the spine, or other causes.

When the internal membrane is inflamed, a *systolic murmur* accompanies Endocarditis as uniformly as rubbing noise accompanies Pericarditis, and lasts longer. (See Dr. Latham's valuable *Clinical Lectures*, vol. i. p. 98.) The exocardial rubbing is sometimes coexistent with the endocardial murmur.

The treatment of acute inflammation of the heart

is, when early commenced, most simple and intelligible: rest in bed, rigid diet, sometimes leeches followed by a large tepid poultice; tartar emetic, one-sixteenth of a grain, and acetate of morphia, a quarter of a grain, every hour at first; moderate attention to the bowels, but not disturbance of the patient by active purgatives. This treatment will generally diminish the disease within twenty-four hours; but perfect rest must be rigidly enforced for eight or ten days, to prevent return of the symptoms, and to guard against the organic diseases which sometimes result. One patient who suffered from that kind of recurring acute rheumatism called "rheumatic gout," had, in the course of three years, five distinct attacks of pericarditis, which were cured in the manner described: he subsequently went to a distant country, and there died of the first attack he had of what was ascertained by autopsy to have been his old enemy.

In order to use morphia with confidence, and in the mode in which it will prove efficacious, it is necessary to have had experience of its powerful antiphlogistic effects; for instance, in severe acute rheumatism, in pleurisy, peripneumonia, pericarditis, and in peritonitis,—the last a disease as dangerous as any of the preceding, on account of its secondary consequences, the adhesions of the peritoneum, which may destroy life after the first urgent symptoms have ceased.

No medicine at all equals acetate or other salt of morphia in pericarditis or endocarditis. Morphia allays the pain and inflammation, and subdues the pulse, which are the first requisites. I have found persons who doubted its efficacy in acute rheumatism,

merely because they had not used it with sufficient freedom. It should be given in frequently repeated full doses, until it conquers the pain. Small doses given every fourth or sixth hour do not in the least check the disease; and then, as the pain or other symptoms increase, the practitioner will begin to doubt whether the morphia is not even doing some harm. It ought to be administered in doses of one-fourth or half a grain at least every hour; if half a grain does not produce any effect after the fourth or fifth dose, a grain should be prescribed each time; but then an interval of two hours may be allowed after the second dose: eight or ten grains will often be taken before pain is subdued and sleep obtained. The patient last mentioned took in various attacks as much as six or seven grains of acetate of morphia in the twenty-four hours for a week or more, sometimes requiring wine with it at intervals to counteract the sedative effect on the pulse. There can be scarcely any better example of the substitution of medicine for the old method of blood-letting; and the author stands forward as an example of the fact that we are "never too old to learn." It is unnecessary—nay, injurious—to disturb the patient by purgatives until the urgent symptoms are subdued. Antimony combined with the morphia will relieve all febrile symptoms and the inflammation without purgation.

One reason why formerly inflammation of the heart was not more frequently detected is, that it seldom in the first instance proves fatal as an acute disease, though it may lay the foundation for the most distressing and, ultimately, fatal chronic cases of

difficult breathing and dropsy. When much lymph is thrown out, *adhesions* of the pericardium ensue, which embarrass the action of the heart, causing uneasiness, and palpitating, violent action. Those adhesions, however, are less distressing and less dangerous to life when uncombined with disease of the valves, a state which too often is induced at the same time, their lining endocardial membrane becoming inflamed simultaneously with the pericardium. Another reason is, that the primary results of the endocardial inflammation were often overlooked, being merely plastic thickening of the membrane, or little *warty excrescences* of organised lymph, which spoil the shape and action of the valve sometimes even from their first deposition, their irregularity causing the edge to turn over so as not to hold the blood.

The valves diseased are usually those of the arterial left side, the mitral and sigmoid; which, after they have been damaged by inflammation, become sometimes like arteries incrusted or deformed, with "bone-earth" *concretions*,* which render them rigid, destroying their function, sometimes by preventing them from closing, sometimes by narrowing the passage, or both.

When the mitral valve is diseased, permitting *regurgitation*, the result is congestion of the lung

* Those white concretions which are found in the heart and arteries and in the bronchi are nearly of the same chemical composition as bone, and are not of the nature of the gouty deposits called chalk-stones, in which there is a considerable proportion of uric acid. It is not, therefore, on account of the chemical, gouty, or rheumatic constitution that rheumatism tends to heart-disease, but because it produces an extra liability to inflammation in that part.

and dyspnœa, either severe and permanent when the organic disease has advanced, or only occasional upon using exercise or exertion when it is slight.

When the sigmoid valves are diseased, *hypertrophy* of the left ventricle of the heart succeeds, induced by the extra work thrown upon it, either through the constant regurgitation of the blood into it when the valves do not shut, or from the difficulty of sending the blood forward when the valvular space is contracted by concretions, or adhesions, or puckering; the hypertrophy compensating for the defect.

In either case, as the ventricle is not sufficiently empty to be ready for the reception of an adequate quantity of blood from the auricle, the auricle cannot send the blood freely into it, and consequently the blood is kept back in the lungs, causing congestion, dyspnœa, asthma, and cough. These symptoms uniformly accompany disease of the valves of the heart, which induces also congestion of the liver, kidneys, and other viscera, and corresponding disturbance of their functions. If the regurgitation be very free, a *double pulse* will be felt at the wrist,—one from the auricle, with the diastole; the other from the ventricle, with the systole: for, as the blood falls back from the aorta into the ventricle, the ventricle not being as empty as it ought to be, the jet from the auricle is communicated on into the aorta, and so the impulse onwards to the wrist; the false weak pulse from the auricle preceding the true pulse from the ventricle. In such cases, if of long standing, the auricle will be found hypertrophied.

A degree of hypertrophy of the ventricle is pro-

duced in some persons by *desultory* violent efforts, as in occasionally lifting heavy weights, but not in artisans who are constantly using powerful exertion. This effort, the breath being held at the same time, temporarily obstructs the circulation, by which the valves of the heart are strained; and though no pain be perceived, an irritability of the organ is induced, which brings on a permanent over-action, and which will, if neglected, end in hypertrophy. In every instance, I have found that the patient has recovered from this state by carefully attending to the caution given him to avoid making these occasional over-exertions, even in cases which had gone so far as to produce some dyspnœa and impulsion of the heart; in the worst of which, a combination of digitalis with morphia greatly promoted the cure. I have had several cases of amateur rowers who had brought on this state by desultory over-exertion, which scarcely ever occurs to watermen trained from youth; there have also been cases of printers who have brought on this state of heart by lifting heavy "forms," but who soon got well when, the cause being explained, they refrained from such work: and a variety of similar instances may be adduced. It is scarcely necessary to add, that these cases of "hypertrophy" were merely functional.

There are palpitations and irregular actions of the heart depending on innervation, and not necessarily associated with change of structure, though in many instances the two coexist; the commonest is mere palpitation, or extra rapidity of action,—the simplest cases of this occurring in persons in good health, but of an excitable nervous system, whether

good or ill tempered; this is the lowest degree, and scarcely to be denominated disease; but when persons of this temperament become even slightly deranged in health, these palpitations become a serious addition and prominent symptom, and sometimes are the most complained of by the patient, and not unfrequently distract the attention of the attendant from the real disease, whether that be hepatic, uterine,* renal, intestinal, or other,—and when the real cause is not discovered, it is said to be "gout;" asthmatic breathing is thus sometimes produced, and the stethoscope is often employed as unprofitably as unnecessarily—to which I have elsewhere alluded. This is a mere ill-directed innervation, a morbid sensibility of the weak part. It is said that every one has "a weak point" physically as well as morally; and thus we find some persons, when slightly ill, get rapid action of the heart; others have tender bowels, and, if exposed to cold or fatigue, will have diarrhœa, others increased micturition, others colic, others headache, or sick-headache: all of them, in fact, neuralgic affections, occurring most commonly as sympathies in hysteric females and nervous men;

* One of the most common and annoying symptoms of irregularity of the uterine functions is "pain in the heart," accompanied by a hard, frequent pulse, which has been sometimes attributed to an inflammatory state, but is a purely neuralgic sympathy, and moreover is generally not in "the heart" (though the patient's hand, placed there, indicated that as the position of the pain), but in the intercostal nerves, or in the cardiac orifice of the stomach close to the heart, associated with flatulence and globus hystericus, and is relieved by tonics, stimulants, emmenagogues, &c., which cure the perhaps latent uterine malady. A similar "pain in the heart" occurs in males from dyspeptic neuralgia.

and it is not necessary that either these males or females should be delicate-looking persons—they are often robust, but with a weak point. Anti-hysteric and tonic remedies are those most generally indicated to correct this constitutional tendency.

We have now to consider a state of enervation, as distinguished from innervation. In the latter instances, we have the nervous influence in excess,—too much steam; on the other hand, we find the machinery of the heart and pulse sometimes flagging from deficiency of nervous influence; in which case, every now and then the muscles make a pause, causing intermission of the pulse. This intermission occurs with all states of the heart, sound and unsound; because, as it depends on the nerves, we may have an intermitting pulse with a perfectly sound heart, when the system is debilitated by any cause, either of internal organic affection, or disease produced by external causes or circumstances; or by some drug, such as digitalis, colchicum, green tea, &c. Intermission of the heart is no evidence whatever of disease of the organ; and many persons who have been subject to palpitation in early life, become at an advanced age liable to intermission on account of the facility with which their nervous system is exhausted; and several persons have been brought to me with supposed "fatty" disease of the heart (a fashionable complaint just now), the organ being lazy, and only requiring tonics and extra allowance of wine to restore it to regular action,—which, I need not say, would not have removed fat, if that had been the cause.

I have found more persons misled by impulsion

of the heart than by any other stethoscopic sign. I have been referred to, in many cases of phthisis, in consequence of apparent hypertrophy of the patient's heart, which depended merely upon the increased perceptibility of the heart's action, from the excessive thinness of the parietes of the chest. Other patients have fits of palpitation of the heart from dyspepsia, even sometimes accompanied by noise (*bruit de soufflet*), during which the impulsion is so great as to mislead the practitioner, if he have not opportunities of ascertaining that for weeks, during the intervals of the attacks, the action of the heart will be perfectly normal.

With respect to hypertrophy of the heart, there has been much misconception as to strong impulsion being an unerring symptom. During violent action of a heart which is not at all hypertrophied, the impulsion will sometimes be so strong as to force up the head with violence when applied on the stethoscope, or to cause that part of the chest to heave up the dress of the patient at each pulsation: this is the case with nervous and hysterical patients; and this violent action will subside, so that the beat of the heart will not be stronger than natural; whereas when the extra impulsion is from real hypertrophy (enlargement), the impulsion is permanent, and the pulse with it unnaturally strong. On the contrary, with the nervous palpitation, the pulse will be found weak during the time that the impulsion is strong; and when the palpitation with strong impulsion subsides, the pulse becomes fuller: the reason being, that during the palpitation the heart has not time to be filled so as to fill the artery at the wrist, though acting with such

violence as to give strong impulsion. Thus many misstatements and errors of diagnosis have occurred, from supposing that "impulsion" is a certain sign of hypertrophy; whilst, on the other hand, hypertrophy, when combined with fatty degeneration, atony, or relaxation of muscular fibre, is unaccompanied by impulsion.

A hysteric constitution in females, and the nervous temperament in males, will produce impulsion sufficient in many instances to deceive the practitioner, if, as often occurs, the patient be merely once shown to him for an opinion; and medical men ought to be cautious of committing themselves. The best way of enforcing this precept will be by a few clinical examples.

A young lady, æt. fifteen, in a distant part of the kingdom, became affected with cough, violent action of the heart, and subsequently dropsical swellings. The physicians who saw her considered her the subject of disease of the heart, and sent her up to London for further advice. She was *shown* to two highly talented physicians separately, who each confirmed the opinion, and gave little or no hope of her recovery. Her ordinary medical attendant called me in to see her. I found her with short breath and short cough,—emaciated, and dropsical even in the upper extremities and face. There was very strong impulsion of the heart; but I could not trace any previous acute rheumatism, or the other usual sources of hypertrophy of the heart at such an early age, and therefore discarded the idea, and set down the case as one of hysterical palpitation, with dropsy from debility; and prescribed

tonics, such as chalybeates and quinine, in small quantities, so as not to oppress the stomach, a generous diet, and immediate resort to gestation in the open air. Upon this plan she rapidly recovered, and has continued healthy for some years.

A married lady was brought to me, not to ascertain the nature of her complaint, but to try if I could suggest any relief or remedy for hypertrophy of the heart, which another physician, who had not alleviated her symptoms, declared the case to be. I ascertained, in the first instance, that she had been about a dozen years married, without children; suffered from headaches, tormina, constipation, and other symptoms of hysteric indigestion, for which she constantly resorted to purgatives, and of which the physician had rather prescribed an addition, instead of trying to wean her from the bad habit. With much difficulty I prevailed upon her to forego the temporary relief of purgatives, and to persevere with light tonics, with terebinthinate medicines. Before long, the result was, that her health improved, she lost the symptoms of hypertrophy, and became pregnant.

A young friend of mine, in consequence of a life of over-exertion in study, pleasure, business, and dissipation combined, brought on such violent action of the heart as would have induced most persons, from the mere impulsion, to have pronounced it hypertrophy. His waistcoat could be seen to be moved as he sat at table. This state, which had lasted from about the age of nineteen to twenty-four, subsided without medicine, merely by a more regular mode of living. At the age of thirty-five,

the pulse and action of the heart were perfectly normal.

A gentleman, æt. twenty-six, consulted me under similar circumstances, but much out of condition, having been on low diet, and taking active purgatives by the direction of a physician, who declared the disease hypertrophy of the heart. He was very nervous and low-spirited, and had neuralgic pain in the chest. I allowed him to take animal food and fermented liquors, and prescribed carbonate of iron, during the use of which the action of the heart was quieted, and the other symptoms subsided.

These cases would of course have required different treatment, had the heart been really diseased, instead of being merely sympathetically disturbed in its function.

With Cruvelhier, I doubt the existence of a permanent simple or "*concentric hypertrophy.*" Persons who have died under the circumstances above stated (the pulse having been smaller than normal) will of course have the cavities of the ventricles unnaturally small, the cavities being less capacious than natural during nervous palpitation; and thus, from the natural expanse of muscle coming into a narrower space, the muscular parietes become disproportionately thicker and firmer, causing the deceptive impulsions above alluded to. I am not, therefore, inclined to acknowledge the existence of hypertrophy, unless the cavities of the ventricles be at least of a normal size. When this is the case, if the parietes be thickened, there must be increase of matter—real hypertrophy; or if the cavities be

enlarged and the parietes as thick as usual, there is evidently an increase of matter—enlargement*—hypertrophy with dilatation.

We have now to consider how *enlargement* takes place. It is true that, like the muscles of the legs of dancers, or of the arms of smiths, the muscles of the heart will increase in size by constant extra work, such as is produced through diseased valves; but this is a slow process, and it requires another condition to produce the great enlargements of combined hypertrophy and dilatation. Diseased valves will exist for a long time, combined with what may be termed a mere increase of healthy muscular fibre; but when there is disease of the muscles—and this commonly occurs sooner or later—the symptoms become aggravated. This disease of the muscular structure may be produced by acute rheumatism, or by the other sources of cardiac inflammation; but without that, there is the tendency upon every over-exertion—and all exertion is over-exertion with such patients—to a sub-inflammatory state, spreading from strained valves, or from old adhesions, &c. It is well known that inflammation, however slight, weakens the tissue in which it exists,—there is a *degeneration* of tissue; the parts thus weakened give

* *Enlargement* of the heart may be ascertained by *percussion*. In the natural state, the sound is that of a solid, over a space which may be ascertained by placing the left hand over the heart,—the tip of the middle finger corresponding with the bottom of the sternum, the wrist pointing to the left shoulder. If the solid sound extend beyond the space covered by the fingers, it may be suspected that the heart is enlarged; if it be much beyond it, there can be no doubt of the fact, unless the dulness proceed from fluid in the pericardium, or from solidification of the lung.

way and are dilated; the heart begins to enlarge by forced dilatation.

Now ensues *hypertrophy* in addition. If the patient takes rest, the symptoms will abate, and the weakened part recover its tone; the dilated part will then become properly nourished, and as thick or thicker than the other,—and thus permanently enlarged. Every person of experience will confirm the truth of my statement, of having found enlarged hearts perfectly sound and firm in their muscular structure. This, however, is not always, nor commonly, the case; the degenerated part usually remains degenerated, in which case it is always softer than natural, though varying in *colour*. If the disease have been recent, the muscle will be found, like all recently inflamed parts, of a dark red; if it be an old case, the heart, like other parts where inflammation had existed, is paler than natural (as in a cicatrix), with different shades of intensity of colour, varying from *red* and *pink* to *pale yellow*; all these tints being producible by the colouring matter of the blood, independent of the *fatty* matter which is often found infiltrated or deposited, and which will be hereafter explained.

Many enlargements of the heart originate in defect of the valves, either with or without an aneurismal state of the aorta; the defect of the valves, as above described, producing a necessarily excessive over-labour of the ventricle, and consequent enlargement of its muscular fibre. These enlarged hearts are commonly found to be covered with old inflammatory organised lymph exudations, more or less adherent to the pericardium. Some pathologists

have believed that these adhesions tended to produce hypertrophy. Doubtless these adhesions took place at the same time that the valves were inflamed and damaged; but it will be found that, if the valves be sound, adhesions of the pericardium constantly exist without enlargement. The adhesions produce irregular action and palpitations, but not that steady over-action which induces hypertrophy. The pulse, when adhesions alone exist, is rather weaker than natural, whereas with hypertrophy it is stronger; with adhesions, the pulse, whilst irregular, is weak, and only during violent action becomes regular, and for a time strong, unless indeed it be rapid. In this case, though the heart be felt at the chest to give a strong and deceptive impulsion, the pulse is weak, because, as above mentioned, from the *frequent* violent contractions of the heart, the ventricle is not allowed time enough to relax and fill to its usual extent, so that enough blood is not admitted for transmission onwards into the arteries. Consequently the pulse is weak, though the heart is labouring; precisely as in simple over-action from nervousness, hysteria, exhaustion from running, or any sympathetic palpitation of the heart, when the pulse has become too rapid,* sufficient blood not being sent to the brain becomes the cause of faintness, or actual syncope, to an alarming extent. This, too, is the

* Thus, persons running or dancing will at first be flushed; but if the action of the heart become too rapid, as described, they will be seen to turn pale and faint, from a want of blood to the brain. I once saw a healthy, active young man *faint* away upon getting into a stage-coach, having run about the eighth of a mile to overtake it.

most frequent origin of the blood being kept back in the lungs,* and is the cause of that short, single, *unsatisfactory cough*, which, to the practised ear, announces that the person who gives it (even a stranger in a crowd) has the pulse quick and weak, from the heart beating violently without being sufficiently distended after each systole. This is the simplest example of *heart-cough*, and the most removable.

This state of circulation may occur even in the healthiest individual, as just stated, from exhaustion from running, dancing, or other exertion; with or without faintness or syncope. This is the cause of being what is called out of breath, which, brought on thus in a healthy individual, is exactly the sensation felt in a variety of diseased states accompanied with *dyspnœa*—the name for the feeling of being out of breath. The congestion of blood impedes the current of the air by narrowing the passages for it: hence the sense of distension produced by the over-injection and load of blood, the arterialisation of the blood being simultaneously retarded.

This dyspnœa is felt, whether the congestion in the lung be produced *directly* by diseased changes in the lung and air-passages, as in bronchitis, peripneumonia notha, whooping-cough, &c., or *indirectly* and secondarily, by diseases of the heart causing the reflux and congestion as described.

* This, again, keeps back the blood in the vena cava, producing congestion, disease of the liver and other abdominal viscera, or dropsy, or both, and congestion of the brain,—from which, if predisposed to disease, apoplexy, paralysis, or mania result; similar symptoms arise from dilated *right auricle*.

We have dyspnœa produced directly by catarrh or bronchitis, when severe; and we have an indirect, or secondary, analogous state of the air-passages produced by heart-disease: thus we may see a patient with blue lips, dyspnœa, and cough; but cannot tell, until we examine into the other symptoms, by auscultation, &c., whether the congested state of the air-passages, which produces these symptoms, depends on a primary disease of the lungs themselves, or is a secondary result of disease of the heart. Frequently these causes coexist; and so much the worse, as the heart-disease will retard the cure of the pulmonary affection; and this will account for the utter failure of "expectorants" addressed to the lung apparatus, when the heart was the seat of disease. In fact, when we find very aggravated cases of chronic catarrh or bronchitis, with distress of breathing and expectoration of long standing, we may suspect that there is some fault in the machinery of the circulation.

We have now to consider the *auscultatory* signs of the different diseased alterations of the heart.

1. It has been already mentioned that, at the commencement of Pericarditis, we may be in time to hear the slight rubbing noise produced by the friction of the inflamed pericardium; and also that in Endocarditis there is a murmur, which proceeds from the swollen, roughened state of the membrane of the valves.

2. If the mitral auriculo-ventricular valve be diseased so as not to hold the blood, the *first* sound*

* The word "sound" applies only to the natural sounds;

will be spoiled, on account of the imperfect tension of the valves. In the first place, it may be heard, though weakly, as coming from the tricuspidal valves only; or it *may* be, though not always, mixed up with a slight noise ("*bruit de soufflet*") produced by the regurgitating ripple of the blood. But if there be a greater amount of disease, including roughness from concretions, the resulting noise ("*bruit de soufflet*") will be strong enough entirely to mask the first sound.

