

Dr. Hooper's Physician's vademecum, or, A manual of the principles and practice of physic / [Robert Hooper].

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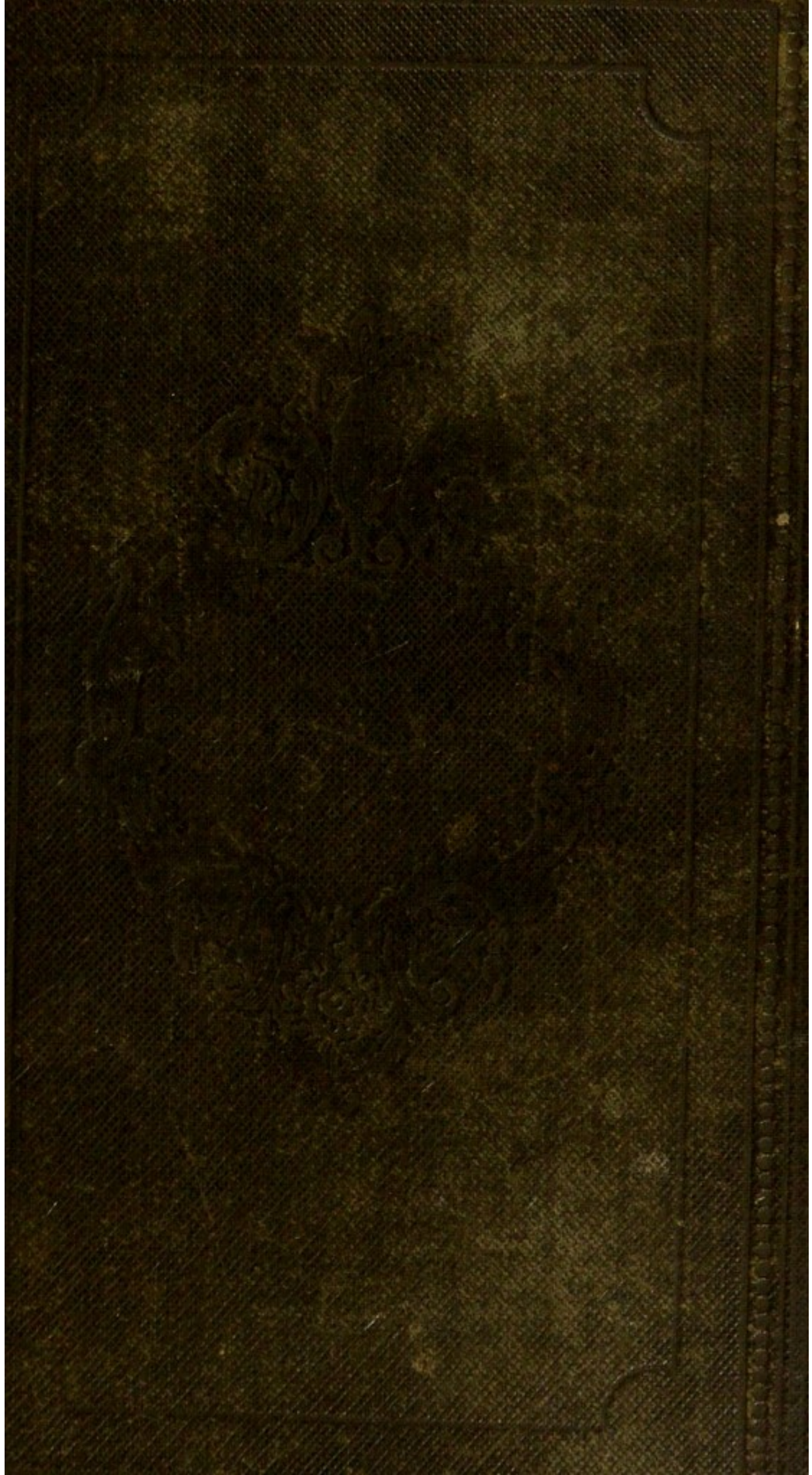
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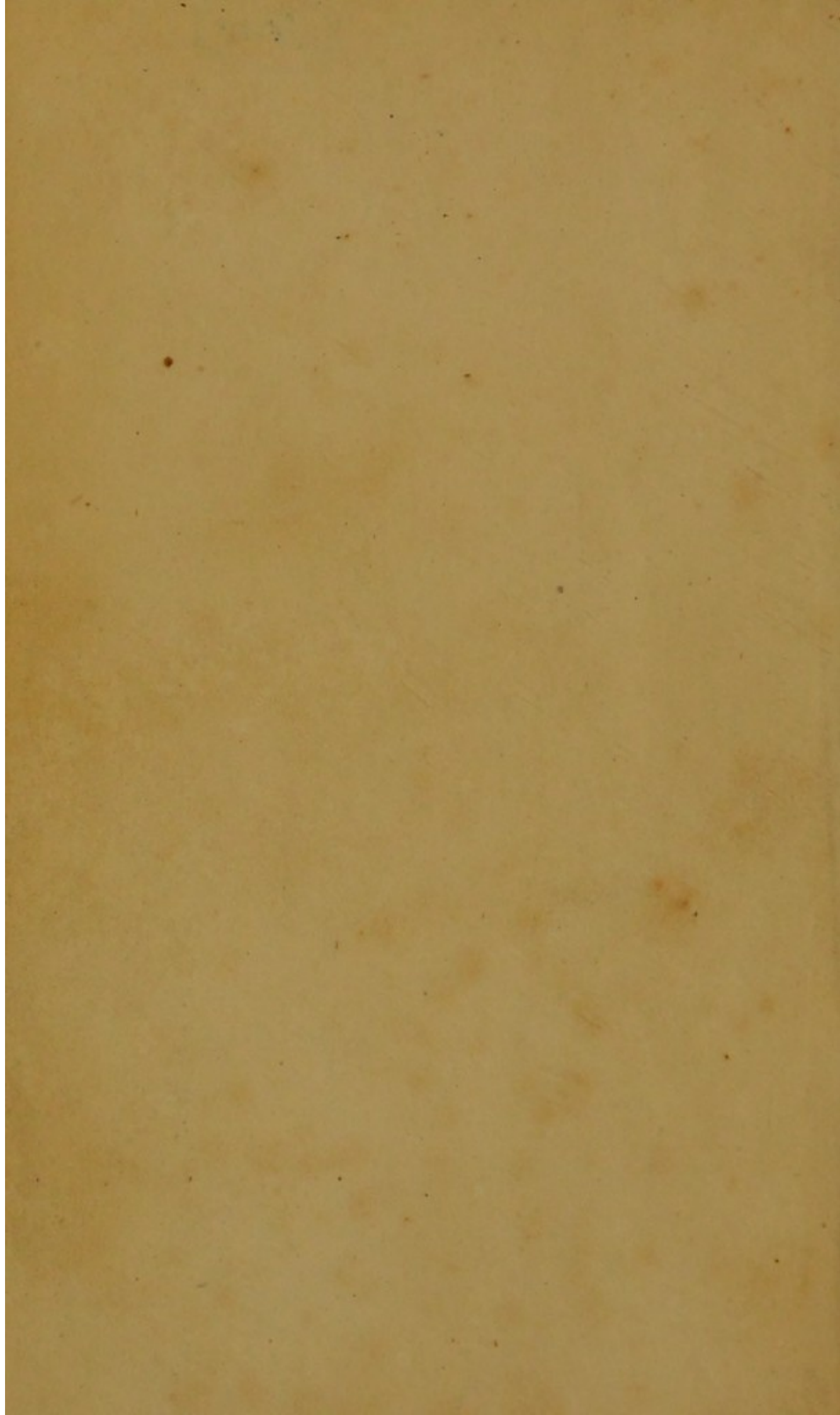


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J. C. M.

THE
PHYSICIAN'S VADEMECUM.

quis hunc librum legere velit.
anatomiam bene scire debet.
an scientiam nisi bene cognoscit
an medicinam comprehendere possit.

DR. HOOPER'S
PHYSICIAN'S VADEMECUM;
OR,
A MANUAL
OF THE
PRINCIPLES AND PRACTICE OF PHYSIC.

New Edition.

CONSIDERABLY ENLARGED AND IMPROVED,
WITH
AN OUTLINE OF GENERAL PATHOLOGY AND THERAPEUTICS,

BY WILLIAM AUGUSTUS GUY, M.B. CANTAB.
PROFESSOR OF FORENSIC MEDICINE, KING'S COLLEGE, LONDON;
AND PHYSICIAN TO THE KING'S COLLEGE HOSPITAL.

LONDON :

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EDINBURGH, A. AND C. BLACK.

1842.

LONDON :

PRINTED BY G. J. PALMER, SAVOY STREET, STRAND.

AUTHOR'S PREFACE.

THE following concise account of the several diseases that fall under the province of the Physician was committed to the press, with the hope of its proving useful to students, and those practitioners in medicine who, from their professional occupations, or other circumstances, may not have it in their power to consult the more voluminous works that have contributed so much to the improvement of medicine.

The very extensive sale of the work, and its having been translated into most of the continental languages, induce the Author to believe that his labours have been generally approved.

It has been his object to compress, within a smaller compass than has hitherto been done, consistently with utility, everything which more especially deserves attention with a view to the treatment of diseases. In pursuing this design, he has discarded all theory, and retained only those leading facts with which it is absolutely necessary for a practitioner to be acquainted when he approaches the bedside of his patient.

Under distinct heads are arranged,

1. The characteristic symptoms by which diseases are known.
2. The causes from which they most frequently have their origin.
3. The circumstances that more especially point out the difference between diseases which resemble one another.
4. The signs which influence the judgment in forming a prognosis of their event.
5. That mode of treatment, which, in the present improved state of medicine, is deemed most appropriate, and which experience has sanctioned.

The select collection of Formulæ, Glossary of Terms,* and the Table showing the Doses of all valuable medicines he employed, will, the Author trusts, combine to render the volume more extensively useful.

Saville Row, August, 1823.

* The Glossary of Terms has been omitted in this edition; the collection of formulæ has been greatly enlarged and re-arranged; and the Table Doses has been remodelled.

EDITOR'S PREFACE.

A WORK to which the familiar name of Dr. Hooper is attached must of necessity find its way into the hands of many readers. This consideration gives to the present work an importance which its small size and unpretending character would scarcely claim for it; and it is this which has induced the editor to undertake the task of preparing it for the press.

From the author's preface it appears that the only object contemplated in the first editions of this work, was that of furnishing a concise treatise on the practice of medicine for the use of the student and practitioner. In the two last editions, however, an introductory part was added, containing a short outline of Physiology, Pathology, and Therapeutics, some brief directions for clinical examinations, and a sketch of symptomatology and semeiology. This part, which did not occupy more than sixty-five pages, has been entirely re-written, and extended to nearly one hundred and fifty pages.

The present edition, then, consists of two parts, corresponding to what is commonly understood by the terms general and special pathology and therapeutics.

The first part consists of six chapters. The first chapter is merely introductory, and contains a scheme of medical study which, it is hoped, may prove useful to the pupil at his first entrance upon his studies. The second chapter contains some useful directions for the taking of cases. The third chapter headed "Health and Disease," consists chiefly of definitions and explanations of terms. An outline of Physiology and General Pathology forms the subject of the fourth chapter, in which an attempt is made to bring together some of those facts and theories which admit, either directly

or indirectly, of practical application. Those functions of the body which attract most attention at the bedside, and those methods of examination which are of most constant application, form the subjects of the fifth chapter. They are the examination of the blood and urine; of the chest and abdomen; of the pulse and respiration. In this part of the work, the object of the editor has been to furnish the most exact information concerning the functions of the body in a state of health; and with this view he has embodied his own observations on the pulse, and introduced, under the head of the respiration, some facts at present new to the profession. The last chapter contains a brief outline of General Therapeutics; with the addition of tables of the doses of the more important remedies, of the proportion of the more active ingredients contained in the preparations of the pharmacopœia, and of the doses proper for each age.

Throughout this first part, the editor's object has been to make the work useful as a book of reference at the bed-side; at the same time that he has endeavoured so to connect its several parts together as to offer some inducement to the reader to study it as a whole.

In the second part, which answers to the original work, very extensive alterations have been made. Cullen's nosology has been laid aside, and an arrangement has been adopted which brings together the diseases which affect the same organs, or are otherwise nearly allied to each other. No attempt has been made to form a nosological system, but the diseases are, for the sake of convenience, thrown together in separate chapters.

Many liberties have been taken with the text. The prescriptions have been thrown together at the end, and carefully arranged under distinct heads, instead of being scattered through the body of the work; the original text and the emendations made in the later editions, have been fused together and blended with the additions made by the editor; many parts of the work have been so much shortened as to admit of the introduction of a great number of diseases not described in former editions; many others which were only incidentally mentioned are treated under separate heads; and a still greater number have been so much altered as to be nearly new.

Among the additions to the work may be mentioned, general

observations on continued fever, puerperal fevers, plague, muscular rheumatism, neuralgia, cephalalgia; and among the diseases which have undergone the greatest alteration, infantile fever, diarrhœa, hydrophobia, laryngitis, asthma, phthisis, diabetes.

Some portions of the work on which the late editor had bestowed much labour, as the diseases of the heart and those of the skin, have been left nearly in the state in which the present editor found them; but even here the same liberty has been used of curtailing anything which appeared unnecessary, and adding in what appeared wanting. Original observations or practical remarks, embodying the results of the editor's own experience, are distinguished by the initial G. A copious index, prepared with much care, completes the volume.

The short time within which it was necessary to prepare this work for the press, has been so fully taken up by the additions and alterations now specified, that little leisure remained for consulting the more voluminous monographs on the several diseases treated of; the references to authors, therefore, are not very numerous. In the first part much assistance has been derived from Dr. Baly's translation of Müller's Physiology, and, throughout the first and second parts, from the many excellent practical treatises in the Encyclopædia and Library of Practical Medicine.

The editor trusts that his labours will be found practically useful, and that they will be received as an earnest of still more extensive improvements which he hopes to make, should the publishers entrust future editions to his care.

WILLIAM A. GUY.

15, *Bloomsbury Square.*

April 1842.

THE PHYSICIAN'S VADEMECUM.

PART I.

CHAPTER I.

INTRODUCTORY REMARKS ON THE STUDY OF MEDICINE.

To make an accomplished physician, four things are necessary ; a good school education, sound medical instruction, experience, and learning. A few remarks on each of these subjects may not be without their use.

The knowledge acquired at school rarely extends beyond the first rudiments of education, and the dead languages. A competent knowledge of Latin is required from all medical men ; the graduates of our English universities are expected to understand Greek, and the London College of Physicians includes that language in its subjects for examination. The advantage which the physician derives from a knowledge of these languages is too apparent to require comment.

When the school education is complete, a longer or shorter interval is allowed to elapse, before the medical man begins the studies of his profession. By some this interval is spent in the classical and mathematical studies of an university ; but by far the majority of medical men pass through an apprenticeship. The graduates of our English universities enjoy the great advantage of a more extended general education, which, in addition to the dead languages, includes the study of mathematics,

and other branches of polite learning. The object of all these studies is to fit the mind to grapple successfully with whatever subject it may afterwards undertake. Those who do not possess the advantage of an extended college or university education may find many opportunities during the period of their apprenticeship of improving their minds, and preparing themselves for the studies of their profession. The knowledge of the dead languages, which they have brought from school, may be preserved and extended, and opportunities may offer of acquiring the modern tongues, especially the French and German. A more accurate knowledge of arithmetic than is usually obtained in schools, and an acquaintance with the elements of the mathematics, would be advantageous to the pupil. To these he ought to add the study of the principles of natural philosophy. The value of these preliminary studies is generally admitted. The languages are the keys of knowledge, and the interpreters of terms; number is the only accurate measure of quantity and standard of comparison; the mathematics form the best exercise of reasoning; and natural philosophy the best example of the power of observation and experiment. Possessed of this knowledge, and of the mental training which it implies, the pupil is well prepared for the studies of his profession.