3. If the orifice of the aorta or the sigmoid valves be rough (ossified), though they close so as to prevent regurgitation, still there will be a ripple produced as the blood passes out of the heart, causing a noise (*bruit*) immediately with, or entirely masking, the *first* sound. But if the valve does not close besides, then there will be the double noise, "*bruit de scie*," of the blood both going out and falling back.

4. If the semilunar valves be only insufficient to close the orifice, either from excrescences causing the edge to turn over, or from slight puckering from inflammation; or if, from dilatation of the aorta, they be relatively too small without ossific roughness,

the word noise ("*bruit*") to the unnatural, morbid sounds, which mask, confuse, or take their place. And I may repeat here, that the first sound—that of the auriculo-ventricular valves (the first valves of the forcing-pump)—occurs when the muscles of the heart act to send the blood forward; of course it takes place at the same time with the impulse of the muscles against the ribs. The second sound is that of the second set of valves tightened by the backward pressure of the column of blood (in the aorta and pulmonary artery), which they support, whilst the muscles are relaxed to repeat the action.

the noise ("*bruit de soufflet*") will be only *single*, from regurgitation, and will confuse the *second* sound.

5. If the semilunar valves, besides being insufficient to close the passage, be also rigid from ossiform deposit, there will be a *double* ("*bruit de scie*") noise heard, as just mentioned; the first (*direct aortic*) with, or confusing, the first sound, on account of a ripple produced by the roughness of the semilunar valves, as the blood is forced through them; and the second noise of regurgitation (*regurgitant aortic*) masking the second sound.

We find, then, that noise with the first sound may arise from disease of either the auriculo-ventricular valves or semilunar valves. The diagnosis depends on the circumstance that, if the disease (partial rigidity) of the semilunar valves be so slight* that you have not regurgitation (in which case the noise would be double), you have not blue lips, dyspnœa, nor other signs of reflux congestion which are produced by diseased auriculo-ventricular valves. This noise of the semilunar valves is heard towards the upper part of the chest; and that of regurgitation, of the mitral, at the heart.†

I must here allude to a noise which is heard with the first sound of the heart, even when quite perfect, during rapid action in nervous men and hysterical

* This harmless noise ("*bruit de soufflet*") exists in many elderly persons.

† These noises are sometimes audible, without touching the patient, at a greater or less distance from the chest: in which case there is often accompanying the noise a vibration ("*frémissement cataire*"), which may be felt by the hand. This accidental loudness does not alter the prognosis.

females. I account for this condition by a spasmodic action of the muscles attached to the chordæ tendineæ preventing the auriculo-ventricular valves from closing perfectly; because I have known this to have occurred in individuals the valves of whose hearts were found quite sound on *post-mortem* examination. I have witnessed the same in men during mental excitement, where it has ceased upon diverting their attention, the pulse falling at the same time; and I know that some of these cases have been mistaken for organic disease.

I have here explained one cause of bruit in a sound heart, produced by the nerves. There is another, depending upon a morbid state of the blood, anæmia, in which there is noise, the cause of which is that the heart's action is feeble and the blood more limpid than natural: the result is a ripple, which produces bruit. For, the heart not distending the arteries as forcibly as usual, they contract in size; there is thus a disproportion produced, the cavity of the ventricle being larger in proportion to the calibre of the aorta than it should be, which, conjoined with the extra limpidity of the blood, produces a sonorous ripple which does not exist in the normal state. This is also the cause of the jerking pulse of anæmia; the aorta, not being so much stretched at each pulse, approaches more to the state of a rigid tube, and the pulse, though weak, because less under the influence of elasticity, more jerking: thus a short, sharp pulse is evidence of feeble action of the heart, and the first sound of the heart will be, for that reason, shorter and more like the second sound in cases in which there is dilatation or softening.

It is utterly futile to attempt giving more than the above directions for distinguishing the varieties of valvular heart-disease; and by a strict attention to these, little if any difficulty will be found in practical diagnosis. These are the primal and useful points of diagnosis. There are rare cases in which auscultation affords no diagnostic symptoms, such as that of an adult woman who died dropsical in the London Hospital, who had had a bluish tint from birth, always increased by exertion; the sounds of her heart were scarcely audible, and her pulse almost imperceptible. The disease was congenital, and she had reached middle age, though the orifice of the mitral valve was not larger than sufficient to admit the tip of the little finger.*

There is a peculiar metallic sound, mentioned by authors, sometimes mixed up with the first sound of the heart, resembling what is made by pulling the prong of a fork and suddenly letting it go, or by drawing the lips forcibly into a small circle as in the act of whistling, and then slightly percuting close to the angle of the mouth: it is not uncommon, and is caused by the first sound being propagated to and through the stomach when tense with flatus; it is always under such circumstances that I have perceived it, and never as an evidence of disease, which is my reason for mentioning it, to prevent any anxiety about it.†

* There was marked hypertrophy of the left auricle, produced by its being constantly over-worked in forcing the blood through such an unnaturally narrow passage.

† To those who have read voluminous works on the subject, the above may appear a scanty account of the bruits of the

Aneurism of the ascending aorta is frequently immediately connected with disease of the sigmoid valves, and commences with inflammation, as above described (p. 576). The inflammation causes subsequently deposition of scales of calcareous matter near the roots of the valves. These scales, upon every extra action, irritate and inflame the surrounding membrane, causing fresh scales and plates to be deposited under the membrane lining the root of the aorta; these again, on renewed extra motion, wound and inflame the membranes attached to them; and thus the mischief spreads to the adjoining tissue, the elastic coat of the artery, which becomes thereby inflamed, and of course softened and distended, and an aneurismal dilatation results; which then goes on increasing, and at last destroys the valvular apparatus. For even if the valves have been previously sufficiently free in their action to perform their function, when the aneurismal state distends the root of the aorta, the valves are not large enough to meet so as to close it; and then it is that the aneurism, which previously, in many instances, produced but slight inconvenience, begins to cause distressing symptoms of cough, dyspnœa, and

heart, but it will be found all-sufficient. I consider it unnecessary to describe the so-called *musical sounds* of the heart, more especially because those who have wasted their own and their readers' time in describing them wind up with declaring that—"A musical murmur, therefore, indicates no more than an ordinary one;" and just let us enumerate their "*music*:" single bruits; "sighing; bellows blowing; whistling; broken whistle! rasping; sea-shell" ("*dum personat æquora conchâ*"); double bruit music; "cooing ("*molles ubi reddunt ova columbæ*"); mewing; sawing; blow and whistle!"

pain between the shoulder-blades. These aneurismal dilatations sometimes commence, as described, from cold, with rheumatism and endocarditis; but they are also produced by accidents which give a violent strain to the sigmoid valves, such as some violent succussion. I traced one to a fall backwards from a cart; another occurred in a sailor, who, whilst straining at the windlass on a spar, which broke, fell on his back; another was caused by a fall on the back from a horse rearing; the celebrated surgeon Liston died of the disease of the aorta and semilunar valves here described, produced by a blow on the chest from the gibing of the boom of a yacht.

An aneurism sufficiently near the surface in a limb, or in the trunk of the body, is seen and felt to pulsate; it evidently shrinks and compresses its contents after each distension by the heart; and it struck me that aneurism of the aorta would, by its *resilience* in such case, cause a double or second pulse in the arteries at the wrist: this I put to the test of clinical observation. In a short time, by examining other patients admitted into the hospital besides my own, I discovered three with resilient pulse: one had undoubted aneurism, making its way visibly through the anterior of the chest; in this patient the resilient pulse was distinct, as it will be found in all similar cases; the two others had resilient pulse with less distinctness: and when the resilience is slight, it requires a practised hand to detect it,—two fingers must be kept with a light elastic pressure on the artery at the wrist. These two latter patients had no external nor any estimable symptom of aneurism besides the resilient pulse, and one of them left the hospital.

The other, who was dropsical, with visceral disease, died; and upon examination, an aneurism of the aorta was found close to the heart, not larger than a common hen's egg—the smallest aneurism of the aorta ever detected during life, and that by the resilience of the pulse alone. The third patient, who had left the hospital, returned the following year with a confirmation of my diagnosis, as the suspected aneurism was now so much enlarged as to be seen and felt to give strong pulsation below the right clavicle.

This guide to diagnosis by resilience was published in the *Lancet* in December 1833. I find that, notwithstanding the above evidence, it is *doubted* by some writers; but persons who are acquainted with hydrostatics will easily *understand* it; and I have had but too many opportunities of confirming it. This resilience is one kind of double pulse. I have elsewhere (p. 577) explained another kind, where one pulse is felt from the auricle, the other from the ventricle; the difference between which double pulse and the resilient double pulse is, that with *resilience* the *first* or *real* ventricular pulse is the strongest; whereas with open valves it is the *second* which is the ventricular and the *strongest.* There can be no doubt as to which is first and second, because, whichever be the first, it comes after the slight pause of muscular relaxation; and in either case there is a pause or longer space of time between the second and the return of the first than between the first and second; thus, if the ear be applied to the heart, counting one, two, three, there is time to say three after the second, before the first comes again.

There is still another kind of double pulse, from

a different cause, not organic, but from fault of innervation,—it is a modification of palpitation, in which the heart is both weak and irritable, sometimes, in addition, enlarged and flabby; the ventricle has not energy to empty itself satisfactorily, but, being irritable, does not wait during a normal diastole, but gives an immediate second systole; in this case two beats of the pulse are felt, and three sounds of the heart are heard,—of the two systolic sounds, the first is the strongest. Then follows the false second sound, *i. e.* the extra systolic of the auriculo-ventricular valves; and thirdly, the normal sound of the semilunar valves, *i. e.* the true second sound.

Aneurisms about the arch of the aorta, and indeed wherever they exist, if not from accident, are the result of the inflammatory process described. It is unnecessary here to enter into the pathology of aneurism generally, which will be found in detail in the excellent works on the arteries by Hodgson and by other more recent authors.

There can be but one mode of prolonging life in aneurism of the aorta—in one word, *rest;* keep the heart as quiet as possible, so as to have as little distension of the sac or artery as may be, and thus afford a chance for its parietes to get firm by the absence of inflammation,—and it may be, sometimes, to become even semi-cartilaginous or bony, or the lining layers of blastema to consolidate. This result can scarcely take place to an extent to be useful in an aneurism of any size, though I met with one about the size of half a small walnut, which had undergone spontaneous cure by becoming perfectly ossified, so that it was as firm as a nut-

shell; this little aneurism was near the semilunar valves, which, besides, had specks of ossification. Sometimes lining layers of plastic lymph (blastema) become consolidated (organised), and thereby retard the progress of the disease. The diet should be cautious and somewhat restricted, but not to extremes; and, when it can be borne, digitalis in moderation is most useful, by keeping the pulse soft; but it sometimes produces an intolerable depression of spirits: in this case morphia, if it agrees, will lower the pulse; if both fail, hydrocyanic acid may be tried.

The treatment here described is exactly applicable to diseased valves of the heart. Both with aneurism and with diseased valves, in time, destructive disease of the lungs, kidneys, liver, &c., and dropsy, will ensue, and are to be combated in the usual way as each specific symptom shows itself; adhering to the general rules above laid down.

Fatty degeneration of the heart must not be confounded with that obesity of the organ which occurs in corpulent subjects. The fatty degeneration, on the contrary, is found in persons even extremely emaciated; moreover, common natural obesity deposits the fat on the outside of the organ, as seen on the hearts of animals in the shambles.

It is well known that inflammation of the heart softens it, as it does other parts, by rendering effete the nutrient cell nuclei; and we find that when this occurs, the deteriorated tissue is changed into a fatty matter, the cells of which are of inferior vitality. In this case we find fatty degeneration, and specks

and patches of fat substituted for fibres here and there, and mixed through the muscular substance of the heart. I have seen the same thing in the muscles of other parts, especially in one case—that of a woman who died in the London Hospital, a martyr to a kind of rheumatism; the muscles of both her upper and lower extremities, when cut through, were actually gray with this fatty deposit.

The muscular tissue thus degenerates from inflammation, and sometimes during fever, with or without fat, as described above in various degrees, giving rise to softening and dilatation. This state of heart of course leads to a very weak, slow, and irregular pulse, and sometimes to rupture of the organ; for the tissues, when thus degenerated, are fragile; and when the muscular sound parts recover strength, and begin to act naturally, they tear the unsound part, and death occurs—sometimes very suddenly, if the laceration be large—sometimes gradually, if the perforation and oozing of blood into the pericardium be small. I have seen some cases, however, of rupture, or rather perforation of the heart, not from fatty degeneration, but from a very slow ulceration of the inner surface of the left ventricle; and in two instances death was gradual and without pain, except that in the first, where death occurred in thirty-six hours after the symptoms of mischief attracted notice, the sense of want of breath was most distressing, though without actual pain. This occurred in a robust, healthy man. In the other case, the blood must have been oozing into the pericardium for many days. I was called to the case four days before death, merely because

the patient felt uncomfortably weak, but with no symptom of distinct disease; his age was upwards of sixty, and he was a person whom I had known for twenty years without his ever being ill, so that I could not trace back any cause for the ulceration which was afterwards found. When first seen by me, his pulse was scarcely perceptible; the next day still less so, and for two days before death not at all; he was without a single symptom of uneasiness, except the indescribable *malaise* of weakness; and his senses were retained almost to the last, even when there was no power of motion. The pericardium was full of blood: on examining the left ventricle, there was a hollow on the inner surface towards the left side, the effect of slow ulceration, at the bottom of which a perforation not larger than a pin-hole had allowed the escape of the blood.

Enough has been stated respecting the lungs and heart in the preceding pages to enable us to account for ASTHMA or *asthmatic* breathing; whether permanent, or that which, coming on in sudden paroxysms, is called *spasmodic asthma*. But even the permanent asthma is not uniform, as it varies at different times, from slight, sometimes almost imperceptible dyspnœa, to that degree which renders the patient incapable of walking about. On the other hand, the individual who is subject to spasmodic asthma, though said to be quite free between the times of the attacks, is never, in reality, able to breathe under exercise or exertion as a sound person does.

The term *asthma* was formerly more commonly

used than at present; because now, the causes being better known, the real nature or name of the disease is given instead of asthma, which was only a symptom—in fact, *dyspnœa:* for instance, when there was dyspnœa with chronic catarrh and bronchitis combined, severe and permanent, it was called humoral asthma; when the dyspnœa, with or without cough, was habitual and without expectoration, dry asthma.

Dry asthma is produced by different causes. A person who has emphysema of the lungs to any amount, though he may breathe tolerably in ordinary circumstances, can never make any extra exertion without feeling dyspnœa: still, emphysema is connected rather with permanent dyspnœa than with what is commonly called asthma, or with cough.

After bronchitis, whooping-cough, measles, &c., the bronchial membrane, having been extensively and severely affected, will, if not properly treated, remain for years in a state of congestion or emphysema, causing a greater or less degree of dyspnœa on exertion, with liability to aggravation on catching cold, and also preventing active exercise or exertion. Formerly this was merely called asthmatic breathing; but precisely the same cause lays the foundation for what is termed an attack of spasmodic asthma: the patient having caught cold, the bronchitis is aggravated; he will not be able to lie down, but will be obliged to sit propped up in an arm-chair, labouring for breath, until, relieved by medicine or from mere exhaustion, the pulse becomes weaker and the membrane less injected, whereby temporary relief is obtained, usually with some expectoration—either of scanty bronchitic pituita alone, sometimes

containing little firm grains of condensed mucus, looking like boiled sago (the pearly sputa of Laennec); or mixed with a more copious mucus, according to the degree of catarrh which may have been induced by the cold.

The way to treat the attack is, to give an emetic, to put the feet in hot water, and to keep them very warm afterwards; to give frequently an expectorant mixture, or pills (before described) of squill, antimony, or ipecacuan, and some opiate combined. When the acute attack is disposed of, the cure is to be completed by some expectorants, as above, until the cough ceases to be troublesome. With these we should combine occasional doses of a mercurial, to be continued, avoiding salivation, until the bronchial membrane is cured, for which a moderate use of mercury is generally indispensable. When the cough is subdued, no longer requiring any anodyne, senega with sulphate of quinine or zinc will be found to promote the cure, and the patient should take exercise in the open air, even in winter. If he be shut up in rooms with double windows, without exercise, neither the constitution nor the bronchial membrane can recover healthy tone.

Congestion, then, is the simplest cause of asthma: it will be easily understood, that where there is disease of the heart combined with chronic bronchitis, as it commonly is, the asthma exists in a more palpable form; and, besides the aggravations from cold, the patient is liable to have paroxysms brought on by indigestion, mental emotions, and other circumstances which disturb the heart's action. In this manner the various causes enumerated by Bree and

other writers on asthma, as inducing paroxysms of "spasmodic asthma," attributed to spasm of the bronchial tubes, can evidently be accounted for.

In what is called "spasmodic asthma," the patient has a sensation of want of air, and makes continual forcible *in*spirations; he does not *re*spire equally,—hence the lungs become loaded with carbonic acid; the enfeebled heart does not send on the blood, and the vascular system and brain become congested with dark blood like that of a person drowning. But spasmodic asthma is merely the name given to dyspnœa when it comes to violent paroxysms: dyspnœa is induced by chronic bronchitis, or heart-disease, or emphysema; there is no such thing as a genuine spasmodic asthma—that is to say, fits of asthma depending merely on neuralgic or nervous spasms, like tic douloureux—as we might suppose from reading Bree, or other old authors—or even modern authors, one of whom puts the cart before the horse, attributing thickened and contracted bronchial tubes, emphysema, dilated bronchi, and even heart-disease, to spasmodic asthma—nay, he accuses spasmodic asthma of producing distortion of chest and spinal curvature. I can easily understand the *vice versâ*, but not this.

At the commencement of the disease which ends in asthma, the pearly sputa of bronchitis, the chronic bronchitis itself, emphysema, or heart-disease, is overlooked; but—eventually proved by dissection—it has been asserted that the spasmodic asthma had produced them.

Thus the condition necessary to induce that great difficulty of breathing, called asthma, consists in a

very congested state of the aerial membrane. This difficulty, when it comes on suddenly, is called spasmodic; not merely from the so-called spasmodic convulsive efforts to draw the breath, in which the respiratory muscles appear to be acting convulsively, but from the prevalent idea that there is some spasmodic contraction in the air-tubes themselves. It is, however, unnecessary to assume this, as the phenomena are quite explicable by the combined derangements of heart and mucous membrane causing laborious action of the voluntary muscles of respiration. But it was found convenient to have one general cause to assign for a proteiform disease, of which the descriptions and modifications given by authors are endless. I will endeavour to show how those modifications may be accounted for without gratuitous spasm of the bronchi.

For instance, one of the simplest cases of so-called "spasmodic" asthma which I have seen, consisted in reality of chronic bronchitis, or chronic dry catarrh of Laennec, extending through a large portion of both lungs; but so mild, that the patient seemed quite well under ordinary circumstances, though never able to run up-stairs or to dance without feeling very "puffy." Whenever this patient caught cold, he felt towards evening slight restlessness (*malaise*), rather than dyspnœa; but as the night advanced, sometimes before going to bed, distressing asthmatic breathing came on, with a short dry cough, obliging him to sit up in an arm-chair, leaning his elbows on the arms of the chair, or resting his arms on a table set before him. I found him in this state when first called to see him, with what I was told

was one of his fits of spasmodic asthma. This was relieved by putting the feet in hot water, a mustard poultice to the chest, an emetic, and an expectorant mixture consisting of inf. rosæ co., syrup of poppies, oxymel of squill and alum. He had evidently a cold in the head; his pulse was natural, but weak; and I gave him some negus. During the paroxysm there were abundant rhonchi, sonorus, gravis, and sibilans, in both sides of the chest; subsequently some rhonchus mucosus: but the attack of catarrh was subdued so soon, that the symptoms of asthma were of very short duration.

He then returned to his usual state of comparatively easy breathing, with very slight rhonchi except on exertion; and his family calculated that he might be five or six weeks without another attack, "until he caught cold, or something disagreed with his stomach;" but they could not tell why he so frequently caught cold,—for during the last three years he had been kept in the house from November till April, at great inconvenience to his studies, he being between seventeen and eighteen. From this confinement he was, of course, languid and sallow.

This was in the month of January: I now directed him to walk out every day for a short time; gave him a pil. hydrarg. twice a week; senega, sulphate of zinc, and disulphate of quinine in pills; and in a very short time he recovered tone, flesh, and complexion.

In the spring I allowed him to drive and walk out, and go into society in the evenings, and heard nothing more of him until just before Christmas the same year, up to which time (instead of for a period of only six weeks, as formerly) he had

continued well. He then took epidemic influenza slightly, and at first paid little attention to it: but the third night I was called to him with what they termed one of his old attacks of "spasmodic" asthma, which, however, was terrific; for this time he had acute bronchitis; his skin was hot and dry (the fever of influenza), and the pulse quick and wiry. The lungs were not as before; but so congested, that in some places, and in one in particular close to the clavicle, there was not only no rhonchus, but no respiratory murmur, and they did not sound well on percussion; whilst every now and then, after a severe fit of coughing, weak bronchial respiration and some crepitation were heard mixed with the gurgling of pituitous phlegm. It may be said by some persons that these phenomena were caused by spasm of the tubes; but as the same symptoms existed in other cases of influenza at the same time in patients who had not previously "spasmodic asthma," I cannot admit it. Upon this occasion I was obliged to apply leeches to the chest, and adopt the plan mentioned above for peripneumonia notha and influenza. As soon as he was convalescent, I prescribed the tonic and other remedies which had cured him before; and he has now remained quite well for eleven years, the chronic bronchitis having been obliterated.