Medical instruction embraces a large circle of sciences, which may be classed as follows:—

1. Descriptive and general anatomy, and comparative anatomy; or the sciences of healthy structure.

Physiology, human and comparative; or the science of healthy function.

Morbid anatomy; or the science of diseased structure.

Morbid physiology; or the science of diseased function.

These, though they may be regarded as separate branches of science, are not taught in distinct courses of lectures. The three last subjects are often combined in one course. The object of all these sciences is to teach the structure and functions of the human frame in health and disease.

2. The second class consists of botany, chemistry, and *materia medica*.

The object of botany is to describe and identify those productions of the vegetable kingdom which are used in the treatment of disease. Chemistry, in like manner, describes and identifies the products of the mineral kingdom, and teaches the theory of the composition and decomposition of the various substances, whether animal, vegetable, or mineral, employed in the practice of medicine. Both these sciences, with occasional assistance from other branches of natural history, find their practical application in the lectures on *materia medica* and therapeutics; which, as the name implies, treat in detail of the physical characters, composition, mode of preparation, and administration of the various

remedies used by the physician, with the effects they produce, and the diseases in which they are administered.

Having obtained a competent knowledge, on the one hand, of the structure and functions of the body in health and disease, and on the other, of the substances which exert an influence, whether beneficial or otherwise, upon it, the student is prepared to understand and profit by the lectures on the practical sciences. These form the third class, and are as follow ;—

3. The theory and practice of medicine, the practice of surgery, midwifery, and forensic medicine.

In addition to the knowledge acquired by attendance upon lectures, the pupil is expected to have a practical acquaintance with anatomy, chemistry, and pharmacy. Facilities for acquiring this practical familiarity are now afforded in almost all the more considerable medical schools and hospitals.

It is greatly to be regretted that the requirements of the several examining boards which give diplomas or licences to practise, differ so widely, that no general scheme of study can be laid down, by following which, the medical student may be prepared for any examination that he may desire to pass, or may be able without inconvenience to make any change in his original plans which may appear desirable. In the absence of any general and comprehensive scheme of study, the following sketch of the lectures, and of the periods at which they can be most conveniently attended, may prove useful. A period of four years is supposed, which may be easily lengthened or shortened according to the convenience and opportunities of the pupil.

First Winter Session.	{ Descriptive Anatomy. General Anatomy and Physiology. Chemistry.	} Practical Anatomy.	
First Summer Session.	{ Botany. Chemical Manipulation.		
Second Winter Session.	{ Descriptive Anatomy. General Anatomy and Physiology. Materia Medica and Therapeutics.	} Practical Anatomy.	{ Surgical Practice of the Hospital and Clinical Sur- gery.
Second Summer Session.	} Practical Pharmacy.		
Third Winter Session.	{ Medicine. Surgery. Midwifery.		
Third Summer Session.	{ Forensic Medicine. Practical Midwifery.		
Fourth Winter Session.	{ Medicine. Surgery. Midwifery.		
Fourth Summer Session.*	}		
			} Hospital Practice, and Clinical Medicine and Surgery.

* This scheme is taken from a printed paper prepared by the Professors of King's College, for the guidance of students.

The College of Surgeons by their recent regulations (Oct. 14 1841,) require a third course of anatomy and physiology in the Third Winter Session. If the pupil's stay in London is necessarily limited to three years, he must attend lectures on materia medica, and the practice of surgery in the hospital, in his First Winter Session; he must commence the medical practice of the hospital, and attend one course of medicine, midwifery, and surgery, in the Second Winter Session, and a second course of each in the Third. This order of study agrees with the requirements of the College of Surgeons and Society of Apothecaries.

Experience is the ultimate aim and object of all teaching. The knowledge communicated in lectures is merely the foundation on which it rests: the superstructure is the work of each man's own hands. Experience implies opportunity and thought; a sufficient amount of materials, and a skilful use of them. Hospitals and Dispensaries supply these materials, with the assistance of able teachers in turning them to account. As soon as the student has completed the prescribed course of study at the medical school or college, he is prepared to profit by an attendance at the hospital or dispensary. Here he gains a practical insight into those principles which he has been taught in the lecture-room, and to apply which, will be the serious business of his after life. A diligent attendance at the bed-side, aided by clinical observations and clinical lectures, is the recognised means of acquiring practical experience. The best way of turning these opportunities to account will be the subject of the next chapter.

Learning is the handmaid of experience, and ought to be its inseparable companion. Lectures are intended to teach the pupil what to look for, and how to observe; to inform him of the real value of facts, and to aid him in the interpretation of them. The knowledge derived from lectures, with the assistance of a few class books, is all the learning which the medical student can hope to obtain. The practitioner may increase this knowledge by a more extended course of reading, and find in books both the guides and correctors of his own experience. As lectures form the foundation of experience, so the teaching of books is the ornament and finish of the superstructure. Learning does not always imply labour and research: it may be had at second hand, and there are always those who make it their business to supply the practitioner's want of time and opportunity. Our modern cyclopædias, the larger systems of medicine, and the many excellent periodical works which adorn and enrich our medical literature, bring learning home to every practitioner of our art.

To the foregoing essential constituents in the character of the accomplished physician, might be added *tact*, or that faculty of applying acquired knowledge which distinguishes the practical man of the world from the philosopher of the closet; and those

moral endowments which in the case of so many of the most eminent members of our profession, have been more conspicuous even than their learning, and have made "superior skill their second praise."

CHAPTER II.

HOSPITAL ATTENDANCE AND CLINICAL INSTRUCTION.

WITH his attendance in the wards of an hospital, the student enters upon a new phase of his studies. Hitherto he has been comparatively passive in acquiring knowledge; he now begins to observe, and, to a certain extent, to act for himself. In this part of his career he feels himself most in need of assistance, and the advice of the more experienced members of his profession is now peculiarly useful.*

Hospital patients consist of two classes—in-patients and out-patients. The in-patients comprise the most severe and the most interesting cases, and furnish the most useful and most complete means of practical instruction. These means are turned to account by observations at the bed-side, and by clinical lectures at stated periods, which form an instructive commentary on the history and progress of the several cases. The out-patients are less useful as means of instruction, but they make up in number what they want in completeness. An accurate knowledge of the practice of medicine can only be obtained by combining the two classes. The more ordinary forms of disease have a claim to attention on account of the great frequency of their occurrence, the rarer and more severe on account of the difficulty of their diagnosis, the rapidity of their course, and the prompt treatment which they require.

In order to derive advantage from the large opportunities of experience afforded by the hospital, it is not enough that the student attend diligently at the bedside, or listen attentively to the clinical instructions of his teachers. He must become his own teacher, and employ his own senses and his own mind on the objects presented to his notice. In this way alone can he acquire true experience. To bind himself to this active employment of his faculties, he should take notes of cases. The following brief directions for taking cases may be useful to him.

Directions for taking Cases.—Those who have had most experience in clinical instruction dissuade the student from beginning

* In this place I cannot too strongly recommend to the student's attention Dr. Latham's "Lectures on subjects connected with Clinical Medicine."

to take cases as soon as he commences his attendance at the hospital. His first care should be to familiarise himself with the elements, so to speak, of all cases—the individual symptoms which, thrown into groups and variously combined, make up the *total* to which we give the name of disease. For this purpose he should lose no opportunity of exercising his senses. He should busy himself in looking at the tongue, feeling the pulse, listening to the sounds of the heart and of the respiration, marking the expression of the countenance, observing the appearance of the excretions, and, in fact, in taking cognizance of everything which is an object of sense. For this purpose he should not confine his attention to one class of patients, and as his object is to gain as much knowledge as possible of individual symptoms, he should avail himself of the extensive opportunities afforded him by the out-patients of the hospital. Having obtained some familiarity with individual symptoms, and with the terms used in describing them, the student is now prepared to enter upon the task of taking cases. At first starting, he may derive much assistance from the case-books kept by the clinical clerks, and he would do well to copy some of the leading particulars of the cases from this source. When he begins to take cases for himself, he should select some well-marked instances of acute disease, such as acute rheumatism or pleurisy; or some equally well-marked instance of chronic affection, as pulmonary consumption. After some practice with these, he will be prepared for more complicated cases of disease.

The student, having selected some well-marked case of disease for his first essay in case-taking, will be naturally anxious for some instruction as to the best mode of proceeding. The taking of cases accomplishes two useful purposes—it binds the student to close and accurate observation, and it furnishes himself and others with useful materials for the establishment of general principles, and the illustration of important points of practice. For both these purposes *method* is necessary. But this is not all that is required. A case is a history of facts: the taker of cases, therefore, must be as free from prejudice and the influence of preconceived notions as the historian. A case is incomplete if it merely records the sensations of the patient, or the more obvious symptoms, many of which are useful merely by suggesting further inquiries. In order to make these inquiries, some previous instruction and experience are necessary. Hence the necessity of not taking cases too soon.

Again, a case should be as short as possible, or its very length will prevent it from being turned to any practical account. Conciseness, therefore, ought to be aimed at. Simplicity of expression is another point often little regarded, but of great importance. The shortest, the simplest, and the most intelligible words should not merely be used, but carefully sought after, and, where it is practicable to make use of figures, they should always be preferred to words. Where the pulse or the respiration are spoken of, they

should be counted; where the quantity of the urine or other excretion is mentioned, it should be expressed in figures; where the size of an external part is described, it should be measured.

Completeness, conciseness, simplicity and accuracy of expression, and methodical arrangement, then, should be aimed at in the reporting of cases. It is not easy to prescribe the exact method or order in which the several particulars of a case should be recorded. Some order is advisable and even necessary; but it may be doubted whether any one form will suit all cases alike. The following hints may prove useful to the beginner.

Each case should be written on a loose sheet or sheets of paper, and a space should be left at the head of the paper for the name of the disease, with a few words expressive of the chief point of interest in the case. Thus supposing the case to be one of acute rheumatism cured by bleeding and quinine, it would be headed as follows:

ACUTE RHEUMATISM.

Cured by bleeding and quinine.

The case should then begin by the *date*, and a statement of the *name* and *residence* of the patient; next to this should follow the *sex*, (implied in the name,) the *age*, the social relation, whether *married*, *single*, or *widowed*, and the *employment*. These particulars may be conveniently thrown together in a tabular form, with a space for recording the result of the case, with the date of its termination. Thus:

Date.	Name.	Residence.	Age.	Married or Single.	Employment.	Termination.	
						Date of.	Mode of.

To these particulars may be added, if required, the ward of the hospital and the physician under whose care the patient is placed. These should follow the patient's name. The patient, thus identified, and some of the more important and prominent particulars concerning him having been ascertained, we next proceed to the patient's own history of his previous health and present illness. This history will comprise the following points:

The patient's habits of life, whether temperate or otherwise; his usual state of health, whether robust or delicate; (in women, the number of children should be noted, and the date of the last birth;) if the patient has been ill before, the nature and duration of his attacks; (in certain cases, as of phthisis pulmonalis, gout,

struma, &c., inquiry should be made as to the diseases which have attacked the family of the patient, his parents and ancestors, his children and descendants, and his other blood relations.)

The history of the patient's former habits, health, &c., should be followed by his own account of his existing malady, including its period and mode of commencement, whether sudden or gradual, and its assigned cause, the symptoms present, the order of their occurrence, their duration, and progress up to the present time; and lastly, the medical treatment, if any, to which he has been subjected.

The present condition of the patient must now be carefully examined. This will be ascertained by simple inspection. The points to be attended to are chiefly the following:—Aspect and physiognomy of the patient; his complexion, whether pale, florid, dusky, or sallow; the bulk of the body, whether large, full, and muscular, or spare and wasted; the temperament; the condition of particular regions or parts; the state of the skin, whether covered with eruptions, and if so, what is their character; and lastly, the power of locomotion, whether or not there is a free use of the limbs.

The history which the patient has given of himself and the cursory examination of his external appearance will have given some clue to the disease under which he labours, and will necessarily determine the questions to be addressed to him, and the order of inquiry which the physician will have to follow. In all cases, the natural order should be followed, beginning with the most urgent symptoms, and the part primarily affected, and proceeding successively to those organs which have the nearest connexion with that part. If, for instance, the head be the seat of the disease, the head will occupy the first place in the account of the case, and those parts and functions which have the closest relation to the function of the brain will follow next in order. It is impossible, therefore, to lay down any precise rules for the further examination and record of the case. A reference to the following chapters of this work will furnish the student with much useful assistance, and suggest the inquiries which he should make in reference to the several parts, organs, and functions of the body.

The number of particulars which require to be noticed in each case, as they depend on the nature of the case itself, must be left to the judgment of the observer. In the more common forms of disease the number of particulars will be limited, in the rarer and more obscure affections a more minute detail will be necessary, in order that no point which either is or may hereafter prove important may be omitted.

The history of the case at its first admission into hospital having been reported, its daily progress will have to be watched and committed to writing, and those symptoms which form the most prominent features of the case will have to be noticed in each day's

report. Here, too, the judgment of the observer will be exercised in selecting those points which are most deserving of attention. For the sake of perspicuity, it will be useful to form two columns, the one containing the daily report of the case, the other the remedies and diet prescribed. When the case has terminated, the result may be entered in the table which forms the heading to the case.

Should the case prove fatal, the appearances discovered on dissection should be described with the same minute accuracy as the symptoms and progress of the disease. A note of the appearances should be taken at the time of the inspection, and whilst the diseased structures are still under examination. The size of parts should be determined by measure and weight, and the quantity of fluids should be expressed with like accuracy. All the important organs of the body should be inspected, that the description of the post-mortem appearances may be as accurate as that of the symptoms and progress of the case during life.

It has been recommended that the cases should be taken on loose sheets of paper. If this plan be adopted, it will be easy to convert them into a book by the use of a spring, and this book may be furnished with a suitable index. By this means, cases of the same disease may be grouped together, so as to admit of easy comparison with each other.*

It must be borne in mind, that the order to be observed in taking cases, or, in other words, writing histories of disease, is not necessarily the same as that to be employed in investigating a case for practical purposes. Here we must be guided in great measure by the patient's first account of his most urgent symptoms. We must make them our starting point, and investigate their nature, so as to convert the symptoms of which the patient complains into signs of his disease. Thus, if he complain of pain, we must inquire into its exact seat, and ascertain its precise nature. This will give us some insight into his disease, and the clue thus obtained must be followed out till we discover its exact nature, seat, and cause.

The use of cases, as has been already stated, is twofold—to encourage a habit of close observation, and to form materials for the rearing of general principles. The grouping of similar cases together is the first step towards generalization. The tabular form at the commencement of each case will render this process easy in respect of some of the more important particulars of each case. Where it is desirable to determine the value of any single symptom, to ascertain the frequency of any sequence, or to construct an abstract of the symptoms present in any form of disease, a method of tabulation first proposed by the late Dr. Todd of Brighton,

* For particulars of this method of forming loose papers into a book, the reader is referred to a paper in the *Journal of the Statistical Society* for January 1841. The plan, which was originally formed for a common-place book, may be adapted with trifling alterations to a case-book.

may be advantageously employed.* In noting the symptoms present in the more common forms of disease, this method may be employed from the first, and it will be found to have many advantages over the usual method of case-taking. The daily progress of a disease does not admit of being reported by this means ; a complete history of the case can therefore only be given by the common method.