The next kind of "spasmodic asthma" occurs when there is heart-disease, either simple neuralgic palpitation* (p. 578), or valvular disease combined

* This neuralgic affection of the heart, already spoken of, when bronchitis has been superadded, was of old one of the commonest sources of "spasmodic asthma."

with chronic bronchial affection. In these cases, when any thing makes the heart act inordinately, so as to render the functions of the valves inefficient, a fit of asthmatic breathing will be the result. Fits of asthma of this kind, according to the degree of valvular disease, are more frequent than those above described, which occur in young persons, whilst these latter exist in elderly persons, at which period of life heart-diseases more commonly arise. They are excited sometimes by indigestion (as mentioned by Dr. Bree), which it is well known induces an inordinate and irregular action in a diseased heart; sometimes they arise from mere nervous irritability, and from mental emotions of different kinds,—leading to the endless enumeration of the occasional "exciting causes" of the fits of "spasmodic asthma" formerly to be found in writers on the subject.

There are cases of heart-disease which tend to confirm the opinion of the existence of an asthma depending on spasm of the bronchial tubes; because detection of the real disease requires some practice, and a knowledge of the actual *cause of the sounds of the heart.* Thus you may find a patient with asthmatic breathing continuing during the day, and having what are called attacks of spasmodic asthma at night. It is probable that you will be told that this is accompanied with chronic bronchitis; and, in fact, the dyspnœa is that state secondarily produced. In this case, if advanced, you will find œdema of the legs, or even of more extent: you may be told that there is no disease of the heart, that there is no *bruit* or unnatural impulsion; but upon listening carefully, you will find, perhaps, that the

first sound is woolly or weak, on account of the mitral valve allowing of regurgitation, though not sufficient to cause a *bruit de soufflet;* and the existing sound is weak, as being derived almost entirely from the tricuspid valves. I am pointing this out as one of the difficult cases to distinguish; for when the same symptoms are produced by regurgitation of the semi-lunar valves, a direct *bruit* is always perceptible on the second sound. Again, with mitral *patency*, which renders the first sound weak, as just stated, if there be even no *bruit* on the first sound, the second sound will be more faint than natural, on account of the smaller column of blood which can be propelled into the aorta.

These cases shorten life by the secondary disease of the lung, the capillaries of the bronchi being kept in a state of continual congestion, incompatible with the function of respiration: the lung itself frequently becomes œdematous, and the patient dropsical, with livid lips,—and so he sinks. The disease is incurable, as there are no means of repairing the valves; it may, however, be palliated for years; and even when the patient appears almost suffocated, relief may be obtained. Taking away a few ounces of blood will restore the freedom of circulation; but this must not be resorted to without cautious judgment, nor repeatedly, as weakening the powers of life. Dry cupping, as practised by the French, affords more relief than could be imagined from the small and temporary derivation which it produces: but a great deal may and must be done by imparting tone to the capillaries of the lungs themselves, so as to enable them to resist the regurgitating pressure. The

ordinary expectorants are resorted to by most persons; but nothing is more efficacious than senega, in decoction or infusion, given in frequently repeated doses, in conjunction with whatever diuretic, laxative, or other medicine may be indicated. Senega, as above mentioned, has the same influence as ipecacuanha on the bronchial tubes, at the same time that it can be taken in much larger quantities, in consequence of its not producing sickness. It is most efficacious in solution, on account of its action on the fauces and œsophagus being communicated by contiguous sympathy to the bronchi.

The dyspnœa is increased by every attempt to lie down, because the heart cannot empty itself; and of course more blood is thrown upon it in the horizontal than in the erect position: for this reason the first asthmatic attack, as it is called, comes on at night. The flurry and mental agitation of the patient quickens the pulse, on which account opiates have a most soothing and beneficial effect; and ethers, helping the action of the heart, without the heating effect of alcoholic liquors, give relief in the paroxysms. It is in these cases of "asthma" that you find other visceral derangements so common, from the same cause—a venous congestion insupportable by the organs. The kidneys, for instance, become imperfect in their function, abundantly excreting albumen, with a deficiency of the usually secreted salts. I can recollect, during my pupilage—before Laennec taught auscultatory diagnosis—a patient being actually sounded for stone, from the irritable state of the urinary organs induced by disease of the heart. The liver is gorged, and

consequently inactive; the stomach also,—so as to produce loss of appetite, with sometimes nausea, and even vomiting.

Having above (p. 604) given a case of "spasmodic" asthma, which was produced really by chronic bronchitis, I may now relate one in confirmation of my view that asthma is sometimes caused by valvular disease of the heart.

I was called in consultation upon the case of a gentleman aged fifty-five, who was dropsical, with dyspnœa, and subject to fits of "spasmodic" asthma, one of which had, apparently, nearly proved fatal the night before. He had some cough, with scanty mucopituitous expectoration, and orthopnœa. There was no morbid sound of respiration, beyond the slight rhonchus sibilans of catarrh or chronic bronchitis; venous congestion, and some lividity of lips. Pulse about 80, weak; impulsion of the heart rather more than natural with so weak a pulse; and dulness of percussion-sound extending over a larger space than normal. There was little morbid alteration of heart-sound—no *bruit* of any kind; but the first sound was weaker than natural.

The diagnosis formed was, that a defective mitral valve existed, allowing regurgitation; but that there was no *bruit* therefrom, because the opening was too free to cause ripple, which opening also caused weakness of pulse; and the first sound was weak, as being that of the tricuspidal valve only —the mitral, in fact, giving no sound, as it did not shut—that there was hypertrophy and enlargement of the left ventricle—that the lung was sound as to its cell-structure, but that the cough was pro-

duced by the congestion of the bronchi incident to venous congestion from faulty circulation.

These points were confirmed by *post-mortem* examination; one half of the mitral valve was puckered, contracted, and adherent to the wall of the ventricle, which was enlarged, and more than an inch thick; the carneæ columnæ were hypertrophied. This disease might be fairly traced to the endocarditis of rheumatic fever twenty years back; this had at first produced but slight symptoms of difficulty of breathing; but as the heart enlarged from continued over-action, the valve became more disproportionate to its office, and the "asthmatic" attacks more frequent and severe.

If Dr. Hope and others were correct in attributing the first sound of the heart to "muscular bruit," we ought to have had here an increased, instead of an almost imperceptible, first sound of the heart; for there was nearly a double quantity of muscle, and an increased beat of the heart.

There was a peculiarity observable in the carneæ columnæ of the sound half of the mitral valve; they were increased in thickness (hypertrophied as well as the ventricle), from having been over-worked in supporting that only efficient part of the valve, which was itself stretched beyond its natural expanse.

I should say that this state of the carneæ columnæ affords an illustration of the cause of increase in frequency, and still more in duration, of the paroxysms of mere nervous palpitation, producing at last alarming symptoms. Slightly hysteric or nervous palpitations cause, by frequent recurrence, hypertrophy of the carneæ columnæ, which, in the

subsequent occurrence of palpitations, as they act spasmodically in unison with the muscles of the ventricles, keep the valves unnaturally open (causing sometimes a *bruit* with the first sound, p. 581), thereby inducing dyspnœa and faintness, from regurgitation on the lungs and deficient supply to the brain—as produced, also, by a weak right auricle; hence the indication for narcotics to allay the paroxysms, and for tonics to prevent their return; morphia, iron, oxide of silver, zinc, quinine, &c., and an abundantly nutritive diet, to give tone as well as strength.

We have seen above that those cases called spasmodic asthma, which in reality depend on chronic catarrh, may be cured by tonic medicines combined with palliating expectorants; but this will not succeed unless the patients, instead of being dieted and confined to the house, have every means taken, by animal food, fermented liquors, and exercise in the open air, to put them "in condition."

I may here remark, that I totally disbelieve in the existence of spasmodic asthma as a disease of the muscular structure of the bronchial tubes, or indeed of spasmodic asthma at all. I have never seen a case which, sooner or later, could not be traced to organic disease of some one or other of the viscera, as the heart, liver, spinal cord, or lungs,—constituting emphysema, Laennec's chronic dry catarrh, or chronic bronchitis. Some of these latter cases, occurring in young or old persons, are curable; many of those depending on organic disease of the heart can of course only be palliated.

I have dilated upon this subject of asthma,

because I find that it is a disease still not generally quite understood by the profession.

ANGINA PECTORIS is a term which is wearing out very fast, as "asthma" will, because we now know better what are the diseased states of the heart, such as ossification of the valves or coronary artery, which produce the sudden and violent pain, or *angina* (anguish), which is only a learned name given to the pain.

For the sake of diagnosis, it is necessary to describe the *coughs* which are produced by diseased LIVER. These almost always at first assume the appearance of chronic bronchitis, or chronic dry catarrh: the disease of the liver producing an irritation of the right phrenic and pneumogastric nerves, the uneasy sensation of which causes the patient to cough. At first this is a short, dry, unsatisfactory cough; but if the patient have previously had chronic mucous catarrh, there is a still more deceptive cough, with expectoration: and even if the bronchi have not been previously affected, the continued effort of coughing causes in time a catarrhal or subbronchitic state of the trachea and bronchi, and a slight expectoration. Uneasiness is felt, not in the liver itself, but about the middle of the chest, nearly as high as the nipple, passing through to the shoulder-blade; that is, where the suspensory ligament is attached to the diaphragm, on the right side chiefly, but extending rather across the chest; and many cases of this kind have been treated for chronic bronchitis, though, upon examination, the swollen

liver could be found encroaching several inches below its natural limits in the abdomen. In some of these cases suppuration takes place in the liver, and the abscess, instead of pointing externally, makes its way through the diaphragm, and, by inflammation, adhesion, and ulceration, into the lung—so that the pus escapes by expectoration; all this being accompanied by hectic, and symptoms resembling consumption; and in several instances I have seen both the external pointing of the abscess and the burrowing through the lungs at the same time.* In all these cases, more or less harassing cough, with distress across the chest, first attracted the attention of the patient, and yielded only in proportion as remedies made impression on the disease of the liver, and not to expectorants, though expectorants produce a certain alleviation of the bronchial symptoms.

Persons are frequently deceived by liver-cough, and go on treating it as chronic bronchitis, until the occurrence of jaundice, or some other circumstance, leads to the true diagnosis.

I have been frequently consulted as to the nature and treatment of "disease of the chest," which was really disease of the liver; and the cough, &c., was soon cured by mercury or arsenic, instead of the expectorants previously resorted to.

* It has been explained here how pus makes its way from the abdomen into the right side of the chest, by an abscess of the liver causing adhesion and ulceration through the diaphragm into the chest. In a similar way, I have seen adhesion and ulceration take place from a diseased stomach, so as to allow its contents to get into the left side of the chest, in which case the flatus that passed caused a state of pneumo-thorax.

I have seen cases in the advanced stage of cough and muco-purulent expectoration, with dulness on percussion in the right side, bronchophony and crepitation, hectic fever, and its accompaniment of lateritious urine, which had proved nearly fatal; when the patients were relieved by the abscess of the liver pointing and breaking, or being opened externally, and finally recovered perfect health. In two instances there were hydatids in the liver, in one of which cases some of the small hydatids made their way into the lung, and were coughed up.

Before the publications of Laennec, it was much more common for practitioners to be guided by obvious symptoms, and prescribe for them. Hepatic disease, as is well known, produces cough; this is dry at first, but in time the irritation of the bronchi produces expectoration; and then, if the liver-disease be accompanied by hectic, as is usual, the case may be mistaken for phthisis. In other cases, the indurated enlarged liver produces pain in the back, and sudden starting up, and difficulty of breathing, in the middle of the night, after the patient has been some time asleep; with dry cough, which subsides after the patient has been sitting up for some time. Cases of this kind, where the patients are dying of diseased liver, with more or less dropsical swelling, are sometimes said to be asthmatic. On the other hand, I have been consulted concerning patients sinking under dropsy and cough from diseased heart, which was attributed to diseased liver; an error more readily committed, in one instance, as the patient had returned with these symptoms from India. In all these cases auscultation was of the most valuable

assistance in furnishing both positive and negative information.

The term PHTHISIS PULMONALIS (CONSUMPTION) is now applied only to the disease produced by tubercles,—small semi-transparent granules, like the roe of a fish, deposited in the lungs—as it is said, in the substance of the lungs; but substance is a misnomer, as there is no part throughout the lungs thicker than a sheet of the finest tissue-paper between the ramifications of the finer bronchial tubes and air-vesicles. The tubercular matter is deposited beneath the epithelium of the air-cells; at least, though the tubercles encroach on, or may appear to be in, the vesicular spaces, they are connected with the epithelial cells. Though the minute tubercles, when pressed between the fingers, feel as if they were isolated bodies, like the grains of fish-roe, yet, upon cutting through them, they will be found to be inseparable from, and, as it were, continuous with, the enclosing tissue; and although in general the tubercular matter is deposited at first in these minute spots, it is frequently found coalescing into diffused patches or masses of various sizes ("tubercular infiltration"). This is the first stage.

There is no inconvenience felt, no cough, at this stage of disease, as I have ascertained over and over again; and there are specimens of incipient tubercles and tubercular infiltration in the Museum of the London Hospital, which I obtained, when a student,* from patients, surgical and medical, who had

* This morbid anatomy of the early stage of tubercles can-

no cough: one from a female who died of peritonitis; others from patients who died in consequence of accidents.

Tubercle cells are effete, and have no power of vitality, or of becoming organised—differing in this respect from the cells of virulent or malignant diseased growths. Tubercles and tubercular infiltration, then, unlike the depositions from inflammation (common or malignant), do not become organised; they increase in size by succession of deposit of the same kind of matter round the first grain, which, being inorganised, albuminous, becomes in time decomposed, and changes colour, losing its transparency, and forming a pale opaque spot in the centre, of the consistence of curd.

The melting down of tubercles is an effort of nature towards a cure; by their thus becoming

not, of course, be found in fatal cases of phthisis; it must be sought for in the lungs of patients who have died from other causes, either of disease, or from accidents, in the surgical wards. At the time alluded to, whilst a dresser under the Blizards, I assisted Dr. Yelloly in numerous indiscriminate *post-mortem* examinations of deaths from accident as well as disease, upon which he founded his Observations on Morbid Appearances in the Stomach† (*Medico-Chirurgical Transactions*); and I had thus, at a time when the pathology of tubercle was little understood, frequent occasions of finding tubercles which had not been anticipated. The opportunities of this kind afforded to students of the London Hospital may be calculated, from the statistical reports of that hospital for the last ten years, which give an average amount of thirteen thousand surgical cases and accidents per annum. It was in this extensive field, and at the same period, that my fellow-student, Liston, acquired much of his surgical knowledge.

† Referred to at p. 494, where Dr. Yelloly's name is misspelt.

liquid, the resulting creamy matter (formerly thought to be pus) makes its way into the bronchial tubes by an ulcerative process: during the existence of that inflammation which takes place previous to their breaking, as well as whilst they are being discharged, there is hectic fever; and according as the tubercles are evacuated, a number of small cavities, causing a honeycombed appearance, are left in the lung. As the tubercles are often in masses or clusters, large pouches will sometimes remain after all the white matter is expectorated. Provided there have been but few tubercles in the first instance, there is an appearance of new membrane or lining investing the resulting cavities, and the patient may live on: this result is a real (temporary) recovery from actual phthisis, which has by some been thought impossible. But the disease will generally return sooner or later, unless the individual die of other disease.

Considering this simple statement of the disease, one might be surprised that more do not recover; but we must recollect that these tubercular tumours being within the lungs, they must, during their progress, induce, and be complicated with, more or less peripneumony, pleurisy, and bronchitis; besides the diminution of the pulmonary tissue, so necessary to life, and the hectic wear of the constitution.

The above statement explains what will serve as a valuable means of diagnosis in this disease; its approach is gradual, inasmuch as the tubercles, which are the essence of the disease, grow as gradually and imperceptibly in the epithelium of the lungs as do warts on the cutaneous surface. Afterwards, as

they accumulate, they produce inconvenience, and some degree of cough; and becoming liquefied, they involve the surrounding tissue in their decomposition, occasioning the fever which necessarily accompanies inflammation in so vital a part,—and, by the consequent diminution of the function of respiration, and hectic fever, destroy life. This is the essential, unchangeable nature of the disease; all the other accompanying circumstances, which we find described, vary *ad infinitum* in phases and intensity.

With advancing disease there is a slight tickling cough, often said to be a nervous or unmeaning cough, as there is no expectoration, no sound of phlegm; it is not a loose cough—it is dry—conveying, alas, too much meaning to the suspecting practised ear. Why does consumption vary so much in its course and duration, from a few weeks to twenty years and longer? Because the number of tubercles may at first not exceed two or three dozen, or there may be several hundreds, or a mass of tubercular infiltration, producing rapidly fatal disease.

Why does spitting of blood, however slight, cause alarm and suspicion of consumption? Because experience records that it is one of the commonest early symptoms of the disease, produced sometimes when the tubercles, having "ripened," are bursting into the bronchial tubes, causing that breach of surface from which more or less blood escapes and is expectorated; and sometimes long previous to that stage, or to any cough having been noticed, from the mere congestion of the epithelial membrane caused by the tubercles. Up to this period there are but slight

symptoms; but about this time, either with or without the hæmoptysis, we perceive the slight flush of fever in the cheek, hot hands, and quickened pulse; but the pulse is seldom affected to the same degree as it is in idiopathic hæmoptysis with "pulmonary apoplexy."

The tubercles, forming generally somewhat in clusters, meet one another as they accumulate, so as to coalesce and form a conglomeration; so that when they soften and are expectorated, a space (cavity) is left in the lung, from which, according to the degree and duration of inflammation, a purulent, or muco-purulent, or merely mucous expectoration, is thrown off. The auscultatory symptoms are at the commencement scarcely perceptible, if the tubercles be few; if at all abundant, there is a diminution of the respiratory murmur, on account of their occupying the space which ought to be filled with air, there will be diminished resonance on percussion, and for the same reason the expiratory murmur will be prolonged. Subsequently there will be rhonchus sonorus, gravis, and sibilans, produced by the catarrhal state of the bronchial tubes; then, as soon as the tubercles produce inflammation and hectic, the crepitation of spots of pneumonia will be heard in addition; and there will be bronchophony in the parts where the lung is consolidated.

When the cavity has formed, if near the surface, or if solidified lung intervene, *tracheophony** and *tracheal* respiration will be heard, and a peculiar sharp click now and then, from the air passing

* "Tracheophony," equivalent to "pectoriloquy;" and "tracheal," the same as "cavernous" respiration.

through the fluid, and a bubble breaking in the cavity, besides the loud mucous or gurgling rhonchus; this sound, however, will not be constantly heard in the same place, as the cavity is sometimes quite emptied by the force of the cough.* The cavity in advanced stages of the disease may have become too large to produce those sounds,—then tracheophony is lost, and a reverberation only is heard, which is called "amphoric" respiration, as if the air were passing through a thin glass bottle; and sometimes, instead of the click of the small cavity, a sound is heard which is called metallic tinkling, louder and sharper, merely from the increase of the cavity modifying the sound. Percussion undergoes modifications at the same time, and the parts which were dull whilst solid have, when much evacuated, again a degree of resonance; but instead of the dull empty-cask sound of healthy lung, there are modifications in the sounds produced by the *form and density of the parietes* of the cavities, to which various names have been given, as "metallic," "tubular," "cracked pot"† sounds.

Sometimes, in this stage, the surface of the lung breaks, and allows the air and liquid contents of the tubercular part to escape into the cavity of the chest;

* This takes place where the cavity has been formed from a patch of tubercles conglomerated, but not where the cavity occurs in a mass of tubercular infiltration; for then the cavity is surrounded by too much solid matter to allow of compression during the act of coughing, so as to empty it,—and in these cases the cough is always more harassing, on account of the difficulty of expectoration.

† I must here again remind the reader that I intentionally omit minute, complicated, and fanciful explanations of phenomena not necessary to diagnosis.

the irritated pleura then throws out fluid, sometimes pus, and this state of affairs is called *pneumothorax* with empyema; there is then on percussion enormous (*amphoric* or *tympanitic*) resonance in the upper part of the chest where the air is, and dull sound at the lower part, corresponding to the fluid.

Now, as before mentioned, the tubercles at the commencement do not necessarily produce symptoms, any more than a chain of strumous knots on the lymphatics, which may frequently be felt in the side of the neck, but which produce no uneasiness, and are often reabsorbed without any remedy being used. We have no proof whatever that tubercles in the lungs are not reabsorbed, and doubtless they sometimes are; we can never be certain of the fact, as the difficulty that we have in ascertaining their existence in the early stage is very great,* unless they be so numerous that there remains little hope of recovery. Yet the progress of auscultation has been such, as to lead us to hope for still further additions to our means of diagnosis; and the more thorough knowledge we have of the nature of the disease, the better we shall be able to combat it. Hitherto the application of remedies in phthisis has been in most cases quite empirical, often inert, and sometimes mischievously active. The student must bear in mind that it is a disease of tremendous destructiveness, and that there are but few cases within the reach of art; but he should recollect that some are curable, at least for a time,—

* Dr. Andrew Clark has worked well and successfully at the pathology and diagnosis of phthisis.

otherwise he will lose that persevering energy which it is the duty of every medical man to exert as long as life remains: I do not say, as long as there is hope; for many patients recover from various diseases after all hopes have been relinquished.