When it is considered that cases form the staple out of which all general principles of pathology and treatment must be formed, the importance of method and care in recording cases will be self-evident. To form a science of medicine, good materials are as necessary as correct reasoning. Well-recorded cases furnish the raw materials, and method is the machinery which induction uses for the formation of general principles.

The necessity of employing figures wherever they can be used has already been insisted upon. It only remains to state, that they are not only applicable to the accurate description of such functions of the body as admit of being estimated in this way, but also to express the number and consequent value of the facts on which any general principle is founded. This use of numbers in medical investigations has received the name of the *numerical method*, and has been extensively and successfully applied by Louis and others.

The employment of numbers in describing the conditions of the functions of the body in health or disease, presupposes the use of certain *instruments*. Those which the physician employs are few in number ; the principal of them are, a tape-measure, or callipers of different sorts, for measuring the size of parts, as of the chest, abdomen, &c. ; a watch, with a second-hand for counting the pulse and respiration ; the thermometer for measuring the temperature of the body ; and the urinometer for determining the specific gravity of the urine. Besides these more accurate instruments which give their indications in numbers, the physician employs other instruments in aid of his senses, as the lens for the examination of minute objects, and the stethoscope to assist the ear in listening to the sounds of the heart, lungs, or blood-vessels. In examining the various excretions he makes use of test-paper, and, in testing the urine, of the spirit-lamp, nitric-acid, &c. On various occasions, too, he resorts to the use of the microscope. Those who are ambitious of accuracy should provide themselves with most of these instruments, and exercise themselves in the use of them.

The medical student having completed the prescribed course of study at the medical school or college, and being about to commence his practical studies at the bed-side, will be naturally anxious to pass in review the extensive knowledge which he has

* The Book of Analysis, or a New Method of Experience, &c., by Tweedy John Todd, M.D.

acquired, and select from it such parts as have the most immediate and useful bearing on the new studies in which he is about to engage. For this purpose he will select from his anatomical and physiological knowledge those facts which are most nearly allied to, and throw most light upon, the alterations of structure and function occasioned by disease. In like manner he will endeavour to recall some of the more striking symptoms of disease with which the lectures on the practice of medicine have made him familiar, as well as the methods of examination by which he may determine their exact value as signs. And, lastly, he will endeavour to cull from the lectures on materia medica and therapeutics, such general principles of treatment, and such directions as to the administration of remedies, as may stand him most in stead in the treatment of disease. To understand its nature, he must add to this knowledge an acquaintance with morbid anatomy. The combination of the sciences just named constitutes the science of pathology—of disease in all its bearings—its symptoms, its seat, its nature, its causes, its consequences, and its treatment. In the succeeding chapters an attempt will be made to bring together, in a short and concise form, some of those points most necessary to be borne in mind at the bed-side, and most likely to prove of use to the student as well as to the practitioner.

CHAPTER III.

ON HEALTH AND DISEASE.

HEALTH admits neither of definition nor description; of none, at least, which can be applied to any useful purpose. If we define it as the integrity of every structure, and the perfect and harmonious play of every function, we give a true definition, but not a useful one. The more lengthened description in which some physiologists have indulged, answers no better end, for it establishes no standard of comparison, and that is what we are in want of. Perfect health, like perfect beauty, is perhaps an ideal compounded of the perfections of many different individuals; or if it exist, it falls to the lot of few, and its phenomena have met with no accurate description. Health, in its more usual acceptation, is a variable condition, and differs widely in different persons, and in the same person] at different times. The terms "*perfect*," "*good*," "*strong*," "*feeble*," "*robust*," &c., applied to health, show how generally this difference in degree is recognized. But there are also differences in kind as well as in degree. The dif-

ferent races of mankind, for instance, are marked by peculiarities of health not less striking than those of form. The fact that people of the same race differ widely in this respect, is recognized in the distinction of temperaments; and that individuals differ, is shown by the existence of the term idiosyncrasy. These differences are readily accounted for by the great number of external influences to which the body is exposed. A due supply of proper food, a sufficiency of pure air and water, a certain temperature, light, suitable clothing and shelter, cleanliness, exercise, temperance, and exemption from harassing cares—these and their opposites, separate or variously combined, are in constant operation to promote, impair, or modify health. These in themselves have an important influence on the condition even of those whose bodies are originally free from all defect. But such are probably few in number compared with those who inherit from parents or ancestors defects of constitution—defects originally derived from the operation of these very causes. The influences to which the body is exposed in all states of society, but especially in highly-civilized communities, are so various and so complicated as, even without hereditary taint, to account for the infinite variety which we observe in health, and as a natural consequence in disease; no additional argument therefore is necessary to establish the first great principle on which much of practice of medicine hinges—that *both in health and disease every function of the body varies in different persons within wide limits of intensity*. This fact is the key to the imperfection of medicine as a science, and its difficulty as an art.

Though health, as has been stated, admits of no accurate description, the several functions of the body, as they are performed in persons who are termed healthy, ought to be carefully studied, the variations in their intensity noted, and their general condition ascertained. For practical purposes those functions are the most important which are most frequently examined in disease, and furnish the physician with his most useful signs. These will be most carefully described in a future chapter.

In speaking of the variations in health, mention has been made of *temperament*. Persons who enjoy equal degrees of health may differ widely in the character of their health, and experience has shown that there are corresponding differences in external appearance. To a certain general aspect of body a certain general character of bodily and mental functions corresponds; and though the correspondence is by no means precise, it deserves some attention, if for no other reason, for this, that the term temperament is in common use. Four temperaments are generally recognized, the *sanguine*, the *phlegmatic*, the *bilious*, and the *nervous*.

1. The *sanguine* temperament is characterized by moderate plumpness of person and tolerable firmness of flesh. The hair is red or light chestnut, the eyes blue, the complexion fair and florid,

the skin soft and thin. The blood-vessels are large, the circulation active, and the pulse full and frequent. The body is active, the countenance animated, the passions excitable, the mind volatile and unsteady.

2. The *phlegmatic* temperament is distinguished by a round form of body, softness of the muscles, and repletion of the cellular tissue. The hair is fair, the eyes light blue or gray, and the skin pale. The blood-vessels are small, the circulation languid, and the pulse infrequent. All the functions bodily and mental are torpid.

3. The *bilious* temperament is recognised by moderate fulness and much firmness of flesh, with harshly expressed outlines of the person. The hair is black, the eyes and the complexion dark. The pulse is full, firm, and of moderate frequency. There is much energy, bodily and mental, the features of the person strongly marked and decided.

4. The *nervous* temperament is distinguished by a small spare form, slender muscles, quick movements, pallor of countenance, and delicate health. The pulse is frequent and quick, and easily excited by mental emotions or nervous impressions. The whole nervous system, including the brain, is active, the senses are acute, the thoughts quick, and the imagination lively.

A *melancholic* temperament is sometimes spoken of. It is nearly allied to the bilious, and is marked by peculiar calmness and seriousness of mind, with a great tenacity of impressions, and a tendency to indulge in gloomy thoughts.

Pure specimens of these temperaments are rarely met with. They are usually so combined that it is difficult to say which predominates.

Each of these temperaments is liable to a different class of diseases. The sanguine to acute inflammation, and active hæmorrhages; the phlegmatic to congestions, and subacute inflammation, to glandular and tubercular diseases; the bilious and nervous to mania, hypochondriasis, and melancholia.