Many years ago, a young married lady, who had had two children, came under my care with all the symptoms of confirmed consumption, cough, and muco-purulent expectoration. She had occasionally expectorated a little blood; there were night-sweats, hectic, and colliquative diarrhœa. I supported her strength with animal food and some fermented liquor, whenever she could bear it; prescribed gentle exercise in the open air, and free admission of air into her rooms; restrained the diarrhœa by catechu, logwood, and sometimes opiates; sometimes applied half a dozen leeches, and blisters, and gave digitalis for a few days when there was appearance of acute inflammation; sometimes gave bark and soda, sometimes quinine with diluted sulphuric acid, which restrained the *sweats*. Beyond my hopes, she got well, and continued so for about five years, having one child more during that time. I think that during the attack she had expectorated a crop of tubercles; but I cannot be certain, as it was previous to the practice of auscultation, or to this application of the microscope. However, after the five years, she had a renewal of all the symptoms; and I know that she had cavities in the lungs, as I then ascertained by auscultation that there was crepitation, pectoriloquy, and "cavernous respiration." From this she recovered again in about a year; and when she regained her strength, she had another child. Within two years

from her second recovery she had another return of the same symptoms, and died—the lungs, upon examination, being full of large cavities. The process of utero-gestation is said to suspend the progress of phthisis; but in this case the period occupied by one pregnancy bears a small proportion to the interval between the first and second attack.

Whoever understands the treatment of strumous cases has the groundwork of the treatment of phthisis, modifying that by calculating the nature of the organ (the lungs) in which the tubercular tumours are formed, and throughout making every effort to support the strength, not merely to preserve the vital powers, but for the purpose of promoting the kindly healing of the internal pulmonary sores; for we have abundant opportunities of seeing, in surgical cases, how rapidly strumous and other ulcers get worse as the patient becomes weaker. Hence one of the great difficulties in phthisis is, that the presence of the tubercles constantly brings on inflammation, which takes the form of peripneumony, or pleurisy, and requires antiphlogistic treatment; while the risk is, that in reducing the acute inflammation we weaken the power of the constitution, and so increase the chronic or strumoid disease. Here we have an explanation of the benefit experienced by some from the use of digitalis, or hydrocyanic acid, which keeps down the pulse and the acute inflammation, without wasting the vital fluid, or depressing the system, except in cases where it disagrees with the stomach, and then of course it does mischief by weakening. Because digitalis had proved palliative, it was recommended and used indiscriminately, as if

frequency of pulse were the essence of phthisis. Having been, however, employed empirically in so fatal a disease, it of course lost its character, except in the hands of those practitioners who could understand in what states it was occasionally beneficial, and who would limit its use to those; knowing that, in the cases of phthisis with a feeble pulse and no tendency to acute inflammatory action, it could do naught but harm. Again, the repetition of emetics in phthisis, as well as in surgical treatment of abscesses, has sometimes done good on a similar principle, by checking the deposition of new matter whilst nature removed the old. But the operation of emetics is so distressing, and the chances of curing phthisis are so doubtful, that few persons now prescribe this empirical mode of treatment, which was at one time much praised and resorted to in this disease, as well as in surgical practice for the removal of abscesses.

One great advantage of auscultation is that of enabling us to decide whether any cases of consumption have been cured or not. Previous to its discovery, if a case recovered, a doubt always existed whether the patient had been really consumptive; whilst all who died were put to the account of consumption, without any reserve. I may here recapitulate a few auscultatory observations, deduced from practice. If few miliary or even crude tubercles be deposited in the lung, no decided evidence is afforded by auscultation or percussion; if there are many, or if tubercular infiltration has taken place (and we may almost always expect to find them near the clavicles), there is diminution of respiratory murmur; and, from the solidification, more or less bronchial

respiration or bronchophony, and some diminution of sound on percussion, occur. Whereas, if the patient's cough be produced by catarrh, the sound on percussion will not be dull, and there will not be bronchophony: and if the murmur be diminished by emphysema, the sound from percussion will, on the contrary, be extra loud. In the progress of the disease there is no alteration in these auscultatory signs except augmentation, until the tubercular matter, having ripened, begins to make its way into the spongy texture of the lungs and bronchi, when a kind of crepitation is heard, being a mixture of rhonchus mucosus with the rhonchus crepitans, or what Laennec calls subcrepitans, and partaking more of the pure crepitation in proportion as, about this time, the lungs may become in a peripneumonic state just round the tubercles, or as the rhonchus mucosus may be mixed up with œdematous crepitation, when the consumption has brought on dropsical symptoms; besides which we find occasional admixture of rhonchus sonorus, gravis, or sibilans, which must not be confounded with the diagnostic signs, but which we need not here analyse. When the sounds cannot be satisfactorily heard during respiration, the patient must be made to cough, so as to remove any mucus which may obstruct the tubes, and prevent the real state from being heard. After the crepitation has lasted some time, we begin to perceive new sounds, according as the tubercles get cleared out; when cavities are quite empty, tracheal ("cavernous") respiration and tracheophony ("pectoriloquy") may be detected; and when they contain some soft tubercular matter, and pus or

mucus, we hear cavernous gurgling rhonchus. The sound from percussion at that period frequently alters, becoming sometimes louder again, in proportion to the degree of the hollowness from the excavations.

Tracheophony in any part of the chest is a certain evidence of the existence of an excavation; indeed, a cavity not larger than a nutmeg, or even less, produces tracheophony distinctly. Thus, in one interesting instance, not of phthisis, but of aneurism of the aorta, during examination of the chest, tracheophony was observed in one spot only, which was between the scapula and spine,—and this sometimes ceased to be discoverable for a day. After death, this was accounted for; it was found that disease of a vertebra, close to the head of a rib, had caused a small abscess, which, instead of pointing externally, had made its way into the lung, through which the pus was evacuated. This cyst, not so large as a nutmeg, gave tracheophony when empty; but when full of pus, as when the patient had been lying quiet, it of course transmitted no sound. On the other hand, there may be a cavity which does not give cavernous sound, as when there is a portion of sound lung intervening between it and the ear.

I must observe, that ordinary nosological symptoms are not sufficient to establish the existence of tubercular consumption; the whole train of symptoms may occur as the production of an ordinary cause, such as catching cold from wet feet, &c., producing peripneumony or pleurisy in the first instance; the sequelæ of either are, not unfrequently, hectic, with cough and expectoration,—the latter of

which might be so similar to phthisis, that, if it were alone considered, as in old times, it would be presumptive evidence of phthisis.

In phthisis, expectoration of blood would be by no means inconsistent with the supposition of the disease being only pleuritic in the first instance; and I must here take the opportunity of observing, that, though there are not many cases of phthisis in which there is not expectoration of blood at some period, still that many cases of hæmoptysis occur without being connected with tubercular disease, and more especially in females.

The heightened colour of the cheeks may not be found circumscribed in the forenoon, which is worthy of attention, as showing how perfect an intermission there may be, though the hectic fever be fully formed, producing hot dry skin and circumscribed hectic flush in the evening; followed by night-sweats, or rather morning-sweats,—for the phthisical patient is generally hot, dry, and restless till four or five o'clock, when sleep comes on, which soon terminates in an uncomfortable state of perspiration. The patient in phthisis, during the later stages, has usually an aphthous state of the mouth, the fauces being inclined to be sore, as well as the back of the tongue and epiglottis, with a whitish pellicle, the tongue florid and glazed, as if skinned; but neither this thrush nor night-sweats are diagnostic of tubercles, as they are met with in hectic from any cause—from dysentery, for instance, or from abscess in the liver or groin, psoas abscess, &c. But if, in addition to the preceding symptoms, we have the signs of true phthisis derived from auscultation, all

doubt will be removed, and we have only to trust to the means of supporting the strength and allaying morbid sensibility.

In various parts of both lungs, in cases of phthisis, there will generally be found tubercles in different progressive stages, explanatory of the symptoms noticed during lifetime; and also ulcerated appearances in the intestines at the termination of the ileum and about the sigmoid flexure of the colon, explanatory of the distressing ("colliquative") diarrhœa which commonly occurs in these cases in the later stages.

The thrush in the mouth (aphthæ) in phthisis is generally coeval with, and indicative of, an ulcerated, aphthous, or thrushy state of the bowels; but we must not imagine that aphthæ, especially in young persons, are always accompanied with ulceration of the bowels; for children have thrush very frequently when debilitated by diseases, as from teething or worms, which rapidly disappears when the cause is removed.

Before we possessed the means of diagnosis established by Laennec, some cases used to be thought "phthisis laryngea," on account of the loss of voice and incessant "laryngeal" cough, from the state of the glottis just alluded to—affording false hopes that counter-irritation on the throat might effect a cure. Formerly, many a case of phthisis used to get the name of a liver-cough—that is, when accompanied by a pain in the right hypochondrium, costiveness, and indigestion; but now the auscultatory symptoms tell too truly the real state of the lungs.

In many cases of phthisis, I may repeat, there

occurs the superaddition of peripneumony, pleurisy, hæmoptysis, or catarrh, or complications with disease of other viscera; and often dropsy comes on at the last, and hastens the fatal termination, or that pleuritic and purulent effusion into the chest which Laennec calls empyema. When there is hæmoptysis, peripneumony, or pleurisy, or any complication requiring antiphlogistic treatment, we must recollect the analogy between the phthisical and strumous constitutions, and save the strength of the patient as much as possible. I would advise the young practitioner not to bleed patients beyond what is absolutely necessary to check inflammations in any case, but more especially in those superadded inflammations which occur during the progress of tubercular phthisis. In peripneumonia or pleuritis with a consumptive habit, we must avoid the risk of knocking down the constitution; but formerly, when phthisis was considered to be the result of common inflammation, patients were bled injuriously.

One thing of which I am convinced is, that the true principle of treating consumption is to support the patient's strength to the utmost; and that though *occasional complications* may call for antiphlogistic treatment, *tubercular disease by itself* does not. I must again caution young practitioners against shutting up phthisical patients in warm rooms. I am satisfied that the want of exercise induces a languor which makes them wear out faster than if permitted to ride or walk, according to their strength, in the open air. At every exacerbation of their complaint, phthisical patients say they have "caught fresh cold;" but the same

thing occurs when the experiment is tried of keeping them in rooms graduated by a thermometer. A mild climate is palliative, by permitting more free exercise in the open air: but when we look at the specimens in our museums, we may judge whether a warm climate could regenerate such lungs.

The question remains undecided whether a warm climate can control tubercles of the lungs. Upon the analogy with struma, we might infer that it can; but we must recollect that, notwithstanding their close analogy and relationship, the diseases are not identical. Tubercular disease, though it be not scrofula, bears a strong analogy to it, in its development being spontaneous, and independent of common inflammation; it is also analogous to various chronic eruptions of the skin. I have had several strumous patients under my care, more or less constantly, for from twenty to thirty years, who have had at various times the general symptoms of tubercular phthisis, cough, profuse expectoration, hectic, diarrhœa, &c.; some still alive, others who died, but not of tubercles. On the other hand, there are abundant cases of tubercular phthisis which exhibit no strumous symptom as to constitutional appearance or disease. I have shown that the medicinal and dietetic treatment which suits strumous is the best for phthisical cases, and there is no doubt that delicate strumous patients are much benefited by change of climate to Italy, or the south of France; and that scrofula increases as we go into cold, damp regions, and decreases as we go south; hence we might infer that a mild climate may

favour the general health of delicate persons, so as to retard or prevent the incipient stage, or formation of tubercles: whilst, on the other hand, we must confess that consumption occurs in some most robust, previously healthy individuals, who evinced no necessity for any such precaution; the only thing is, that the inhabitants of the milder regions suffer less from consumption. Yet few persons can submit to the inconvenience and expense of taking their children to the Continent as a matter of precaution, which may after all, when it has been resorted to, have been unnecessary; as there are numbers of delicate persons who never become consumptive, and numbers of robust ones who do. When unequivocal symptoms of tubercles set in, it is too late; and, besides, we see that such cases may rally in this climate (p. 623).

In my opinion, the advantage of breathing warm air is very much overrated. We uniformly see that real consumption (tubercular) runs its course rapidly in Italy, or in any warmer climate; such, at least, is the result of my observation.* A deception has arisen in consequence of persons not really consumptive, but affected with severe chronic catarrh or bronchitis, having been sent into warm climates, who, from the comparatively trifling nature of their disease, have returned cured, or at least not worse. In some of these cases, erroneously called phthisis, the progress of the disease is said to have been checked by the influence of the milder climate. This popular prejudice has still, however, a strong

* I am confirmed in this opinion by the experience of Andral.

hold on the minds of men, and even auscultation has not yet corrected it.

It is generally very unnecessary, and worse than useless, to send patients away from their friends, which is often done at an enormous inconvenience. If they are consumptive, they will thus die in exile; and if not, they may be cured at home. Of the first it is unnecessary to give examples—there are abundant marble records in the neighbourhood of Leghorn, in the West Indies, and in Madeira. A case will explain more fully what I mean by the second. A young gentleman was condemned, by high medical authority, to banishment to Madeira, as "nothing else could save him;" but to this some strong objections existed. First, he was engaged to be married; secondly, his partnership in a valuable business, which depended much on his personal superintendence: a reconsideration of his case was therefore moved for, and my opinion requested as umpire. I decided that it was mere chronic catarrh in a relaxed constitution; that some tonic, such as iron or bark, with animal food and fermented liquor, was alone necessary; but, above all, exercise on horseback in the *cool* open air. Under this treatment he recovered within a month, and is now the father of a family—in this edition, I may say grandfather.

The case of another patient, who, after having been sent to the West Indies for incipient consumption, as it was called, had returned in good health, was triumphantly adduced to me as opposed to my opinion (as the last-mentioned case would have been, had the patient exiled himself as at first re-

commended). In the following January, however, I was again consulted, in consequence, as it was said, of the consumptive symptoms having returned. I found the patient shut up in a warm room, dieted and physicked, and waiting for a vessel, intending to sail again to a warm climate, at a great inconvenience as to family affairs, &c. I prescribed the same remedies as in the former case, and insisted upon walking exercise in the open air being commenced, even at that time of year. The patient was free from cough in about ten days, and has so continued for many (now twenty) years. I must observe, that auscultation alone did not decide me in either of these cases: they had both been previously seen by practised auscultators. Though a warm advocate for auscultation, I am aware that, besides the injurious and absurd affectation of some who are really practically ignorant of it, pretending to understand its employment, there are others who place too much reliance on it for diagnosis, omitting the consideration of the collateral constitutional symptoms.

Now, is consumption curable? Decidedly so, for a time (but—*Naturam expellas furcâ, tamen usque recurret*): thus it is very seldom that there are but a dozen or two, or even a hundred or two, of tubercles; but if that be all, when they are expectorated, the patient gets well, and remains so until after a year or two, or more, when a fresh crop forms; if these be not too numerous, the patient may recover again and again, as in the strongly marked case which is detailed above (p. 623), where the patient survived nine years after the first attack of "con-

firmed consumption," having been twice during that time, at intervals of two or three years, at the point of death, and having recovered each time to a state of comparative health. Again, another mode in which life is prolonged, is by one side of the lungs remaining sound: thus, when I was a student, a friend of mine was declared to be consumptive, and within six months of his death, by one of the most talented physicians in London; he got better, however, though always coughing, and went abroad, through various vicissitudes of climate, for three or four years, actively employed in business; returned to London, led an active life, consumptive all the time, and was under my surveillance for twenty years; he at last died of consumption, though a long time about it. The treatment was merely palliative —expectorant pills, and abundant diet, animal food, wine, and other fermented liquor, to keep up his strength, exercise in the open air, and occasionally tonics. One lung was nearly sound when he died, the whole of the other consumed away, so that that side of the chest was as empty as an egg-shell.

Another patient of mine had consumption sixteen years ago, is still thin and consumptive, though active, but will possibly live as long as myself; and I have several friends whose cases I contemplate with some degree of anxiety, though now apparently in good health, on account of suspicious attacks from which they have recovered.

In former times the opinions respecting consumption were highly erroneous. I can recollect when it was considered a disease of common inflammation, and the tubercles as the "*result* of inflam-

mation in a peculiar tissue," and when the greatest anxiety was felt as to the discovery of *pus* (p. 618) in the expectoration, as a diagnostic symptom. Referring to the above plain, condensed statement, we can recognise the absurdities retailed in works on the practice of medicine, and the erroneous assertions in memoirs, as to the origin of cases of consumption, such as from catching cold; from over-exerting the voice or chest in singing, flute-playing, &c.; the dust from various trades, which, though it may produce chronic catarrh, or even fatal bronchitis, will never directly cause tubercular consumption.

From misconception of the nature of consumption, much stress was formerly laid upon the nature of the expectoration, as to whether it was purulent or not, it being supposed that consumption was an inflammatory ulceration in the lungs; whereas, as above stated (p. 620), the expectoration from the lining of consumptive cavities and bronchi is frequently mucous, without pus; whilst, on the other hand, in cases of chronic bronchitis, not consumption, we may have pus secreted and expectorated. I can recollect, as a junior, in consultation with Dr. Baillie and men of his day, the careful search which was made for pus, as a diagnostic appearance; whereas men of equal skill now have learned that it is worthless towards discrimination, *and that its absence is no security.*

The slow advances of the disease, and the constitutional symptoms,* will afford diagnosis even

* Above all, the pulse: if the pulse does not exceed 72, I could almost guarantee that tubercular disease does not exist;

where we have scarcely any auscultatory signs. It is in other diseases of the lungs, above discussed, and in the diseases of the heart, that auscultation is indispensable and invaluable, simple and certain,—and especially in the latter, to those who know the real nature of the sounds of the valves.

The progress of the symptoms of consumption varies in individual cases, but the symptoms are all reconcilable with the above concise statement of its nature, the duration of the disease being generally directly influenced by the quantity of tubercles. Some patients suffer more, some less, just as the inflammation produced occurs in a more or less sensitive part. For instance, when the ripening and bursting tubercles are on the interior of the lung, the pain is the dull pain of pneumonia; when on the surface, there are the acute pains and stitches of pleurisy, for the relief of which the older physicians used to bleed, with leeches or otherwise, to a most exhausting degree, without bettering the patient. Under such circumstances, relief must be obtained by opiates, and various external applications, to palliate the symptoms, until the tubercular disease of that spot has run its course,—for run its course it must; and all we can do is to assist nature to bear up against it. The pleurisy thus produced may possibly run so high as to require an active antiphlogistic treatment; but we must recollect how much in consumptive pleurisy the strength of the patient ought to be saved; and the acetate of morphia, or other opiate, will do more towards allaying the inflammation

and, from long experience, I consider 84 the most suspicious number that occurs, if permanent.

than general or local bleeding, especially if combined with antimony or ipecacuanha, and constant application of moist spongiopile or poultice. Antimony is preferable in the acute or subacute exacerbations, but morphia or opium, in some shape, is indispensable in consumption, to allay the cough; for in the common chronic form it saves the patient from the fatigue of loss of rest; and in the acute state, it must be evident of how much consequence it is to save the inflamed parts from the constant concussion of the cough. Morphia is a direct, and in free doses an active, antiphlogistic, besides being anodyne; so that no combination is so efficacious against acute inflammation as the combination of it with antimony: four parts of acetate of morphia with one part of antimonii potassio-tart. in solution, and given freely every two or three hours, or every hour at first.

In the ordinary unpainful state of consumption, the most convenient and useful medicine is equal parts of pulv. ipecac. co. and pil. scillæ co., made into five-grain pills, one to be taken at the intervals of every eighth hour, or, according to the degree of cough, every sixth or every fourth hour. This is to allay the catarrhal or chronic bronchitic state of the lung induced by the tubercle; just as the same medicine is most efficacious in common catarrh or chronic bronchitis. If the pulv. ipecac. co. confines the bowels, one-sixth part of the pil. scillæ may be withdrawn, and an equivalent portion of aloes, pil. rhei. co., or other laxative, substituted to counteract that inconvenience.

The patient's strength ought to be supported, as

in other chronic exhausting diseases; the difficulty in the way of practitioners having always been, that the lung being the part affected, the animal food and fermented liquor, which are so necessary in this, as in scrofulous cases, seemed contra-indicated, though absolutely necessary to support the strength; and, in general, it will be found that the patient will cough just as much, and die as soon, if half-starved; being weakened, of course, all the quicker. The same observation may be made as to tonics, which are as necessary as in scrofula; but so many think that quinine and other tonics tend to increase inflammation,—which I think I have proved elsewhere (p. 145 *et seq.*) that they do not,—that they fear to support the patient's strength by their means.

Inasmuch as we have as yet discovered no remedy for tubercle, we can only support nature through the progress of it, as we do with strumous tumours. It is a disease which has always afforded a harvest to quacks and to quackish regular practitioners, whether they have been knaves or fools. Some infatuated persons have thought they could cure it, because they did not understand the difference between it and inflammation, and indulged in other misconceptions. Every new agent and new medicine has had its turn in disappointing the world in this *opprobrium medicorum*: Beddoes was sanguine that by inhalation of oxygen gas the disease might be modified; Darwin was sanguine as to the effect of digitalis, because it could make the pulse slower: but retarding the pulse did not retard the disease, any more than does the use of cod-liver oil. It is essential to the disease that the pulse is quick, but making it slower

does not touch the tubercles; it is essential to the disease that the patient wastes away, but putting fat on his outside by means of cod-liver oil* does not

* Cod-liver oil has the peculiarity of fattening the human species, as oil-cake does brutes; and, by affording this kind of nourishment, improves the appearance of strumous children, more especially when they have no appetite for food,—and it is really useful, as the nourishment it affords assists in the formation of healthy pus-globules, which are deficient in the thin discharges of strumous disease; but as these discharges do not exist in phthisis, the oil is neither required nor useful. Cases of chronic bronchitis, with debility, resembling consumption, have given a false *éclat* to the remedy on that score.

A few years since I was called in consultation by a highly intelligent medical friend, on the case of a boy, whose parents were apprehensive of his being in a consumption, on account of constant cough (chronic bronchitis) and emaciation from weak digestion; in fact, all his mucous membranes out of order, with a tendency to struma from weakness. He improved slowly under treatment; but a non-medical friend recommended cod-liver oil, and the proper medicines were discontinued, notwithstanding the exhortations of the medical adviser still attending other members of the family. The youth got a little plumper, or rather less emaciated, the cough continuing from neglect; for the minds of the affectionate though ill-judging parents, being relieved from the fear of consumptive death, could not be persuaded of the fallibility of the oil; but the boy being disgusted with it, *usque ad nauseam*, would not take any more, so grew thinner again. After a while, by coaxing, they induced him to take it again; then his cheeks filled up a little; but he was as "weak on his pins" as ever, and coughing away: tired again of the oil—thin again; and with this alternation the infatuated, indulgent parents will perhaps persevere, and the youth grow up into a weak, wheezy adult, despite the remonstrances of their medical friend, from want of proper medicines, which might have been assisted by the oil.

Now, though I do not attribute anti-tubercular powers to cod-liver oil, I concede what it deserves in struma; and it is

touch the tubercles, or restore the disorganised lung, though it nourishes like other oleaginous articles of diet, and gives false hopes to the friends of the patient, who does not live five minutes longer than if he had not taken it. Digitalis is useful in dropsy and other diseases, and cod-liver oil is useful in struma, &c.; but neither of them can cure consumption. Poor St. John Long was an ignorant enthusiast, who thought he could do good in consumption by violent counter-irritation, and he died in his faith—or superstition; for he applied his own treatment to his own back when he was dying of the disease.

Nothing can be more variable than the progress of this disease: some patients gradually waste away and sink into the tomb with comparatively little distress, whilst the sufferings of others are severe, and from different causes; some have repetition of severe pleuritic pains; some suffer much from difficulty of breathing, whilst others have scarcely any feeling of dyspnœa; sometimes the cough is harassing, whilst others seem scarcely conscious of the frequent hacking, which it is painful to hear. The reasons for these differences have been stated above. Great variations take place also in the same individual; the cough, which has been troublesome, with difficult expectoration, up to the time that cavities are formed, will now frequently become looser, and the expectoration easier, from the greater compressibility of the parts.

useful in other diseases from its non-nitrogenous nature, as in rheumatic affections: in fact, it was used empirically by our Newfoundland fishermen long ago as an antidote to the rheumatism and scorbutic pains induced by climate and diet.

Some patients have the appetite, digestion, and other functions deranged, which often led formerly to a fallacious opinion or hope that the cough might be a "stomach-cough," or a nervous or hysteric cough; but in other instances the appetite and digestion may continue unimpaired up to an advanced stage of the disease,—and it is, in fact, a diagnostic symptom, if wasting advances though sufficient food be taken and digested—the red sediment in the urine, however, showing a deficiency of the assimilating power. One of the most common causes of distress in the disease is the diarrhœa which sets in at the advanced stages, and which is caused by an eruption of tubercles taking place in the epithelial membrane of the intestinal canal, similar to that in the epithelial membrane of the bronchi, and which runs a similar course, producing spots of ulceration which harass the patient with diarrhœa and sometimes dysenteric symptoms; and it is well known that fistula is not an uncommon complication, earlier or later. Astringents, such as kino, logwood, lead, silver, &c., with opium, palliate these symptoms. The membrane of the glottis and epiglottis not unfrequently becomes ulcerated, simultaneously with aphthæ,—causing great distress, pain, and loss of voice; in which case, in the advanced stage, liquids cannot be swallowed, but are rejected through the nose.

I have seen many cases which assumed the character of phthisis, and which would have afforded opportunities to those who either did not exactly understand, or wished to deceive, to quote them as examples of phthisis cured. For instance, in a case of neglected pleuro-peripneumony, the general symptoms

were cough, muco-purulent expectoration, hectic fever, and emaciation; the physical signs, bronchophony, mucous *râles*, crepitation, and dulness on percussion. *Perfect rest*, gentle counter-irritation of the side, the expectorant pills mentioned above, and abundant nourishment, cured the patient in a few months; and I have met with several cases exactly resembling this.* Again, the patient alluded to above (p. 604), during one severe attack, had such intense congestion (*engouement*) of the upper part of the right lung, that it produced dulness on percussion, and bronchial respiration to so great an extent that a medical friend, a most expert auscultator, to whom I showed the case, coupling the symptoms with the primary chronic disease, could not believe that there was not a tubercular mass existing; and yet within six weeks I showed the patient to him again with a complete clearing off of these alarming symptoms. Of course, I take no credit to myself for diagnosis in this instance, having previously watched the case; I mention it merely to show how difficult it sometimes is to give a decided prognosis on the single examination of a patient.† I may just mention one kind of cough

* See also p. 565, pleuritic disease simulating phthisis.

† Such cases as above related occur not unfrequently to every person in extensive practice; and, as there seen, these are not to be distinguished from phthisis on a single examination, even by experienced auscultators. Besides what I have stated here, I may add the testimony of my late colleague Dr. Thomas Davies, who saw more of phthisis than any physician of London in his time. He has told me of cases which had surprised him by perfect recovery, he having been consulted only once for his opinion; and he had considered them tuberculous upon the single examination, though he was too cautious to commit him-

which it is difficult—if, indeed, it be possible—to distinguish from the cough of incipient consumption: this is the short, dry cough of hysteria, which is a modification of globus hystericus; and I have known many cases of chronic bronchitis so aggravated by hysteric complication, as to give rise to suspicion of phthisis, slight hæmoptysis even having taken place, or sometimes vicarious catamenia, not slight;* but curable by the treatment applicable to the primary disease.

self by giving an unguarded diagnosis: these are very apropos cases for those who wish to make out that cod-liver oil or any thing else can cure or "arrest" real tubercular phthisis. I have shown that cases of *real* phthisis recover temporarily under *ordinary treatment*, and have seen that those real cases, and the other mentioned unreal cases, have given a temporary *éclat*, during my recollection, to inhalation of gases and of tar-vapour, to respirators, probangs, to St. John Long and Prince Hohenlohe, to tar-water, digitalis, white mustard-seed, prussic acid, cod-liver oil, and sulphur, as remedies for consumption. Faith is a wonderful thing: it can "remove mountains," but not tubercles.

* In this work my object is to give generally useful information, rather than rare and curious cases, though I have abundance of them to record, which may not occur to any man twice in his lifetime. These curiosities, which students are always running after, afford but little practical information. I may mention, however, a couple of cases of strumoid tumours in the chest, like enlarged glands, of a substance resembling pancreas, giving symptoms of phthisis (though not phthisis), all except perfect pectoriloquy, but strong bronchophony by their solid interposition. In one of these cases death was caused by another disease; one of them proved fatal, rather from the enormous bulk of the tumours, encroaching on the thoracic viscera, than from any inflammatory or malignant disease: one of the masses was five inches in diameter. Another similar case, which has deceived several practitioners, I have still under surveillance, enjoying tolerably good health, and robust.

With respect to *idiopathic hæmoptysis*, Laennec gave it a name which, however it may be objected to, served at least as a marked distinction from the phthisical hæmoptysis: he called it *apoplexy of the lungs*. This sometimes arises from an accident, such as a severe blow on the chest, or from a spot of inflammatory disease causing the vessels to pour out blood, —and this blood diffuses itself into a greater or less portion of the lung, besides what escapes and is spit up. In these cases there is crepitation as in peripneumonia and in peripneumonia notha, and more or less dulness on percussion, in some instances very considerable. Three old medical friends of mine lived for respectively fifteen, twenty-five, and forty years, after an occurrence, or rather repeated attacks, of this kind; a relation, who died at the age of seventy, had had slight hæmoptysis at intervals of from three to seven years during his whole life, after the age of seventeen; yet not one of these persons was phthisical. I know several others living who have had severe spitting of blood, and yet are not consumptive.

Hæmoptysis frequently arises in consequence of disease of the heart, when there is congestion of lung produced either by obstructive valvular disease, or when a weak heart has not power to send forward the blood, the result being in either case accumulation of the fluid which ought to pass forward.

The treatment of hæmoptysis is perfectly simple: entire and absolute repose in a reclining, not quite horizontal position, not to speak, to drink freely of "mineral lemonade," which is made with water, sugar, lemon-peel, and diluted sulphuric acid instead of lemon-juice; and if there be much cough, to allay

it with morphia. If the patient be plethoric, or if there be pain or hardness of pulse, or at any rate if the hæmorrhage be obstinate, venesection or leeches, followed by a large tepid poultice to the chest, is necessary: a poultice to the chest is most useful, as in all cases of inflammation therein. As above stated, Laennec called this disease apoplexy of the lungs, from the clots of blood found in fatal cases, resembling the clots found on the brain in fatal cases of apoplexy: the name may be criticised, but is very expressive.

Acute inflammation of the LIVER, as described by Dr. James Johnson, Sir Ranald Martin, and others, though so frequent and well known in hot climates, is very rare in this country, but not the less dangerous when it occurs. Here it is induced, like peritonitis, by the opposite cause of a severe chill; and it has been known to be so violent and rapid in its progress as sometimes to destroy life on the third day,—in which case the liver was found so disorganised as to be in parts "soft as a poultice."

The treatment in these cases must be actively antiphlogistic, and it is one of the diseases wherein, even at the present day, leeches or V.S. would be considered admissible, besides calomel, saline antimonial medicine, and acetate of morphia.

Cases of CHRONIC HEPATITIS are but too abundant in this country,—some being secondary, the sequel of previous inflammation in warm climates, not from simple caloric, but malaria; and also a great number originating here,—some from intemperance, some from malaria, as in Lincolnshire and other aguish

districts: indeed, when not produced by abuse of alcoholic liquors, they are almost universally to be traced to neuralgic or aguish intermittent or remittent disease.

When the liver takes on inflammatory disease, there is an altered, deteriorated metamorphosis. We may state the result under three heads: the first, acute, when—the nervous power having been reduced through intemperance, excessive heat or cold, or malarious, aguish poisons—hyperæmic *engouement*=swollen congestion of blood, and unhealthy cells, constitute the altered tissue. The *post-mortem* appearance in this stage is similar to that of inflamed lung—swollen, purple-red, and softened.

If the patient does not die in this state, the *engouement* gradually subsides, and the liver, like a lung, may sometimes be cured and restored to nearly its original natural structure and appearance. More frequently, however, a degree of imperfection remains, and a portion of the interlobular areolar tissue, which had been hyperæmic, though not destroyed, remains thickened, and paler than it was originally; and this, being alternately mixed with the still vascular lobular parenchyma, causes that mottled admixture of dark and light, like a cut nutmeg, which is called cirrhosis.

The liver, under these circumstances, is found of various shades and sizes; but eventually a third phase takes place. The damaged secreting tissue—its bile-cells being obliterated, as shown by Dr. Lionel Beale—has a tendency to contract; and, by degrees, there is a preponderance of light-coloured nutmeg appearance, and the *bulk* (unless kept up by deposit

of fat) of the liver itself diminishes, and it becomes at the same time harder,—not the schirrhus of incipient cancer, but merely hard like it; and at this stage the secretion of the liver gradually falls off, in consequence of the diminution of its secreting structure. The first hyperæmic swollen state, with fever (which in the East Indies, and other hot climates, they call "having the liver;" and which also occurs, with less urgent symptoms, in Lincolnshire and other aguish districts), produces pyrexia, pain, short breathing, and other distressing symptoms, and is to be combated by antiphlogistics, in addition to whatever treatment may be required for evident or latent aguish or old malarial disease, such as quinine and arsenic, or mercury—more especially liquor arsenicalis in judicious doses, from two to five minims three times in the twenty-four hours.

The state of cirrhosis produces less palpable symptoms, and requires less active treatment, though generally rendering the patient incapable of active pursuits, in consequence of debility, anorexia, more or less dyspnœa, often *cough*, indigestion, dysentery, and a host of minor complaints which accompany it. It is incurable, but susceptible of much relief by the judicious use of mercury, arsenic, quinine, and nitro-hydrochloric acid, for the liver; bismuth, or oxide of silver, for the stomach; chalk-mixture, or log-wood, for the bowels; and in all cases a moderate allowance of wine. Whilst the liver is in the transition-state, still swelled, the Cheltenham or Carlsbad waters, and other Continental purgative saline springs, are generally beneficial.

Inflammation of the liver sometimes ends in

abscess, which points and breaks, or is opened, and the patient recovers: which cases occur, not unfrequently, both in hospitals and in private practice; or there may be a number of small abscesses, which do not point, but gradually destroy life. The abscess, sometimes, instead of pointing externally, makes its way, by contiguous and continuous inflammation and adhesions, and ulceration, into some part of the intestine, or the stomach, or through the diaphragm, and into the lungs,—and so the pus escapes by expectoration. I have seen the abscess point both ways, —externally, and through the lungs,—so that pus was discharged at the side and by expectoration at the same time. In one instance, where the abscess had been caused by hydatids, dead hydatids were discharged both ways. If the abscess bursts into the cavity of the peritoneum, it produces peritonitis and death.

It would appear that nitro-hydrochloric acid, either taken as medicine, or absorbed from a bath, has an action similar to mercury and arsenic, in diminishing the morbid deposit of imperfect metamorphic cells in the glandular parenchyma, whereupon the previous deposit is absorbed, and thus congestion is diminished, and secretion restored.

The enlarged liver of hot climates is not, like that of the Strasbourg goose, merely congestion caused by excessive caloric, but a sub-inflammatory swelling—tissue altered by the defective metamorphosis of malarious disease.

Disease of the valves of the heart produces congestion of the liver; but I should doubt its ever causing inflammation.

JAUNDICE is produced by whatever obstructs the

passage of the bile through its ducts, small or large; whereupon it escapes by exosmose into the absorbents and blood-vessels, to be diffused by circulation, and so tinge the skin yellow. This in itself is of very little consequence, as it passes away when the obstruction is removed; but when it is permanent, it is an evidence that the mischief which produced it is permanent also,—and so far, combined with old liver-disease, it is a disagreeable symptom. There occur a few cases of sudden (generally transitory) jaundice, produced by gall-stones in the ductus communis, with or without the usual symptoms of gall-stones; and these, if they do not give way to morphia, may be generally cured by emetics, which dislodge the calculus. In no other case is jaundice to be attended to, except as a symptom of, and depending upon, liver-disease, and, so far, not requiring special treatment for itself.

There is jaundice colour under all circumstances where the liver is so congested or inflamed that the bile cannot pass into the deferent ducts, and is therefore carried by the absorbents into the circulation, as in the yellow fevers of hot climates, in hepatitis, cirrhosis, or schirrhus.

GALL-STONES, impacted in the ductus communis, though not dangerous, are extremely annoying, painful, and inconvenient,—it may be, just as a person is prepared to enjoy himself in an excursion or a dinner-party. A great deal of unnecessary, though *secundum artem*, trouble is taken frequently by the doctor to give imaginary solvents, which do not tell upon the offender; and sometimes, during the paroxysm, useless means are taken, such as leeches,

fomentations, and even hot baths—the one thing needful, when a paroxysm comes on, being opium, as in the following case:

A lady, the wife of a physician, whom I saw in consequence of his being out of town, had suffered for years paroxysmal returns of pain, evidently from gall-stone, as at the present attack, with the peculiar pathognomonic symptom of slow pulse (under sixty), though the pain was agonising. I gave a grain of acetate of morphia. She soon fell asleep, and awoke free from pain, which has never returned since—now seven years. We have neither heard nor seen any thing more of the gall-stone. We did not catch it, as it was not worth while to worry the patient with purgatives to search for it, and it passed, of course, unobserved with solid fæces. Whether *post hoc* or *propter hoc*, she was cured, and much improved in appearance and health. An emetic will frequently dislodge a gall-stone which is causing jaundice.

The SPLEEN, being merely a vascular diverticulum subservient to the circulation in the stomach and liver, has nothing to do with secretion, and very little with pathology (see p. 87). It becomes congested in aguish disease, and is cured by quinine, or by whatever treatment cures the primary malady, though it sometimes remains permanently swollen and inconvenient.

The STOMACH (ventriculus) is not liable to acute gastritis (idiopathic inflammation), as it occurs there only in consequence of some damage by poisonous chemical agency, such as concentrated

mineral acids or alkalies, or oxalic or arsenious acid, taken by suicides, or by accident, such as the swallowing a liniment by mistake, containing ammonia, cantharides, or other acrid matter; or of injury by medicines, such as colchicum, iodine, arsenic, or nitre, in improper doses: from all which circumstances gastritis has been known to arise. In such cases, after using the various usual means of washing out or neutralising the poison, the only thing to be depended upon is laudanum or morphia, given profusely, so as to allay the morbid sensibility of the damaged peripheral nerves.

Gout in the stomach, as before referred to at p. 345, is not inflammation, but neuralgia.

Chronic gastritis can scarcely be said to exist, except in those rare malignant diseases of the glandular structure which are difficult to be ascertained, are incurable, and can only be alleviated by opiates.

But there is chronic morbid sensibility, short of inflammation, with distressing indigestion,—that is, real indigestion by the stomach. There are various pains and discomforts of the intestines called indigestion, but they are from different sources.

There are two principal causes of INDIGESTION: the morbid sensibility of the nerves, and a deficient secretion of pepsine, which occurs at all ages, from want of tone in the organ, and which may be cured by a variety of tonics, according as the practitioner discovers the origin,—as, for instance, in pale, delicate subjects, iron, or iron and quinine, may be given; or small doses of arsenic, or mercury, or oxide of silver, which is most valuable where there is an evident prostrate cachectic

anorexia; but, as a general remedy for dyspepsia, there is no medicine to be compared with nitrate of bismuth. The smallest quantity which is beneficial is ten grains—generally twenty,* and frequently thirty—three times a day. Although a most efficient remedy, it is perfectly harmless. I have had patients taking thirty grains three times a day for various periods,—from three months to nine, and longer,—in whom it eventually restored secretion, and conquered the morbid sensibility of the organ. I had one very interesting case of this kind. A gentleman consulted me as to the possibility of his being able to leave off the bad habit of taking opium, which his friends and medical advisers wished him to do. I found that he had taken one grain three times a day, to relieve dyspeptic morbid sensibility of the stomach. I therefore told him not to leave it off until I could cure his indigestion, which I did by bismuth. I began with twenty grains three times a day, but soon increased it to thirty. The case was rather obstinate, but after seven months he was able to leave off the opium; and I made him take the bismuth two months longer, to prevent relapse. According to my experience, the old-fashioned bitters of quassia, gentian, &c., do little, if any, good. Sometimes infusion of cascarilla, with compound tincture of cardamoms, promotes appetite.

In treating this subject of DYSPEPSIA, we must start from a physiological point. The office of the stomach is to make chyme,—this is the true meaning of *assimilation*,—to convert food—whether ani-

* My ordinary dose for out-patients of the hospital, twenty grains three times a day.

mal or vegetable—into a material so *similar* to the general mass of the body, that, in the various parts to which it is circulated, it may in each be metamorphosed by the nerves, influencing the affinities of each,—O.H.N. and C.,—into the special constituent of the part. It has been said, that digestion is only commenced in the stomach, and completed in the intestinal canal: this, as to apparent phenomena, is true, but is not essentially the fact; which is, that digestion and assimilation—*i. e.* the formation, by means of pepsine, of that material, chyme, essential to nourishment—belong to the stomach alone. For though mastication and chylification are associated for nourishing, life can nevertheless be carried on —though unsatisfactorily—without either. It is scarcely necessary to tell any experienced practical man that, however useful masticatory grinding and the mixture of saliva with the food may be (subservient to digestion), they are yet occasionally withheld, without fatal result. Then, as to the separation and perfecting the essential element chyme, when it takes the name of chyle (page 5), this is effected by the bile; and it is not necessary to give proofs that life can be carried on without any bile passing through the intestines. As to the pancreatic juice, that, like the saliva, is merely the admixture of a suitable animalised fluid, for the purpose of mechanically aiding in the transmission of the chyme, and, together with the mucus of the intestines, promoting defecation and excretion. Digestion, formation of chyme, therefore, belongs essentially to the ventriculus: Q.E.D.

As to that mysterious dissolver of food, *pepsine*,—which sometimes dissolves part of the dead

stomach itself,—it has been thought that it has a power of acting even on the living stomach. But, without evading the question by falling back upon the "fitness of things," it is clear that, whilst the stomach is alive, its nerve-power preserves its organisation, unless inflamed; and a healthy stomach is perfectly invulnerable by the gastric juice: of this there is abundant evidence, in frequent *post-mortem* examinations, in which we do not find the mucous membrane in any degree softened, except in the neighbourhood, or on the edges, of chronic inflammation of malignant or other ulcers; or in cases when inflammation has been set up by acrid poison.