Disease.—To define disease we must first have defined health, for the one is but the negation of the other. In like manner the description and right understanding of disease depends upon the description and right understanding of health. Without attempting a formal definition of disease, it will be sufficient to state, that disease is present when any structure of the body is changed, (provided that change be not the direct and immediate effect of external injury,) or when any function is either unnaturally active, or torpid, or altered in character. As we cannot say that any structure is changed unless we know what that structure was in health, nor that any function is disordered without a previous knowledge of the natural condition of that function, it is obvious that an accurate acquaintance with structural anatomy and physiology is a necessary preliminary to the study of disease. We learn the healthy structure of the body by dissection, the healthy con-

dition of the functions by observation. On this latter point our information is extremely imperfect, and many difficulties lie in the way of our obtaining it. Its importance is not yet fully recognized.

Diseases vary much (*a*) in their mode of occurrence, (*b*) in the causes which produce them, (*c*) in their duration and course, (*d*) in their type or form, and (*e*) in their nature. The following are some of the terms corresponding to these differences.

(*a*) *Epidemic*.—Attacking a number of persons at the same time, and recurring at irregular intervals; as fever, small-pox, cholera, &c.

Endemic.—Peculiar to certain localities, as ague, goître, &c. The same disease may be both epidemic and endemic: thus typhus fever is epidemic and endemic in certain districts of large towns. Cholera again is endemic in India, and epidemic in Europe.

Sporadic.—Attacking one individual at a time. In this sense the term is sometimes applied to epidemic and endemic diseases, attacking one or two persons only, in which case they are said to occur *sporadically*.

(*b*) *Contagious and infectious*.—These terms are now used synonymously to designate diseases communicated from one person to another.

Hereditary.—Transmitted from parent or ancestor, to offspring or descendants.

(*c*) *Acute*.—Of short duration and great severity.

Chronic.—Of long duration and slight severity.

These may be combined, as in intermittent fever, which is *chronic* in duration, and *acute* in severity. Again, one may run into the other, the acute subsiding into the chronic, and the chronic being heightened into the acute. In one instance, the terms *acute* and *chronic* have been incorrectly used to mark merely the severity of disease; thus articular rheumatism or rheumatic fever is called *acute rheumatism*, and rheumatism of the muscles is called *chronic rheumatism*.

(*d*) *Continued*.—Running their course without interruption in their symptoms.

Intermittent, or periodical. Interrupted by intervals of health.

Remittent.—Having an alternate augmentation and diminution of their symptoms.

(*e*) *Structural*.—Consisting in some alteration of structure.

Functional.—Consisting in disordered function.

Common.—Presenting the more usual character of common inflammation, &c.

Specific.—Peculiar, or departing from that character. Thus syphilis and scrofula are specific diseases.

Malignant.—Embraces structural diseases for which no remedy has yet been discovered, and which spread from texture to texture; as cancer.

Causes of disease. (Etiology.)—Many verbal distinctions are in use in respect of the causes of disease. Some authors make them *external* and *internal*, and others divide them into *mechanical*, *chemical*, *vital*, *physiological*, &c. The division most generally recognized is into *proximate* and *remote*.

Proximate causes—(Causæ abditæ, continentēs, occult causes)—This term has arisen out of the twofold meaning of the term disease. If a disease happens to be named from the part which it attacks, and the nature of the change that part is undergoing, as pericarditis, or inflammation of the pericardium, the proximate cause is the disease itself; if, on the other hand, the name is but the representative of a group of symptoms, as cough, dyspnoea, hectic fever, emaciation, &c., the symptoms of phthisis, then the term proximate cause means the suppurating tubercle which gives rise to all these symptoms. But if we are ignorant of the seat of a disease, as is the case with fever, the search after a proximate cause is but an inquiry into the real nature of the disease.

Remote causes. (Causæ evidentes.)—All constant antecedents of an event are called *causes* of that event, and all constant consequences of an event are called *effects* of that event. Hence the same thing may have many causes. Thus an hereditary taint, intemperance, or want, and a common cold, may exist in the same person as causes of pulmonary consumption. The hereditary taint may have rendered the person more liable than others to the formation of tubercles, intemperance or want may have occasioned their actual deposition, and the cold may have excited the dormant tubercle into activity. Now all these are *causes* of consumption, and the consumption may become the cause of death. How then are such causes to be distinguished from each other? They are divided into *predisposing* and *exciting*. In this instance the *predisposing* causes are the hereditary taint, and the mode of life; the *exciting* cause is the cold, and the *proximate* cause (if the term must be used) the suppurating lung. The condition of the body itself, however it may be brought about, is the *predisposing cause*, or the reverse, of any disease which may befall it; the *exciting causes* are external agents of various kinds, as cold, heat, &c. These external agents are also among the most powerful *predisposing* causes. Thus that combination of external influences which we call climate is the predisposing cause of a great variety of diseases, whilst any one of the elements of which it consists may become an exciting cause.

Symptoms and signs of disease (symptomatology semeiotics.)—All lesions of structure, whether the consequence of external injury or of internal change, cause some disorder in the functions of the body; and almost every disorder of one function leads to derangement in those which are most closely connected with it. These disordered functions are called *symptoms*. Thus pain, cough, and difficulty of breathing, are symptoms. Groups of symptoms

also, if they have a name, become compound symptoms. Thus fever is a symptom of inflammation.

The term symptom is variously qualified in medical writings. Thus we have *anamnestic* symptoms, or those which relate to a patient's previous state of health; *diagnostic*, or those which distinguish his disease from others; *prognostic*, or such as enable us to predict the event of his disease; *pathognomonic*, or those which are peculiar to his malady, and to that alone; and *therapeutic*, or such as indicate the treatment to be adopted.

But we have also *signs* of disease, and the word *sign* has not precisely the same meaning as the term symptom, though the two terms are sometimes used without much discrimination. The difference between them will be best shown by an example. Cough, expectoration, dyspnœa, hectic fever, night sweats, and emaciation, are *symptoms* of pulmonary consumption, but they are not *signs*, for each of them may occur in other diseases; but cavernous respiration and pectoriloquy are signs. So also expectoration is not a *sign* of consumption but a symptom, for it may occur in many other diseases of the chest, but a certain kind of sputa is stated to be a *sign* of that disease. From this it would appear that *signs* are merely pathognomonic or diagnostic symptoms. There is indeed nearly the same difference between a symptom and a sign as between a character and a characteristic. Redness, pain, increased heat, and swelling, are symptoms, or characters, or phenomena of inflammation; but redness, increased heat, and swelling alone, are at the same time symptoms and signs, characters and characteristics; pain is merely a symptom.

The term *physical* sign is in common use among medical men: it means a sign which is an object of sense. Thus heat, redness, and swelling are physical signs of inflammation, pectoriloquy of phthisis, coagulable urine of disease of the kidney.

The first duty of the physician is the interpretation of symptoms; this he effects by careful examination. If, for instance, a patient complains of pain in the chest, he proceeds to ascertain whether that pain is external or internal, and if internal, what is its precise seat. If, again, a patient void urine different from that of health, he submits it to chemical analysis, that he may find out the exact nature of the change which it has undergone, and trace that change to its source. By thus weighing the value of every symptom, he learns what the disease is, what its severity, what the treatment to be adopted, what the hope of recovery. His success will greatly depend on the method of examination which he adopts. Some of the more important methods are described in a future chapter.

In the observation of disease, the physician should be prepared to encounter one great difficulty, viz. the variation of the same symptom in different cases, and the occasional absence even of those

symptoms which when present are most characteristic. Thus, a frequent pulse is among the most striking symptoms of consumption, but cases sometimes occur in which the pulse does not exceed its average number in health. In these cases it is true the number of beats may be really greater than it was in the same person in sound health, but by our ignorance of that number we lose the benefit of the symptom. This same symptom of increased frequency of pulse is amongst the most constant and characteristic attendants on fever, and yet in some epidemics the pulse has been unusually infrequent. These anomalies meet the physician at every turn.

Names of diseases. (Medical nomenclature.)—No uniform plan has hitherto been pursued in giving names to diseases. By far the majority has been named from some prominent symptom; as fever, (from *ferveo* to burn,) hydrophobia, diabetes. Other diseases have been named from their seat, as hydrocephalus; or from their seat and nature combined, as pericarditis, pleuritis, iritis, the root indicating the part affected, and the termination *itis* denoting the nature of the disease, viz. inflammation. Recent attempts have also been made to substitute for words in common use more philosophical terms descriptive of the nature of the existing disease. Thus it has been proposed to substitute the term hyperæmia (excess of blood) qualified by the words general, local, active, passive, &c. for plethora, inflammation, and congestion; and anæmia (defect of blood,) similarly qualified, for chlorosis, &c. To these innovations it may be objected that it is yet premature to use terms which imply an accurate knowledge of morbid conditions, and that for some time to come it will be better to continue the use of those terms with which the profession is most familiar.

Classification of diseases. (Nosology.)—The same objection applies to all philosophical systems of nosology which lie against innovations in the use of terms; viz. that we are not yet prepared to construct a philosophical system. Almost all the systems hitherto proposed have rested upon some theory, which is now disallowed, and they have been attended with the usual inconvenience of all hasty and premature generalization—the inconvenience of associating dissimilar things, and separating those which are closely and naturally allied. Cullen's nosology illustrates this inconvenience in almost every page. The arrangement adopted in the present work is such, as to bring the diseases of the same parts together, whereby the student will have the advantage of comparing and contrasting one with another.

CHAPTER IV.

PHYSIOLOGY AND GENERAL PATHOLOGY.

THE human body may be regarded as a machine, not less remarkable for the finished workmanship of its parts and the consummate skill with which they are put together, than for its complexity. In these respects it resembles, at the same time that it infinitely surpasses, the most perfect works of men's hands; but it stands alone in this, that it contains within itself the means of ministering to its own growth and preservation, and, within certain limits, of repairing the many injuries to which it is exposed. It draws its supply of materials from without, appropriates to its own use almost every form of organized matter, and converts it by a subtle chemistry into blood. This fluid is distributed through the entire frame, nourishing, vivifying, and stimulating every part; the system of vessels by which it is conveyed, and the heart by which it is circulated, forming not the least remarkable portion of its mechanism. The blood, once circulated through the frame, becomes unfit for the nourishment of the body or the support of its life, till it is restored to its state of purity by exposure to air in the lungs. But the change produced in the blood by the contact of air, though it be the most striking, is by no means the only one which it undergoes in its circulation through the body. A variety of noxious ingredients derived from the food itself, or from the effete textures of the frame, are separated from the blood by appropriate organs, and expelled; at the same time that the functions of nutrition and secretion are going on in every the most minute part of the frame. In the performance of these several functions, the solid structures of the body are in incessant action, its fluids in perpetual motion, and both in constant change. The means by which all this is effected is more remarkable than the fact of its taking place. A power, of the nature of which we are profoundly ignorant, whose centre is the brain and spinal cord, and whose instruments are the nerves, presides over all these motions and changes, regulates, controls, and harmonizes them; and so adapts itself to the varying conditions of the frame, as almost to seem endowed with discretion and volition as well as power. Lastly, this wondrous fabric is the abode and material instrument of a mind, by which it is brought into connexion with the external world, and exposed to all those varied influences which make one race of men to differ from another, and each individual from his fellows. The intimate connexion which exists between the several parts of the frame, and the close dependence of one function upon another, is even more

remarkable than the multiplicity of parts of which it consists, and the variety of functions which it performs. If the heart ceased to circulate blood, or the lungs to purify it, the nervous system would no longer send forth those influences by which the heart beats, and the chest breathes. If, on the other hand, the nervous centres suffer injury, respiration may be prevented, and the heart may cease to beat. External influences also, on whatever part of the frame they act, affect not that part only, but through it other organs, and through these the entire body. Again, the mind affects the body, and the body reacts upon the mind, and both together form a being so intricate in structure, and so complex in function, that the continuance of his life and the maintenance of his health appear a constant miracle. But the perfection of this machine is equal to its intricacy; and thus it happens, that whilst the one provides under favourable circumstances for the free play of all its parts, the other exposes it under unfavourable ones to serious derangements of functions and alterations of structure.

Thus, then, the human body consists of a fluid with appropriate organs for its elaboration and purification; a system of vessels for its distribution throughout the frame; solid structures to be formed, maintained, and renewed; a ruling power presiding over every action of the solids, and every motion and change in the composition of the fluids; and an organ of the mind, the instrument by which its mandates are conveyed to, and its workings take effect upon, the body. The contents of the present chapter, arranged in the order which this recapitulation suggests, will therefore be as follows:—

1. The physiology and general pathology of the fluids, including digestion, chylification, sanguification, and excretion.
2. The physiology and general pathology of the circulating organs, considered as instruments for the distribution of the blood.
3. Structural pathology.
4. The physiology and general pathology of the nervous system.
5. The mind; considered more especially in its relation to the body.

I. PHYSIOLOGY AND GENERAL PATHOLOGY OF THE FLUIDS.

Digestion.—All organized matters are capable of being digested. Having been divided and triturated by the teeth, and moistened by the saliva, they are conveyed to the stomach, where they are submitted to the action of the gastric juice and converted into chyme. The time required for this operation varies in different persons, and in the same person at different times, and under different circumstances. The chief causes which affect the duration of the process

are the degree of division, the quantity of the saliva, the quantity and quality of the food itself, and the quantity of liquid with which it is mixed. This latter is of great importance, as the removal of the superfluous liquid by the absorbents of the stomach is necessary to fit the mass for digestion; a fact which has an important practical bearing on dyspepsia. The time required for digestion also varies with the kind of food. From the experiments of Dr. Beaumont it appears that animal food is more rapidly digested than vegetable, the meat of full-grown animals than that of young animals, fresh meat more readily than salted. Roast and boiled meats seem to require nearly the same time. Another circumstance which influences the duration of this process, is repose of body and mind. Exercise and anxiety both retard it.

Digestion is in part a chemical process, the gastric juice acting out of the body as well as in the stomach. An artificial digestive fluid may be made by soaking the mucous membrane of the stomach in dilute muriatic or acetic acid. This fluid, at a temperature of 99° or 100° Fahr., converts food into a substance closely resembling chyme.

All food, whether animal or vegetable, may be resolved, according to Dr. Prout,* into four classes or groups of staminal principles—the *aqueous*, (water); the *saccharine*, (sugar, vinegar, starch, gum, &c.); the *albuminous*, (the proximate principles of animals, and vegetable gluten); and the *oleaginous*, (oils and fats.) Neither of these principles taken alone will support life, and no substance which constitutes the food of the more perfect animals consists of less than three, if not of four of them. Milk, the nourishment provided by nature for the young of animals, is a compound of all these principles.

The food received into the stomach undergoes two changes, which have been termed by Dr. Prout *reduction* and *conversion*; the one consists in the formation of a homogeneous pulp, the other is a chemical action by which the several staminal principles are converted into substances similar to those which enter into the formation of the blood. In the healthy stomach both these processes are perfectly performed; but in disease, one or both are liable to derangement.

The *reducing* power of the stomach may be increased, whilst the *converting* power is diminished. In these cases, large quantities of food are taken, but the body remains thin and spare; the products of digestion pass off by the bowels, or in rare instances entering the blood, are discharged unchanged by the urine. On the other hand, the reducing power of the stomach may be diminished, giving rise to various forms of dyspepsia. If the converting power remains at the same time intact, the patient may gain flesh; if it is diminished, he grows thin. The reducing function of the stomach may be impaired by over-repletion, by the excessive use of

* On the nature and treatment of stomach and urinary diseases.

liquids, especially those of a stimulating kind, by injudiciously prolonged abstinence, or by the abuse of condiments.