We may conclude that the one thing needful, in a normally healthy stomach, is the pepsinised gastric juice secreted by its glands, which has the power of assimilating (animalising) the ingesta. It has at the same time the peculiar—and, as yet, unaccountable—property of preventing fermentation, and has evidently, like chlorine, a strong affinity for hydrogen; for when semi-putrid matter, such as high game, is put into the stomach, it evidently decomposes the carburetted or phosphuretted hydrogen, and removes the fœtor; but in a weak stomach, deficient in power of secreting pepsine, the food begins to ferment, instead of digesting, and there is a more or less rapid evolution of gas, producing eructation, sometimes pain, sometimes nausea, and even vomiting. This is the only real dyspepsia (morbus ventriculi). These symptoms of pain and nausea may also proceed from cancerous diseases of the glands or epithelial membrane of the stomach (such as Napoleon I. died

of), which, at first, produce symptoms equivalent to dyspepsia.

The appetite, as may be supposed, is very variable under these states of disease. The natural appetite we may consider as proceeding from the excitement of the healthy accumulation of pepsine, preparatory to a meal; if, then, that be deficient, there will be want of appetite (*anorexia*); and if, under the influence of wine or bitter medicines, a false appetite be induced, the above symptoms of indigestion will take place. I may here mention that I have long since—unless under peculiar circumstances—abandoned the use of the common bitters—quassia, cascarilla, gentian, &c.—for quinine; but to remedy this state of anorexia and indigestion, nitrate of bismuth and oxide of silver, or preparations of iron, are the most useful medicines. Bismuth should be given first; and if inefficient in doses of from ten to thirty grains, quarter-grain doses of oxide of silver will generally be found efficient, if the disease be simple dyspepsia ventriculi, and not organic disease of the glandular tissues. It is better to commence with bismuth; for oxide of silver, even in minute doses, is sometimes too active to begin with, as illustrated at page 335; see also page 205, for the application of tonics to dyspepsia.

Prescribing pepsine-pills for indigestion is mere placebo patchwork, which does not strike at the root of the disease. It is, besides, rather a nasty idea, that a man should borrow the contents of a pig's stomach to help to digest the food which his own stomach ought to be able to dispose of without such assistance. The lower classes do not suffer from dyspepsia, if they

are not intemperate in drink, nor too poor to obtain good food: neither would the rich, if they consumed only enough of good, wholesome* food. But when dishes are offered in the succession of a long *carte* (each, by the deleterious skill of the *chef*, more appetising than the preceding), followed by a variety of fermented liquors, the stomach is goaded on, until, reckless of its own capability, it becomes, not an organised stomach, but a pouch full of rubbish which cannot be digested, but must be passed on in an unnatural state, for the intestines to dispose of it as best they can. Under these circumstances, is it any wonder that the individual is bilious? But what is bilious? does it mean too much bile, or too little? I have never met with a bilious patient who could tell what that convenient phrase means; but I can. His liver has contracted to supply enough bile for ordinary consumption, but not for three times as much; so that the bile is not *plus*, but *minus*. But it is answered, that the bowels do not become sluggish. How can they, when crapulous, undigested matter

* It is by no means necessary that the meat should be English "lumps of flesh," plain roast and boiled, now becoming "fashionable" in Paris, according to some of the untenable superstitious assertions as to what is "wholesome." The pepsine of a good stomach will digest all meat alike, whether it be over-done or red-raw: cooking at all is only a luxury, and the stomach would digest meat without any. It has been said that French cookery is unwholesome. *Du tout!*—not in France or Italy, where time is not so valuable as it is here; but if the *fricandeau* or *stufato*—in the preparation of which its own artist spends four or five hours, in order to make it tender and good—is got up in half an hour, with economy of time, by an English cook, it will be tough, and not so wholesome or digestible: but good pepsine will conquer it, nevertheless.

produces, fortunately, in most cases an extra laxity? —upon which the high feeder congratulates himself; until the half-digested, half-pepsinised matter produces rheumatism, gout, and gravel, for the benefit of the doctor.

So much for real dyspepsia. But there are various inconveniences and pains which take place in the intestinal canal, from the pylorus to the anus, more especially in the colon, which are called indigestion; and hence the interminable discussions about indigestion, which ought to be referred to, and remedied in, the part really affected.

The most common of the causes which produce pains, with sometimes diarrhœa, sometimes costiveness, are abnormal states of the biliary secretion, or intestinal worms; sometimes there is chronic disease of the glandulæ agminatæ or solitariæ: but the pains from these are more fixed in their position. There is frequently, besides, much inconvenience from flatus —which flatus is the product of fermentation, arising from deficiency of pepsine in the stomach, or of bile in the intestines,—both of which check fermentation. But, as we set out with stating, the stomach, not the intestines, is the origin and seat of dyspepsia.

The INTESTINES are much more liable to idiopathic inflammation than the stomach, either during sporadic fevers, such as typhoid, or from the more common cause of inflammation—cold applied to the surface. The damage of cold falls upon either their external serous or internal epithelial (mucous) membrane. Analogous to the effect of a chill upon the bronchial tubes, the first or minor degree is

catarrhal, producing pain, or, at least, uneasiness, and an extra flow of mucus,—which, with the increased peristaltic excitement of the nerves, causes diarrhœa; and this, if allowed to go on, will end in disorganisation of the mucous membrane, dysentery, and death. The appropriate treatment is rest, with liquid nourishment and opiates; and, if there is any degree of feverishness, ipecacuan or antimony in small doses, so as to produce resolution, as in catarrhal states of the bronchi. If the symptoms are more urgent,—if there is much pain, with a greater degree of fever,—more antimony will be necessary, with acetate of morphia; and, in all cases, a large lukewarm poultice should be applied over the abdomen; with or without leeches, according to the necessity of the case.

Besides the dysentery which is produced thus by external influences, it occurs sometimes from indulgence in unripe fruits in hot climates, from which the military have often suffered. Grapes or oranges, when not quite ripe, but just sweet enough to be agreeable,—especially where the temperature produces thirst,—are very deleterious, and have frequently brought on fatal dysentery; the most effectual remedy being Dover's powders in large dose, combined with tannin, gallic acid, or other vegetable astringent—above all, logwood, either the extract or decoction; or mineral astringents, such as oxide of zinc, or of copper, or of bismuth. Again, when the secretion of bile is suspended by the liver-disease of hot climates, the food ferments, and produces diarrhœa, and even dysentery—which may be assuaged by the above medicines; but cannot be cured until

the liver itself is cured, and the secretion of bile restored, by mercury, arsenic, or nitro-hydrochloric acid, prescribed either internally or in baths, as recommended by Sir Ranald Martin.

If the chill has attacked the peritoneal covering instead of the mucous lining, it is more dangerous, and is often insidious (see p. 216); it is seldom, however, that peritonitis arises from merely catching cold. The best opportunities which we have of knowing the progress of peritonitis are in fatal cases, where it has succeeded to wounds from accidents, or stabs, or operations,—such as tapping for dropsy, or operations for hernia,—or in cases of the escape of the contents of the intestine from an ulcerated perforation. We then find exudation of plastic lymph (blastema) on the surface of the peritoneum, or of the intestines, or of the lining of the abdomen, or on both, besides exudation of serous liquor sanguinis,—which fluid is often of great use, by helping to prevent the adhesive agglutination of the intestines to each other and to the parietes of the cavity, if the patient survives long enough.

In peritonitis, there is always pain on pressure; but, as might be expected, it is greatest when the membrane lining the abdominal parietes is the part most inflamed. There is diarrhœa in the muco-enteritis, not in the peritoneal; unless the inflammation penetrates to the inner membrane, as it does in time in the fatal cases, when permanent, harassing, uncontrollable diarrhœa helps to carry off the patient.

The treatment must be the same in either case, and no attempt should be made to disturb the bowels by laxative medicines.

The consideration of the internal rete mucosum and epithelium naturally leads to that of the external epithelial membrane as the seat of CUTANEOUS diseases, the cure of which has been, perhaps, retarded by the well-intended labours of the nosologists. Their time has been wasted in making distinctions between diseases which resemble each other as much generally as a horse does a mule, or an ass a zebra—the species of each genus of disease being curable by the same means; so that, in fact, the true service to medicine would have been to have shown wherein the different varieties resembled each other in essential points, so as to group them and cure them on principle.*

The first great distinction which we have to establish in cutaneous diseases is between the contagious and the non-contagious. In the former class we can include with certainty those which depend upon parasites, animal or vegetable: first, the animal, such as the itch (*scabies*), scalled head (*porrigo*), and prurigo senilis; secondly, those arising from vegetable parasites—the sporules of microscopic fungi—such as ringworm of the scalp (*tinea*), or pityriasis, or favus. Whatever other chronic eruption the young practitioner is consulted about, he may at once answer for its not being contagious; but it

* On this subject, there are some valuable observations by Mr. Jonathan Hutchinson, surgeon to the London Hospital, in the *Journal of Cutaneous Medicine*, edited by Erasmus Wilson, No. I., p. 86. When such men as Wilson and Hutchinson, who were accomplished surgeons before they directed their talents to any speciality, take up dermatology, ophthalmology, or other peculiar department, the public must benefit thereby.

will require a little experience to enable him to distinguish the various forms which the itch, for example, assumes. The itch is sometimes papular, like prurigo; sometimes pustular, like ecthyma; sometimes vesicular, like eczema or herpes; sometimes scaly, like psoriasis;—though unequivocally the same identical disease: in other words, according to the state of the constitution, the same irritating cause—a peculiar animalcule (*acarus scabiei*)—may produce a disease, papular, vesicular, or pustular; the itch, in fact, communicated from a patient who has it in the pustular form, may produce it in another person in the vesicular or papular state. I infer, from analogy, that the various non-parasitic cutaneous eruptions are but degrees of one state, a morbid sensibility and loss of power in the capillaries (chronic, sub-acute, or acute inflammations) of the sub-epithelial vessels, assuming various forms according to the age and constitution of the patient; as we see morbid sensibility propagated from the gums produces in infants porrigo larvalis or strophulus—seldom seen in adults; or, if seen, called by another name.

I believe it will be found perfectly useless, *as far as treatment is concerned*, to make any further division of chronic cutaneous diseases than the above. I really see little use in the interminable hair-splitting distinctions made by authors, from Willan down to the present time; they are most repugnant to the unhappy student, leading to vain repetitions in the description of remedies, and to an empiricism which excludes or confounds the principles of treatment.

The first or lowest degree of derangement is PAPULAR, or simple itching, which is sometimes not even evidently papular; in this the nerves evince morbid sensibility only, the first degree of debility, leading to congestion of the capillaries, *e.g.* prurigo, or lichen.

Next comes the thickening, *i. e.* relaxation and sponginess, of the epithelium in various points; the relaxation being sufficient to cause a slight loosening of the pavimentum—on account of the deficient vitality of the cells, which ought to consolidate in cuticle (pavimentum), but which adhere in SCALES —as in pityriasis, in which the scales are primary; or in psoriasis or lepra, in which they are secondary.

The third degree is the PUSTULAR, when the relaxation (inflammation) has gone the length of some minute loss of substance, which the surrounding healthy capillaries set about restoring by granulation and suppuration, *i.e.* by pustules—as in impetigo, or ecthyma.

The fourth might be thought by some to be a minor degree, because apparently more simple—the mere separation of the cuticle in the form of VESICLE; but, on the contrary, this is a higher, being a more rapid, inflammation; and, moreover, we see analogically that these herpetic vesications take place in connection with an erysipelatous tendency of disease, which evinces loss of power of the constitution. Vesicular ecthyma occurs in weak strumous patients; mercurial vesicular eruption, when the constitution is suffering from the mineral; pemphigus and vesicating patches of purpura or scurvy, when the constitution is in the worst state.

The coincidence of disease of the lining of the intestinal canal and of the skin, the internal and external epithelial membrane, has been universally observed and acknowledged. This connection I attribute to the whole being supplied by the ganglionic system of nerves, whereby a sympathetic impression is produced on the skin from the primæ viæ, as when cold water drunk during perspiration produces scaly eruption on the skin, or when, *vice versâ*, applied to the skin, it produces pain in the stomach and bowels, and diarrhœa; and as arsenic, antimony, or bismuth,—which cure dyspeptic irritation or dysentery in the cases to which they are adapted, —taken into the stomach, or used in fomentation, cure cutaneous eruptions; or as a warm bath also relieves diarrhœa.

Enough has been said in the preceding pages to guide to the application of remedies, on principle, to the constitutional chronic inflammations and their consequences. In the first place, tonics, such as iron, mercury, bismuth, and arsenic, cure in two ways— by their direct effect upon the vessels of the skin when circulated to them; and by their effect upon the primæ viæ in giving tone and strength: we must not, however, produce salivation by the mercury, nor inflammation of the bowels by too free use or abuse of mercury or arsenic. Iron, again, injudiciously applied, will rather retard digestion, of which it is one of the greatest promoters in proper doses,— which doses are relative, as has been already shown. Compound decoction of sarsaparilla, with mezereon and decoction of dulcamara, are much lauded remedies; but if the stomach and bowels be oppressed by

them, they do no good,—and I am sceptical as to their being really valuable. I have shown (p. 336) how remedies sometimes fail from being too energetic. In cases of prurigo, in which the usual routine of medicines had been tried by various practitioners unavailingly, because too freely applied, seeing that the patients were of a very delicate though not unsound constitution, with weak digestion, though not want of appetite, I have given the mildest tonic, the sulphuric-acid or nitric-acid lemonade, which has rapidly cured the previously intractable prurigo; when the digestion is more imperfect, bismuth will be found efficacious,—or it may be used in the first instance.

Some cases of psoriasis, &c., are associated with, if not dependent upon, a congested sub-inflammatory state of the mucous membrane of the primæ viæ, evinced, besides the presence of general signs of indigestion, by occasional nausea, and a foul or too red tongue, or both together, with hard pulse, precordial uneasiness, or palpitation. In these cases the emetic substances, such as ipecacuanha and antimony, in doses just short of nauseating, are highly useful, followed up by bismuth; sometimes, if there be much nausea, and irritability of the alimentary canal, decoction of logwood with prussic acid will allay it better than the ipecacuanha or antimony, unless there be pyrexial heat of skin.

Antimonial medicine circulated to the cutaneous vessels is most valuable, but we are told it often fails—we are not told why: the reason is, that the cutaneous eruptions not being acute diseases, not febrile, there is little tolerance of antimony, and

therefore the common doses are often oppressive; but as arsenic is not a sedative, it is not oppressive,—and, not being dangerous, it is generally preferred. It cannot be too often repeated, that persons frequently give much too large doses of each of these remedies in chronic diseases, and thereby fail. And, again, the sedative antimony cannot cure the eruptions of broken-down constitutions, which require tonics, such as iron, quinine, and arsenic, and full diet; and in such cases, as the primæ viæ are weak, it is often a difficult matter to make them profit by the tonics and diet; and therefore we may be obliged to begin with the mildest, such as hæmatoxylum as a tonic, and milk, with perhaps a little brandy in it, as nourishment; or the sulphuric-acid lemonade, with animal broths and jellies, and farinaceous diet. Warm and vapour baths are commonly useful, by softening scaly eruptions; and at the same time the warm bath is a powerful means of soothing the nerves of the primæ viæ, and restoring them to tone and digestive power: but in some of the papular eruptions, the heat often rather increases the tingling of the skin.

We may use mercury as a tonic to the primæ viæ and the capillaries, being mindful not to salivate, and not to oppress by over-doses of antimony, hydriodate of potass, &c.: but arsenic is generally preferable; and in chronic cases, when remedies fail, it should be recollected that they may have been used too freely. In fine, the successful treatment of skin-diseases does not depend upon specifics,—except in secondary or tertiary syphilitic eruptions, or those produced by parasites,—but upon a judicious appli-

cation of constitutional medicines, diet, bathing, air, and exercise, in accordance with the state of the digestive organs. Exercise on horseback has immeasurable advantage over every other kind, as it gives motion to the viscera without fatiguing the limbs; very little motion being given to the viscera in carriages, or even in walking.

With respect to outward applications for skin-diseases, there is an immense variety of astringent and other lotions, and baths, as palliatives for those which are constitutional, at the same time that constitutional remedies are judiciously prescribed; but for those eruptions, such as scabies, tinea, porrigo, &c., which are produced by parasites, the object is to suffocate the offenders,—which is done in scabies by sulphur, and with the vegetable parasites by a variety of substances, but most efficaciously by tar combined with grease, which smothers the parasite by excluding the atmosphere from it. Thus, in 1815, an old woman in the Borough had great celebrity for curing ringworm, and other affections of the scalp; which she did by a tar-and-grease ointment, covered by a cap of bladder, kept on, without being changed, for about three weeks. Some persons combine mercury or other substance with the tar and grease.

External applications alone are generally of little use, except when the disease depends upon the parasites,—as, for instance, tinea or porrigo,—for which I know nothing more efficacious than one of Erasmus Wilson's prescriptions, which I feel certain he will forgive me for publishing—as he possesses such a store of them:

Picis liquidæ,
Alcohol, āā, ʒss ;
Saponis mollis ʒi.
Fiat unguentum, nocte maneque infricandum.

The simple, quick, and certain method of curing the itch (scabies), is by the following prescription:

Calcis recens ustæ ʒij ;
Sulphuris sublimati ʒiv ;
Aquæ ʒxx.
Decoque, ligno movens, per horas iv ; sepone, et post horas xii cola.

This solution rubbed to the skin, where the eruption is visible, for half an hour, cures it at once, seldom requiring a second application.

The identity of the itch-insect has been involved in almost as much mystery as that of the "Man in the Iron Mask." About 200 years ago, some of the medical naturalists detected and spoke of it. Löwenhoe described it; but, as no person could use his simple microscope with the same effect as he did, the existence of the acarus was doubted even at the beginning of this century; in consequence of which, a reward was offered by the French Institute for his, or rather her (for it is the female which infests the skin), detection. A clever rogue of a barber-surgeon won the prize, by getting some minute animalcules, mites of cheese, or nits of pediculi, and concealing them under his nail ; then, as the proof, he punctured the itch-vesicle with the point of a needle, and "escamoted" the insect, so as to show it on the point of the instrument. This trick being detected, more doubt than ever was thrown upon the existence of the acarus ; and even after its identity was proved,

it was asserted by many that it was not the *cause* of the vesicle or pustule, but merely found in it an appropriate *nidus*. If it were necessary to produce any argument against this absurd statement, it would be sufficient to adduce the immediate—almost instantaneous—cure of itch by the lime-and-sulphur lotion. But there never was any necessity for using a microscope to *discover* the acarus; it is quite visible to the naked eye, or with a very moderate lens; it only requires one to know how to look for it. This was shown to the profession here, about twenty years ago, by a young French surgeon, a refugee, who had been imprisoned—for either aristocratic or democratic principles—during one of the up-and-down revolutions of Paris. Whilst in the prison, he had abundant opportunities, amongst the miserable inmates, of becoming acquainted with the itch-insect; he made the author a present of half a dozen between two bits of glass, and showed him how to detect them on a patient. He was most expert,—handling the minute animals as easily as if they had been kittens or puppies. The insect is not to be found in the vesicle, but at the end of a little red line running from it, at the distance of, it may be, one-sixteenth of an inch, or less, where it is burrowing like a mole; the point of the needle, inserted at that spot, will bring it forth.

The cause of arsenic being so generally prescribed by the best and most experienced dermatologists is, that it is the most powerful of tonics to the nervous system, and at the same time the most efficient regulator of the secretion of the liver; thereby restoring general health and strength, and

influencing the local disease by improving the metamorphic action of the nerves and capillaries: it does not act by "sweetening the blood," as the humoral pathologists assert.

Apropos, sarsaparilla, dulcamara, mezereon, houseleek, cuckoo-flower, and other sweeteners of the blood,—especially sarsaparilla, about which most medical men are sceptical,—have gained credit indirectly through other medicines, such as mercury or arsenic, employed with them; or, in another way, by change of diet. These sweeteners, in old time, were considered *tonics* and *stimulants*, as cinchona-bark was at the same period, and were therefore withheld until the palpable weakness of the constitution demanded a generous diet; and then sarsaparilla was thought appropriate, and got the credit due to the beef and wine, especially the latter.

Up to the present time, the profession has not agreed as to whether sarsaparilla possesses the virtues attributed to it or not. No cases were more uncertain or puzzling than those of secondary syphilis; and it is most likely that in a large proportion of these cases, in which sarsaparilla gained credit, the good effects were the result of leaving off the mercury, which used to be empirically and injuriously continued too long; and in these cases homœopathic globules would have been as efficacious, by letting the patient recover from the mercury, with the assistance of good diet. But, even supposing that sarsaparilla is more efficacious than liquorice-root,—which some of us doubt,—there is another difficulty in judging of it, which arises from the fact—well known to manufacturing chemists—that frequently

one-third or one-half of a cargo is bad in quality; yet, syrup or extract made from such stuff may have got the credit of effecting the cure of syphilitic nodes or eruptions. Having been for some years Professor of Materia Medica at the London Hospital, and, consequently, purchaser of drugs for that institution, I got a little behind the scenes of the drug-trade. The receipt for *making* "*Smyrna*" scammony (which was artificial—composed of gamboge, powdered charcoal, &c.) would be edifying, all the *real* scammony at that time having been sold as "Aleppo."

Notwithstanding the differences which exist between the obvious structures and secretions of the KIDNEY and liver, there is a close analogy between them as to pathology. Thus, in the first stage of inflammation, the kidney, like the liver, presents the appearance of swollen, dark-red hyperæmia; when the case is not fatal, the substance becomes (analogous to cirrhosis) of a dirty white colour, rather firm in consistence, and still larger than natural; and with both states we frequently find granules, or tubera, intermixed. If the patient survives long enough, the kidney becomes shrunk, with irregular indentations, and hard, like a cirrhose liver; and, in both this and the second stage, there is usually more or less fatty degeneration of tissue. These, and some other modifications, Dr. Bright traced with skill and patience, and demonstrated that the result was gradual destruction of the secreting machinery, evinced by epithelial-tube casts and albumen in the urine; hence it was denominated "Bright's disease:" when this takes place,

the result is certain—nothing can avert dropsy, and, sooner or later, death, according to the amount of disease, and according as both kidneys are alike affected or not. There is no specific remedy for Bright's disease; the only way in which I have been able to (apparently) prolong life has been by general constitutional treatment, assisted by uva ursi. In this state of albuminuria, the kidney, instead of secreting cells containing urea and the other usual saline urinary products, permits an exosmose of liquor sanguinis unsecreted, and containing albumen, which thus runs off to waste, and impoverishes and exhausts the constitution,—albumen being the basis of metamorphic nutrition.

Besides the frequent temporary appearance of albuminuria in scarlatina, it occurs under various circumstances of dropsy from pulmonary, hepatic, or heart disease, which obstructs the circulation, and thereby produces a congestion of the capillaries of the Malpighian bodies inconsistent with their function.

Under these circumstances, it is not surprising that ordinary diuretics, such as squill, the terebinthinate balsams, or (what is inconsiderately and indiscriminately recommended by many of our medical practitioners) gin, have scarcely any power in diminishing the congestion and obstruction of the kidney,—the last generally rather adding to it after the first day or two. Sometimes *sedatives*, such as nitrate of potash, hydrochloride of ammonia, acids, or alkalies, have a temporary effect; but the medicine which is the most efficient in procuring diuresis is the astringent uva ursi, which gives to the distended

Malpighian vessels some power of contracting to their normal state, and thereby partially resuming their function. Uva ursi is little known, and little used; although, as I mentioned with respect to antimony, any medical man would take it ill if you suggested that he was not acquainted with its properties; but if he is, why does he not use it, either in dropsy or in gravel? Almost uniformly, when I propose it, my friend says that he much prefers buchu (barosma) as a diuretic; well, buchu is a diuretic, but it is an aromatic diuretic—not an astringent, equal to uva ursi—and not to be preferred where the astringent property is indicated: buchu may do very well where you want to make tolerably healthy kidneys secrete an extra quantity of urine to wash the urethra, as copaiva in some cases, or gin in others, would do; but, although a diuretic, it is not the diuretic for albuminuria or gravel. A person might as well say, when quinine is proposed, that he prefers iron as a tonic,—both being tonics, as both the others are diuretics, though differing as to their adaptations; and on the above principle it will be found that port-wine-and-water will be infinitely better than gin-and-water, as a beverage.

We have not such special information as to the causes of nephritis, acute or chronic, as we have as to the causes of hepatitis; still, we know that both are liable to occur from undue exposure to inclement cold, or are induced by intemperance; and also that, in the same way that malarious ague fever induces hepatitis, scarlet fever is associated with epithelial nephritis, though not so uniformly; and that, besides, epithelial disease of the urinary tubules commonly

subsides with the epithelial desquamation of the cuticle, and is in general little to be feared,—although the frequent accompaniments of temporary albuminuria and anasarca may cause a degree of anxiety. The amount of medical literature on this subject—albuminuria—is appalling; but Dr. George Johnson's work seems to contain all that is worth knowing as to its pathology.

Diabetes, with saccharine urine, is another disease attributed to the kidney, because the sugar passes by that channel; but it is well known that, when patients have died during diabetic symptoms, the kidneys have not shown anatomical degeneration of structure, beyond a flabby state, even when the disease has lasted a long time: there have been no organic changes of structure, as in Bright's disease,—the truth being, that diabetes is not a disease of the kidney; but when, from anomalous states of the liver, lungs, or even the brain, influencing the chylopoietic viscera through the eighth pair of nerves, the sugar, which ought to have been converted in the lungs, escapes to the kidney, it irritates that organ, and produces such relaxation of the Malpighian bodies, that they allow of a rapid flux of limpid urine,—that is, without the normal separation of urea and salts,—and the sugar, which is neither made nor altered there, is found in the urine. There are several sources of the sugar; first, it may be redundant in the chyle, from debility of digestion by the stomach of the starch in the food; secondly, the liver may be deficient in its powers of conversion; and, thirdly, the lungs may not have

the power of normal conversion, as we see diabetes so often occurring during the course of phthisis.

The treatment of diabetes by feeding the patient with fat, gluten, and other substances which cannot be converted into sugar, is most empirical and illogical. Of course, *ex nihilo nihil fit*—you cannot "make bricks without straw," nor sugar in the viscera without starch; but what does this profit you? you are not *curing* the disease, but merely concealing it. On the other hand, rational practice will cure it sometimes: *e.g.* A gentleman, æt. forty, consulted me for diabetes; he was also suffering from extensive old chronic bronchitis, with blue lips, and had, besides, very bad digestion. I prescribed pil. hydrarg. g. v every other day, to act on the capillaries of the lungs; compound squill pill, and Dover's powder, g. ijss of each, three times a day, as an expectorant; and nitrate of bismuth, ℈ss, three times a day also, to promote digestion. In about three weeks the mercury affected his gums slightly, with manifest improvement of the bronchi, the cough and dyspnœa being diminished, and the lips appearing natural; his digestion rapidly improved, and, at the end of two months, he had neither cough nor diabetes. During the cure, there was no restriction of diet as to vegetables, sugar, or any thing else. The fault seemed here to be chiefly in the lungs, though the digestion was bad; but we cannot tell why in very similar cases diabetes does not occur.

A gentleman, æt. sixty, consulted me for diabetes, having nothing else to complain of except the usual thirst, and rather increased appetite, with debility; micturition troublesome, copious, and saccharine,

with the pathognomonic confinement of bowels and dry skin. He was very low-spirited and discontented, because, though feeling weak, his ordinary medical attendant had stopped his brandy-and-water, of which he was fond, though by no means intemperate. He had been on military service in India, and the liver was sluggish. I gave him blue-pill and bismuth, as in the last case, and ʒj of uva ursi in powder three times a day. This treatment was continued for three months, the mercury never affecting his mouth; but as the urine and sugar diminished in quantity, not wishing to make the gums sore, and not considering so much of the blue-pill necessary, I ordered it to be taken only once a week: and at the end of four months more—that is, seven months in all—there was no sugar in the urine, and the secretion of the kidneys was normal in quantity. He liked my practice very much, as I permitted him to eat what he pleased, to take his grog in his usual old way, and to drink lemonade to allay thirst. He lived eight or nine years after this, without return of diabetes, and died of apoplexy in the country. Of course, I have not always been so successful; but I mention these cases in order to explain what I mean by general treatment, the only thing special being in one case the uva ursi, which is a most valuable adjunct in all affections of the kidneys, irrespective of diabetes. In fact, I made up my mind long since that the first thing to be done in treating diabetes is to ignore the kidneys, and attend to the general health, and to whatever other organ or organs evince disease, functional or organic.

But sugar may be found in the urine more

frequently than was supposed when it used to be sought for only in the aggravated cases of "diabetes mellitus." In the troublesome prolonged micturition in hysteria of either married or single females,—more frequently in the former, according to my experience,—sugar will be found sometimes in the urine, and more especially if there be tubercular phthisis coexisting; extra thirst, rather than the micturition, exciting my suspicion of diabetic sugar.

The formation of SAND, GRAVEL, and CALCULI *commences* in the pelvis of the kidney. It is very common to allude to the bladder as implicated, though it has no more to do with gravel than the kidney has to do with the formation of sugar in diabetes. When the urine secreted in the Malpighian bodies contains more saline matter than it can keep in solution,—whether that be uric acid, triple phosphate, or other salt,—it crystallises in little grains of sand, which are usually passed along with the urine, producing an uneasy sensation in the urethra or glans, and visible to the naked eye in the excretion. Sometimes one of these grains remains in the kidney, and then, of course, the crystallising matter accumulates upon it,—so that it grows into gravel,—which may remain, before it passes into the ureter, until it has attained the size of from one to three tenths of an inch in diameter, or more; it seldom happens, however, that a calculus larger than this passes into the ureter, but it remains in the pelvis of the kidney until death,—increasing to half an inch, or more; and several of these may form—three, or four, or a dozen, or more—with surprisingly

little inconvenience, if they are smooth. In many of our museums, there are specimens of kidneys with a number of these round calculi, looking like a schoolboy's bag of marbles cut open. If they are rough, they produce pain and bloody urine upon taking exercise. They have been found as large as a grape-shot or tennis-ball.

But what we are chiefly interested in is the small gravel, or calculi, about the size of peas, which, if smooth, sometimes pass easily along the ureter into the bladder, and thence are evacuated by the urethra, being scarcely or not at all noticed; or remaining in the bladder until they enlarge, so as to produce symptoms of stone in the bladder, and to become the subjects of surgical operation.

However, the small gravel, rough from crystalline projections, in passing through the ureters, cause great pain, usually with blood in the urine, from abrasion of the epithelial membrane.

The symptoms of one of these little calculi (from one-sixteenth to three-sixteenths of an inch in diameter) passing, or rather sticking, in the ureter, are, distressing sympathetic nausea, and even vomiting, with very severe pain—not in the back, as might be supposed (until the calculus gets down close to the bladder, when the pain is felt just above the os coccygis)—but chiefly in the front of the abdomen, just opposite to the iliac fossa; and these symptoms have been mistaken for peritonitis, though the general absence of pyrexia, and the state of the pulse (as occurs also with biliary calculi), assist in making a diagnosis. I may exemplify this by a clinical case. I was summoned to attend a gentleman

labouring under the above-mentioned symptoms; and found a medical practitioner standing over him with about a score of leeches on the abdomen, just before the anterior superior process of the ilium, to relieve the "peritonitis" which he diagnosed. I asked the patient if he had been troubled with gravel. He said that he had not had what could be called gravel, but large red sand. On retiring into the adjoining chamber to consult with the doctor,—who, it is but fair to observe, had not attended him previously,—I said to him: "Your friend is a strong man, and therefore the leeches will not do him any harm; but they cannot suck the calculus out of his ureter: so pray put them aside, and let us try something else." He looked incredulous, but did not dispute the point. He had given the patient a dose of calomel, which also he was strong enough to bear, as well as the leeches; and was following it up with saline purgative draughts, which I took the liberty of exchanging for the following:

Pulv. fol. uvæ ursi ℈j;
Ol. terebinthinæ ♏vj;
Tinct. opii ♏xij;
Mucilag. acaciæ ℥ss;
Aq. distill. ℥j.

Ft. haustus, 4tis horis sumendus, urgente dolore; phialâ prius agitatâ. Tales mitte haustus iv.

The next afternoon, when "we three met again," the patient, who was quite comfortable, in good spirits, and facetious, held up the calculus, a quarter of an inch in diameter, saying to us, "Here's your friend." He said he had taken the four draughts;

that the first was so abominable, that he thought it would have returned, but, on the contrary, it soon took away his nausea; that, after the third, he had a tolerably good night's rest; and that the last draught, "*like a ferret, had made the varmint bolt.*"

This prescription has never failed me in quickly dislodging calculi passing through the ureters. It is true, that in most cases the calculi will pass of themselves, but with great and prolonged pain, sickness, and exhaustion: they have even been known to remain, and produce fatal ulceration into the peritoneal cavity. On a subsequent occasion, on my return from an excursion, I found this same gentleman in bed; where he had been for about three weeks, "writhing with pain like labour-pains," as he said, and frequently vomiting. I asked him why he could not have taken his *urgente-dolore* draughts, as he called them; and he said it was because our friend Liston, as there was no calculus for himself to operate on, had introduced to him a celebrated gravel doctor,—and, as he (the patient) himself was very orthodox, he obeyed orders given *secundum artem*. However, he took the hint, sent for the four draughts, and next day produced another calculus rather larger and rougher than the first. Notwithstanding his boasted orthodox submission when ill, he was a very disobedient person, as to diet, &c., when he felt well; but this last attack was rather too severe to risk a recurrence, which I promised he should escape by following my directions. I prescribed nitrate of bismuth, ℈ss, three times a day for some months, to cure his digestion, which was defective, and, of course, the cause of the uric-acid

calculi ; gave him neither alkalies nor acids, except lemonade to drink when thirsty, but not medicinally, and uva ursi to restore tone to the kidneys, along with the bismuth. *Apropos* of lemonade and alkalies for gravel,—both which I ignore,—on the first attack, above mentioned, he complained much of thirst, and I told him to order some lemonade. He said, "May I have sugar with it?" "Of course," I answered; "it would not deserve the name without." "You're a pretty doctor!" he exclaimed; "I have not been allowed to look at a lemon or a lump of sugar for the last three years." After his indigestion was cured, he never had a return of gravel, though he survived more than twenty years; and he died on the Continent, of disease of the valves of the heart, produced by endocarditis, with acute rheumatism.

Another gentleman was much out of condition, from having these calculi, and concomitant constitutional disturbance from time to time, besides the severe pain which they gave him in passing. He had had no rational medical assistance, not even an opiate, —which will sometimes suffice, as with gall-stones, to make the calculi pass; he had been dosed with alkalies. By the end of the first week that I took him in hand, he passed nearly twenty gravel calculi, some not larger than a pin's head, some increasing in size to nearly two-tenths of an inch —which I keep still, besides sundry other little collections of the same kind, *in memoriam*. By regulating his digestion, and giving him uva ursi for some time, he only passed a small one occasionally for about six months, and was then quite cured. However, having made his fortune in town, he purchased an

estate, and retired to the country. After he had been there for about three years, I received a letter from him: "I have disobeyed your orders, and, in consequence, am suffering from it,—passing gravel again. You told me not to drink ale; but, as we brew our own *pure* malt and hops, I thought it safe. I have had a good deal of pain lately, and some blood in the water." I wrote to him to take merely ℈j uvæ ursi three times a day; and in about a week he sent me a little packet in a letter, with above a dozen specimens of the small gravel enclosed, and a faithful promise not to drink any more ale.

I should observe here that, both in hospital and in private practice, I have found that those who drink ale are more subject to indigestion, and consequently gravel and rheumatism (gout), than those who drink porter, stout, or wine. I have also inquired into it, and ascertained that persons who habitually drink brown malt liquor, which does not ferment so easily in the stomach, if from any circumstance they are deprived of it, and can obtain only ale instead, get uneasiness in the kidneys and back, and red uric-acid sand in the urine.

I may as well give my *rationale* of the above prescription: the ureter, by the irritation of the calculus, is inflamed and swollen; the consequence of a tube being swollen is that it is narrowed, independently of any spasmodic action, which is not quite proven,—though I do take that possibility into consideration. The uva ursi is an astringent, with great power to contract the swollen surface, and thereby enlarge the tube; the opium allays pain, and also spasm, if there be any;—but the prin-

cipal object I have in giving it is to counterbalance the turpentine, which I employ to increase the flow of urine, so as to wash down the calculus; the turpentine without the opiate might irritate the kidneys and ureters: the opium evidently soothes and smooths the way. I have been called in where turpentine had been given alone with the above intention; but, instead of bringing away the calculus, it produced bloody urine, with great additional pain; indeed, this did actually occur in the case above mentioned, before I arrived.

The UTERUS is the last in my arrangement, though not the least in consequence, of the viscera. Independently of its physiological relations to mankind, its innumerable pathological sympathetic affections render it the source of cares and anxieties in families, and of abundant occupation to the medical profession. Hysteria is the most profitable and safe disease in the catalogue of the ills that flesh is heir to. "No patient ever* dies of it," and that is fortunate; for if as many mistakes were made in the treatment of lung, heart, liver, or kidney diseases, as in the treatment of uterine maladies, they would swell the bills of mortality.

Every part of the frame sympathises in turn with the morbid sensibility of the uterus; which gave rise to the imaginative description of Aretæus,

* Though I quote this from high authorities, it is not *quite* true: hysterical disease brings on sympathetic functional disease of the heart, and dropsy—see cases, pp. 582 and 687; and, though these patients recovered, others have died of similar disease, as they might have done under different management.

that "the uterus is an animal residing within another, all the various parts of which it visits in rotation, and disturbs by its presence."

In the good old times of bleeding, what myriads of leeches were applied to the head, to remove or avert the supposed meningitis, which was nothing but hysteric headache! A patient of mine, the mother of a family, kept a jar-full of pet leeches, which were regaled with her sweet blood at various intervals of from three to six weeks, more or less, *minitante cephalalgiâ hystericâ.*

At the same period, every fifth or sixth bed of those in the female wards, which were under the care of my late colleague at the London Hospital, Dr. Robinson, was superscribed "Peritonitis;" the patient having really no other disease than hysterical morbid sensibility of the peripheral nerves of the abdominal walls; and frequently he had a case of hysterico-neuralgic "Pericarditis:" but these inflammations of serous membranes were never met with by his colleagues! I need scarcely add, that none of his patients of this description died; though some lingered on for as long as six months in the hospital. The low diet and leeching, to which they were subjected at first, always aggravated the trifling real malady; and the students used to scoff at the "peritonitis." But, then, the doctor could not be expected to know much about females or hysteria, as he had been for many years surgeon of a regiment before he came to us; and, amongst the *men*, he had, doubtless, seen some cases of real serous inflammations, certainly never *hysteria.*

Still, this is all negative; the positive information

is, that the uterus is in close proximity to the cauda equina, and, by its nerves,* in direct communication with the spinal cord, and all the ganglia of the frame—the head, chest, abdomen, and limbs. But, then, why does this "animal" of Aretæus select sometimes one part, sometimes another, to torment?—simply because the morbid sensibility communicated to the ramifications of nerves will be developed and evinced in whatever organ is at the time the weakest, and hence the most susceptible. Thus, if the stomach be weak and dyspeptic, pain will be felt at the cardiac orifice, aggravated by flatus; and the cardiac orifice being in immediate contiguity with the heart, the pain is often thought to be in the heart. Or the heart itself may be weak from a variety of causes, and then the pain is really in that organ; and this occurs in delicate females, if they fatigue themselves. Or the kidneys may be susceptible, from deficiency of clothing over the loins, or from the effects of indigestion; in which case, the morbid sensibility will produce gushes of limpid urine. Or the inconvenience may be reflex, in the round ligaments or the external appendages of the organ, from weakness or irritability produced by a bad habit. Again, the sympathetic hysteric morbid sensibility may be in the great ganglion, the brain itself; and thence may arise the various anomalous states of the ideas in hysteria, which have puzzled the doctors from before the time of Aretæus until now,—diverting their attention from the morbid condition of the uterus, where alone it can be cured,

* The existence of nerves in the uterus, denied for many years, has been demonstrated by Dr. Robert Lee.

to the secondary phrenological affections of the brain; so that, in their bewilderment and credulity, they think that disease is simulated, from perverseness, deception, and cunning.

I shall attempt some illustrative cases, in addition to those at pp. 366, 413, and 582, not aiming at being graphic, but endeavouring to sketch the outlines as correctly as I can; *e.g.* a young lady, the governess of three girls in a family at whose house I frequently visited and staid, was of a highly cultivated and intelligent mind, with gentle and amiable manners; so, also, was the mother of the family. The younger lady being, however, not robust, was hysterical; so that, when fatigued with her duties, she used to become languid, and depressed in spirits—so much so, as to shed tears even during meal-times. The elder lady, who treated her as a daughter, counteracted this state by kindness,—sometimes by cheerful and sometimes by objurgatory remonstrance,—and always, one way or the other, dispelled the clouds, which sometimes darkened to a degree of irritability of temper, but not to perverseness or duplicity; a few slight hysterical fits also occurred. This state of things went on for some years; until, the duties of the governess ending by her charges having emerged from her tuition, she changed her course of life by marrying a gentleman introduced to her by the family, and became an amiable wife and good mother: and the hysteria faded away. I was too young at the time to have the medical charge of the case.

A patient of mine, aged seventeen, with symptoms similar to the former,—but worse, as having several times in the year strong hysteric convulsive

fits, associated with scanty catamenia and leucorrhœa, —I cured by ʒj of cubebs in water, three times a day; having ordered a towel wet with cold water to be applied to the hypogastric region on the occurrence of a fit, which the old nurse of the family acknowledged to be "very efficacious, though she dreaded it might have given her cold or the stomach-ache; and she was surprised it did not."

Another case,—exactly similar, except in one respect: that the catamenia, instead of being scanty, were excessive, lasting profusely during seven days, —I cured by the wet towel, and, instead of cubebs, a quarter of a grain of oxide of silver three times a day. Many married women, whether barren or not, suffer severely from hysteria, and I have relieved them on the same plans; often curing barrenness by those remedies adapted, as above, to the state—plus or minus—of the catamenia: in *all* cases inculcating full diet of animal food, and rational use of wine; in some prescribing iron or quinine, or other necessary adjuncts: but the most valuable medicines in hysteria generally are cubebs and oxide of silver.

For instance, I was consulted about a young lady, æt. twenty-three. Her symptoms were: cough and dyspnœa, with livid lips, and frequently recurring paroxysms of palpitation of the heart, of which there was strong impulsion, with slight *bruit de soufflet* on the first sound,—but the sound of the valves was distinct; pulse 90—too firm; dropsical swellings, especially of the legs and thighs; a little of the face, and the eyes suffused; the urine, of course, scanty; appetite bad; tongue natural; bowels irregular;

catamenia irregular, very scanty and painful when occurring, and leucorrhœa.

She had been seen by several well-known physicians, by whom she was considered to have heart-disease; but I attributed her symptoms to dysmenorrhœa, and began by giving her cubebs, which acted on the kidneys, and also as an emmenagogue, with great amelioration of the chest-symptoms.

In the course of three months, all the symptoms were improved; she could take walking exercise; there was no œdema of the legs remaining; but there was still impulsion, with occasional palpitations; and, though the catamenia were much improved, there was still considerable leucorrhœa. I therefore exchanged the cubebs for oxide of silver, which removed all her symptoms in the course of about sixteen months from my first seeing her,—and she has remained in good health for twenty years. I have had several cases exactly similar, with similar results.

I have often been told by practitioners, in consultation, that patients would not go on taking cubebs; but I could only answer, that they would if they were inspired with confidence. I have cured patients by giving them a more disagreeable medicine, where there was habitual costiveness to be corrected: that is, ʒj of cubebs in ℥j of our old-fashioned London-Hospital mist. cretæ cath., *i.e.* magnesiæ sulph. ʒj in each ℥j of mist. cretæ co. Where you have a certainty of your indication, you must persevere; and I have cured patients by this medicine who have taken it for a long time,—in one instance for eight months, in another for sixteen,—with little variation, except the omission of the salt when not required.

This medicine, cubebs, so much used by surgeons, is scarcely employed in medical practice; but forty years ago, and ever since, I have prescribed it abundantly in uterine affections, as well as in chronic catarrhal states of the bronchi, or of the urethra (called gleet), and in catarrhus vesicæ. One of my former colleagues in the London Hospital used to give it, with marked benefit, to most of his patients who had chronic catarrh or bronchitis; but, strange to say, he never gave it in hysteria, where it would also have been efficacious. But, like uva ursi, it is so little known in medical cases, that twice during the period mentioned I have noticed that members of the rising generation of the time have announced in a medical journal, as a discovery, the fact that "cubebs cures chronic catarrh or bronchitis." They can have derived but little instruction from the lectures on materia medica, if they considered that a novelty. Cubebs must be used in substance,—speaking from certain knowledge; no pharmaceutical preparation of it, either tincture, extract, decoction, or infusion, is so efficient as the powder. It has been often asked how it can act on the uterus or vagina, since it does not come in contact with either as it does with the urethra. The answer is, that it reaches them through the circulation (as it reaches and acts upon the bronchial tubes), in addition to the nervous sympathy of the uterus with the lower intestine, which is directly influenced by the medicine; and which may be exemplified by the well-established emmenagogue character of pil. rufi.

Horse-exercise is decidedly the most efficient

adjunct to the oxide of silver or cubebs, above recommended, for painful menstruation, whether scanty or profuse, and, consequently, for barrenness, of which it is the most frequent accompaniment and cause. Of course, equitation, if carried to excess, so as to induce fatigue, as is too commonly done, will do more harm than good, and—as well as other active exercise—ought to be abstained from for the first day or two of the periodical return.

Before I began to employ cubebs in these cases, I prescribed oleum terebinthinæ in small doses—six or seven drops three times a day in gum-mixture, to be shaken up, or the turpentine to be dropped upon moist sugar in a teaspoon, as the patient preferred. Its action and efficacy are very similar to the effect of cubebs, though decidedly inferior. Some persons have an almost insuperable dislike to cubebs, and sometimes the stomach rejects it; but for that there is a certain antidote; a teaspoonful of lemon-juice with each dose of the cubebs infallibly prevents sickness from it. Cubebs may be given in water and shaken up each time; or according to the following prescription:

Pulveris cinnamomi compositi ʒij;
Pulveris cubebæ lb. ½.
Conterendo misce, et immitte pulverem in phialam oris lati.
Signetur.
Cochleare unum minimum, ter die, ex aquæ fontanæ cyatho vinario dimidio.

Hysterical fits have been sufficiently dealt with under the head of epilepsy; since they are simply epileptic convulsions, arising from sympathetic irritation of the uterus, instead of from worms in the intestines, or from external wounds, or from direct

morbid sensibility of the brain itself, caused by mechanical or other irritation.

There are, however, several artificial distinctions drawn between hysteric and other epileptic fits in females, though they are mere modifications of the same secondary pathological state of the nervous centres. It is said that epilepsy is more purely physical, and that hysteria is influenced by the sensorium. It is remarked that the patient in hysteria grasps the throat, on account of the globus hystericus, and cries out; and Marshall Hall, who has written so much on epilepsy, lays great stress upon the "cry" in it, and the morbid feeling about the larynx. The mode of struggling in hysteric convulsions is sometimes peculiar, which may be explained by the series of reflex involuntary actions being associated with the uterine organs. In fact, the considerations in favour of identifying hysteric fits with epileptic fits are so numerous, that hysteric convulsions may be properly denominated hysteric epilepsy. It has been said, that there is more of consciousness during the hysterical than during the epileptic fits; but, in the minor fits of epilepsy, there are all degrees of consciousness described, as much as in hysteria.

When we consider the uterine system, and the necessarily large supply of nerves for it, in its various states, we can account for the great influence its disorders must have upon the spinal cord, cerebellum, and cerebrum, and hence the more numerous and interminably varied morbid sympathies which arise in the female than in the male; causing symptoms of apparent ("mimose") unreal disease in every organ in turn,—the brain, the trunk, and the limbs.

We have already, perhaps, in this work of *general* pathology, sufficiently alluded to the physical symptoms and treatment of hysteria; but we must still further investigate the nature and cause of the ("animus nec *sponte* variabilis") cerebral morbid sympathies, which produce so much medical discussion and difference of opinion and embarrassment in practice, so much anxiety to the patient's family, and so great distress to the patient: the sensorial symptoms being as involuntary as the hysterical pain in the heart, stomach, throat (globus), colon, surface of the abdomen, back, or hip. And now, reader, if you do not understand or believe Gall's *Physiology of the Brain* (see p. 395 *et seq.*), you may as well pass over the next two paragraphs.

These sympathies of different organs arise from any particular one being predisposed by debility (see *analogy*, at p. 87). Now, if it be granted that the sensorium is not a homogeneous mass, but consists of definite parts or organs, which more or less influence the feelings,—such as affection, suspicion, spirituality, gaiety or sadness, amativeness or aversion,—then the morbid sensibility propagated from the uterus may not be generally diffused, but will affect the organ predisposed, by moral or other causes, to receive it, and will keep up its influence, in spite of reasoning, until you cure the uterus—and sometimes, in a certain degree, afterwards, until the constitution is strengthened.

Why is it said that hysteric patients are deceptive? It is just because they are *not* insane; they have false, uncomfortable ideas, of which they are partly conscious, and in many instances ashamed,

and therefore they try to hide them,—from good disposition, not from duplicity, of which they are accused by unfeeling and ignorant persons, who cannot understand them, and who often treat them harshly, instead of with pity, and above all with *patience*. The neuralgic pains and the painful thoughts and feelings which they suffer are alike real, neither imaginary nor simulated. There is no disease which requires so much *discrimination*, *skill*, and *patience* as obstinate hysteria, unless it be that with which it has been too often confounded—*insanity*.

I have already given an outline of the treatment which will be sufficient for the guidance of an *intelligent practitioner*, provided he has a competent knowledge of his profession, and does not trust to such superstitions as saffron, madder, or valerian—which latter gets undue credit when it is combined with an effective tonic, such as zinc, iron, or quinine.

The nervous actions, and we may say the thoughts, in hysteria are as involuntary as the convulsions of epilepsy or the grotesque movements of chorea. The pains suffered, though purely in the nerves, are as real as if there were a fracture, dislocation, inflammation, wound, or burn in the part: but because no such evidence exists, allowance is not made for the real suffering of the patient, who is thought very tiresome for having pain in the surface of the abdomen, so that she cannot bear the pressure of a girdle—or in the hip, so that she walks lame, or not at all—which pain would be allowed for if in the side of the face, and called tic douloureux, because that is a nervous pain which has "a local habitation and a name."

The laughing or crying of hysteria—which occurs occasionally, also, in paralytic patients—is as involuntary as hiccough. There are temporary struggling and spasmodic movements when even the patient is not quite unconscious, as is often the case in hysteria—as involuntary as those of epilepsy or chorea; and sometimes involuntary (not from mental aversion) pushing away of those who are affectionately liked, from a feeling of want of free space, when the fit is on, like an asthmatic patient gasping and crying out for air though the window is wide open.

When an hysterical patient relates or writes to me a list of her "sufferings and agonies" in head, chest, throat, mamma, shoulder-blade, spine, hip, sphincter vaginæ, rectum, colon, bladder, uterus, pylorus, or heart—one, two, three, more or fewer of those items—I am quite aware that she is not trying to deceive me, nor is she mistaken herself as to the reality of her sympathetic neuralgic sufferings. But I do not attempt to relieve them by ill-judged and futile *direct* empirical practice addressed to symptoms, such as applying leeches to the abdomen, as if there were peritonitis there; or to the head, as if there were meningitis; or blistering the spine, or laying the patient on an inclined plane for months, as if the disease were spinal; or leeching or blistering the region of the heart for "hypertrophy,"—when it is only hysteric palpitation continued till it produces "impulsion."

Such practice I have seen adopted by persons who did not know that the *fons et origo mali* is the uterus, and who did not know that perhaps this very patient

had the uterus so tender from chronic hysteritis that she sat down with caution, dreading the pressure of the chair against the perinæum and uterus—one of those unmentionable states which frequently exist in both unmarried and married females; and, when cured, the anomalous symptoms above mentioned disappear, and a barren woman becomes the happy mother of children: as in one instance,—exactly like that mentioned at p. 583,—a patient of mine, who had been married for twelve years, but, like Scarron's mother, was unfruitful, and suffering from scanty, painful menstruation, was cured by cubebs and gentle exercise on horseback in four months, and in nine months more had a healthy baby.

Another, married for six years, but with a perpetual habit of aborting at from six to twelve weeks—symptoms, painful menorrhagia and leucorrhœa—was cured by oxide of silver, and afterwards had three living children.

We have already seen how some one or more of the sensorial organs may be directly morbidly affected and excited; and this takes place in hysteria sympathetically, so as to make the patient appear or be temporarily insane (p. 366), on account of the morbid sympathy transferred from the uterus to that part or those parts of the brain; but if you cure the uterus, the brain will be as it was before—not worse, nor better: for the phrenological organs, *i.e.* the disposition, may have been originally peculiar and disagreeable from childhood, as may be ascertained from the family or friends; but that has nothing to do with our present subject. Sometimes hysteric females are accused of want of candour, and reserve,

or concealment of their feelings; which, in reality, proceeds from modest diffidence of telling some of their distresses, such as mental ones,—which they are half conscious are erroneous,—or some of the bodily ones, such as the state of the perinæum, already mentioned, or frequent micturition, and other symptoms connected with the concealed parts: and the young practitioner is sometimes puzzled; but men of age and experience, with whom "persons" will be more confidential, ought to know better than to accuse them wrongfully.

One of the most curious phases of hysterical disease is the state called "catalepsy," which has been very little analysed, but which will be best understood by considering that *volition is in abeyance;* and the hysteric patient is often misunderstood, and thought to be obstinate, sulky, or inattentive, when she is positively unconscious—in a state *resembling somnambulism.* Observe, too, that in this state, like somnambulists, the patients do not speak—if led into the middle of the chamber, they will stand there until, if neglected, they would fall from fatigue of the muscles of the legs; they have little or no real sleep, getting out of bed at night, and being often more inclined (if that can be called inclination which is involuntary) to walk about then than in the day-time; from insensibility, or rather from want of sensation, they have no disposition to take food—in which state, in old times of mismanagement, they used to be rather roughly forced to swallow;—and in this state they do not seem to hear or see: just as a person semi-chloroformed, they give no signs of intelligent perception,—unless,

when spoken to suddenly by a friend who usually has influence upon them, you may, perhaps, if the patient is very amiable, perceive a faint smile.

This state, uniformly depending on the uterus,—and marked by either irregular catamenia, or leucorrhœa,—is harmless, has nothing to do with "insanity," and will pass off when the uterine disease is corrected: the chief indication, and one of the greatest difficulties, being, to induce the patient to take *quantum suff.* of food and wine. The duration of this state may be from a few days to a few months—often eight or nine; "*sed levius fit patientiâ*,"—and these cases require *great* patience, both of doctor and family. There is a valuable work *On the Disorders of Females*, by our late lamented and talented friend, Dr. Addison, which is a pattern of skilful judgment and good feeling, and, though written some time ago, is not yet superseded *even* by clitoridectomy!

But some unobservant gentlemen have taken it into their heads to malign females who have the misfortune to be afflicted with hysteria, and not even to give them credit for acting under the involuntary impulses of the disease, or even of partial insanity; but they accuse them of wilful, wicked perverseness. Of these, as I think, groundless and cruel assertions, made by different authors, we have an epitome in a recently published clinical lecture on what is denominated "so-called hysterical disease." After a sufficiently candid but indefinite exordium, the lecturer proceeds to say: "It will be well, I think, if we commence by a *résumé* of the opinions held by some of the best authorities respecting the

essence of hysteria" [that is, positive, well-defined hysteria; something might have been anticipated about "so-called hysteria"]. "Sir Thomas Watson, with characteristic wisdom, abstains from offering an exact definition, but sets forth in graphic descriptions the chief features of the malady in its various manifestations." [Could he improve upon Cullen's definition, or the description given by Aretæus a couple of thousand years ago?] "We cannot but gather from his pages, that he holds *undue mobility and excitability of the nervous system generally on the one hand, and an ill-regulated, deceitful, perverse mind on the other, to constitute the essential factors of the various phases of this pathological Proteus.*" The last sentence, in my italics, is graphic, certainly; but, I believe, it is also imaginative, and not true. It must either be *disease*, and so far involuntary; or, if deceitful and perverted, as Sir Thomas asserts,* or rather is made to assert, it is *not disease* at all.

* I am happy to say, that the opinion is not to be found in print in Watson's *Practice of Physic;* and I have seldom seen a writer more misapprehended. It is as I suspected: Sir Thomas Watson was alluding to vicious young females of the lower class, malingerers in hospital; not hysterical cases, but cases feigning ischuria, for the gratification of being catheterised by the dressers. Sir Thomas Watson's meaning is misinterpreted; he merely says, towards the end of the section (having referred to *these*, if you please, *so-called* hysterical cases): "Some of the shapes assumed by this pathological Proteus are hideous and disgusting;" and in *alluding to them* he uses the terms "deceitful, perverse, obstinate" (vol. i. pp. 693, 694). I may here mention one of my own methods of getting rid of these "deceitful" malingerers, which does not seem to have occurred to either writer, viz. to turn them over to one of the elderly nurses, to intro-

How could the Professor gravely indorse such a libel upon the sex? If he does not know, I do, that the most *well-regulated, candid, and amenable* females become severely afflicted with hysteria, without having their wits warped, or becoming possessed of a devil, which is the nearest thing to his description. Certainly, he or his authorities may have encountered vicious women occasionally, both in hospital and private practice, whose evil propensities were unfortunately exaggerated by the morbid sensibility of real hysteric *disease* when that coexisted. But this is not applicable to hysteria in general.

He proceeds: "Dr. Prout's opinion may best be expressed in his own words, which, no doubt, convey his actual experience: 'In investigating hysteric cases, we should constantly remember that the utmost duplicity and cunning may be displayed, where from mere appearances we should expect nothing but the most rigid truth; in short, that the whole energies of the patient's mind are bent on deception.' The cause which gives rise to this mental state, Prout believes to be the natural desire of being an object of attention when it is disappointed in its legitimate form, and perverted into a craving for pity and commiseration. He evidently lays most stress on the peculiar mental condition, and, as is shown in a case which he gives in a note, believes that this disorder may hold sway in persons whom no one would ever have suspected of yielding to it." "Yielding to it:" what does Prout *mean?*

duce the catheter—whose services, not suiting their tastes so well as those of a young man, were very soon dispensed with.

Does he assert that hysteria is invariably *imposture?* He appears evidently to incline to that view. The lecturer leans upon Prout's "experience;" but who cares for experience, with such a result?

The lecturer adduces cases, such as one of Dr. Todd's, of fatal paralysis from cerebral disease, with the autopsy thereof; one of his own, that of a lady who wounded her finger, sat quiet for a time, afterwards "laughed, cried, and kicked!" he quotes Sir Ranald Martin, as describing hysterical nervous symptoms occurring as *sequelæ* of *sun-stroke* (but do they constitute *hysteria*, or *so-called hysteria?*); he mentions, among other authors, Dr. Conolly, Dr. Meryon, and Sir Benjamin Brodie; and, lastly, gives an account of a *gentleman* who fainted after a fatiguing walk, and, whilst recovering, had the greatest difficulty to restrain himself from bursting into a paroxysm of laughing and crying (query, was *she* hysterical?*). It may seem that I am turning the matter into ridicule; but I have quoted from the lecture honestly and in good faith. According to

* This suggests the unpardonable perversion of the term *hysteria* in applying it to analogous symptoms in the *male;* though men who are paralytic, or who have suffered a shock from an accident, will sometimes shed tears or laugh involuntarily, *like* an hysteric patient. The usual means that the author has employed, in order to point out this absurdity, has been to ask, "Has your friend ever been 'in the family-way'?" as the word *hysteria* distinctly refers to ὑστέρα. It is bad enough for a man to be nervous, without being called a woman. A well-known surgeon consulted Sir Astley Cooper about his heart; offended at Sir Astley's opinion that he was hysterical, he in his will left his heart to St. Thomas's Hospital, and to Sir Astley bequeathed his *uterus!*

my experience, *versus* Prout's, I attended, twenty, nay thirty, years ago, ladies still alive,—the most amiable of their sex—good as wives, mothers, and spinsters,—who were then miserably hysterical, but not possessed of a devil, nor with "ill-regulated minds, perverse and deceitful." They were neither "*impostors*," nor was their disease "*self-produced*." The lecturer quotes from another writer, that "the gouty diathesis" (not very common in girls of sixteen) "may give rise to hysteric disease." There has been much absurdity written about gout, and also about hysteria; but this union of the two is a climax. However, lecturers may call diseases what they like; but they should not state or imply that the phases of true *hysterical disorder* are more or less wilfully and of set purpose simulated. Let me, in justice to woman, quote from another periodical:

"No nobler passages of service to God and man can be quoted than those which record the deeds done by the brave gentlemen who have bent patiently over the plague-seed, and hunted for its secret with scalpel and glass; and by the brave women who went down to hospital and alley, and for charity's sweet sake, and no other reward, fought the battle of the plague. We only know some few of their names, such as that of Miss Sellon; and if we cannot find out yet what makes the cholera, we know at least what it cannot unmake—the steady search for truth, through danger and through dread, on the part of men who are her true lovers; and the splendid courage of human hearts in the face of death, even in its most terrible form, when pity,

duty, and firm trust in the life beyond all deaths makes even women warriors, conquerors, heroines, angels."

The author has attended more than one of these very "angels" in hysteria; in the case of one of them, there was actual hysterical delirium for weeks, brought on by over-exertion, though she is now in perfect health and strength.

From Aretæus to Cullen, and from Cullen until now—or rather, until lately—intelligent and experienced medical men understood hysteria to be that collection of anomalous symptoms to which no other appropriate name can be given, because they depend upon the peculiar morbid sensibilities of and sympathies with the *womb*. Hysteria depends upon the uterus as certainly as dysmenorrhœa or leucorrhœa, which cannot exist in the male. Hysteria cannot, therefore, have existed in the Duke of Wellington, although he is adduced by one of these authors as an example of that state of nervous disease, "so-called hysteria;" an epithet adopted by well-intentioned and amiable, but mistaken authors, who have never been able to make themselves masters of the subject of hysteria—partly from forgetting, or from never having learned, Cullen's definition.

We do not find the same states of mind in *males*, even if they are so excessively nervous as to be *miscalled* hysterical; and when we meet with anomalous symptoms, and unaccountably odd whims and dispositions, and tiresome fancies, in hysterical females, we must ignore them altogether, and, by general constitutional treatment and specific medicines, cure

the uterine system; and then the natural disposition will return and show itself.

In the foregoing pages I have endeavoured to lay down general principles, deduced from physiology, which may apply to particular cases of disease. In the explanation of pathological phenomena, I have referred to the action of capillaries and nerves, considering them *as they exist in nature*, ramifying with and supporting each other throughout. It is by their combined and normal action upon the blood sent to them by the heart that they produce the phenomena of health—their deranged action constitutes *disease*, which does not commence in the blood, as the humoral pathologists would fain persuade us. I have also tried to explain the nature of remedies, with regard to which I would urge, that although not a moment should ever be lost in their application, yet we should have patience in waiting for their action; and that, while inert practice is mischievous, the safety of the patient may, on the other hand, depend upon the due recognition of the Terentian maxim, *ne quid nimis*.

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