The *converting* power of the stomach may be unusually active, in which case the food is rapidly converted into nourishment; or it may be lost in respect of all the principles, in which case the body ceases to be nourished; or it may extend to one only of those principles, and thus lay the foundation for serious disease.

The want of power to assimilate one or other of the staminal principles into which all aliments may be resolved, viz. the aqueous, the saccharine, the albuminous, and the oleaginous, may often be traced to hereditary predisposition, and to those causes which impair the general power of the stomach.

Little is known of the mal-assimilation of the aqueous principle, but the mal-assimilation of the saccharine and albuminous principles leads to effects both strongly marked and severe. The mal-assimilation of the saccharine principles (viz. sugar and vinegar, starch, lignin, and gum) causes the formation of sugar, which finds its way into the blood and urine in diabetes mellitus; of oxalic acid, which, combined with lime in the urine, constitutes the oxalate of lime or mulberry calculus; of lactic acid, which abounds in rheumatic and hectic fevers, and is probably the principal ingredient in many acid liquors rejected from the stomach in dyspepsia and other diseases. Mal-assimilation of the albuminous principles (albumen, gelatine, fibrin, and gluten,) may lead to an excess of albumen itself, conveyed into the blood and eliminated in the kidneys, and to the formation of lithic acid and cystic oxide calculi; whilst the mal-assimilation of the allied gelatinous principles leads to an excess or deficiency of urea, or of its equivalent the carbonate of ammonia. The mal-assimilation of the oleaginous principle leads to a deficiency of fat in the frame, or leanness: an unusual power of assimilating this principle to corpulence.

These forms of mal-assimilation are inferred to exist, not so much from the analysis of substances rejected from the stomach, or contained in that organ after death, (though sugar has been found in the stomach in excess in cases of diabetes,) but from discovering the products of such mal-assimilation in the blood and urine.

The chyme formed in the stomach, passing into the duodenum, is mixed with the bile and the secretion of the pancreas. Here the acid of the chyme is neutralized by the alkalies of the bile, and other changes take place which are not well understood. The chyme is separated into two portions, chyle and excrementitious matter; the chyle is taken up by the lacteals, whilst the excrementitious matter, mixed with the chief ingredients of the bile, passes through the intestinal canal, and is ejected as fæces. The bile, with the more indigestible portions of the food, forms the natural stimulus to the motions of the intestinal canal; an excess of bile increases the peristaltic action, a deficiency of it causes constipa-

tion. In like manner an excess of excrementitious, and especially of ill-digested, matters produces diarrhœa, the absence of all indigestible matter from the food tends to cause constipation. This is one of the evils of an over-refined cookery.

The fæces form but a small proportion of the entire ingesta, and consequently of the egesta. In Dr. Dalton's experiments, ninety-one ounces of ingesta yielded only five ounces or about 1-18th part of fæces. The quantity of this excretion, however, varies greatly in different persons, and in the same person at different times, and has also a close dependence on the quantity of indigestible matter taken with the food.

The biliary secretion stands alone in being formed from blood which has already served other purposes in the economy—the blood of the vena portarum. This vein, deriving its blood mainly from the intestinal canal, suffers distension whenever the coats of the intestines are unusually loaded with blood. Its intimate connexion with the liver makes the secretion of the bile dependent upon the supply of blood from the intestines, and the state of the intestines is, on the other hand, influenced by the quantity and quality of the biliary secretion.

Of mal-assimilation in the duodenum, little is known. If the chyme contains an excess of acid, the bile is unable to neutralize it, and the food passing through the intestines, gives rise to serious disorders of the first passages. The acid chyme also entering the veins of the porta, may give acid properties to the bile, and thus increase the original disorder.

Of the two portions into which the chyme is separated, viz. chyle and excrementitious matter, the chyle is absorbed by the lacteals, and conveyed into the thoracic duct, where it is mingled with the lymph collected from every part of the body by the absorbents, and the mixed fluid is then poured into the venous system, and becomes a part of the blood. This mixed fluid, of which the most important ingredient is albumen, in its course through the lacteals, undergoes changes by which it is approximated to the character of the blood. The absence of these changes is supposed to be one cause of disease, leading in children to obstruction of the mesenteric glands, and, at more advanced periods of life, to the deposit of an imperfect albumen in the form of scrofulous matter, tubercle, and gouty concretions.

To the changes which the food undergoes from its first reception into the stomach till it is mingled, in the form of chyle, with the blood, Dr. Prout has given the name of *primary assimilation*. The changes which take place in the capillary vessels during the formation of new parts, the changes of the effete structures of the body into lymph, and those which the lymph itself is presumed to undergo in its passage through the absorbent system, have been called *secondary assimilation*. A few words in reference to this process will complete the present outline of the

means by which the constant waste of the circulating fluid in secretion and nutrition is repaired.

The precise nature of the changes which take place in these minute parts cannot be determined by direct observation, but must be inferred from the composition of the blood on the one hand, and the composition of the various excretions on the other. In the formation of the several secretions and structures of the body, many ingredients of the blood, such as fibrin, albumen, salts, &c. must be removed, and the blood itself must be returned to the heart robbed of a portion of its chief constituents. In the destruction of the effete and useless parts of the frame, on the other hand, there is reason to believe that many new principles are formed, which are destined for removal by the excreting organs, and which, if not so removed, act as subtle poisons, and give rise to serious diseases. But the blood may be tainted, not merely by the accumulation of these matters in it, but by the formation of others still more injurious, in consequence of *secondary mal-assimilation*.

The principal structures of the body are the albuminous and the gelatinous. The *albuminous* structures which in health are resolved into lithate of ammonia, when mal-assimilated give rise to lithic acid gravel, and perhaps to certain combinations of cyanogen, which act as subtle poisons. During this imperfect assimilation, certain organic diseases of the albuminous tissues are supposed to arise.

The *gelatinous* tissues which in health are resolved into lactate of urea, when mal-assimilated are converted into sugar and urea, or into oxalic acid and urea, the urea being replaced in either case by carbonate of ammonia. The mal-assimilation of these textures also leads to certain forms of disease, especially of the skin, and to destructive suppuration or other diseases of the cellular tissue. The sugar eliminated by the kidneys constitutes diabetes; and oxalic acid, combining with lime, forms the mulberry calculus.

This outline of the processes of primary and secondary assimilation must be received with reserve, as a theory undoubtedly true in some parts, and a fair inference from observation; but in any case as suggestive of useful reflections and important inquiries, and sure to lead, even if only partially true, to useful results, as it lays a broad and probably not insecure foundation for a sound humoral pathology.

The food has now been traced through the process of digestion, chymification, and chylication, to its commixture with the mass of the circulating fluid. How the milk-white contents of the thoracic duct become converted into red blood, we are ignorant; the fact of their being so changed is all we at present know. The next subject for examination is the blood itself.

The Blood.—This fluid furnishes the materials for the formation, nourishment, and growth of every part of the body; it contains within itself the elements of its several tissues, and all

the new elements into which these tissues are resolved when no longer fit to form a constituent part of the frame: it will not be easy, therefore, to overrate its importance, or the advantage to be derived from an accurate acquaintance with it. The quantity of blood contained in the adult body is variously estimated at from 8 to 30 pounds. Valentin estimates it at $34\frac{1}{2}$ lbs for the male, and 26 lbs for the female, when both have attained their maximum weight. Its colour is bright red in the arteries, and dark red in the veins. It is fluid when circulating within the living textures, but coagulates in from three to seven minutes after its removal from the body. It consists of red particles or globules, to which it owes its colour, and a transparent and colourless fluid which has received the name of *liquor sanguinis*. This, which consists of serum holding fibrin in solution, may be obtained in small quantity from human blood, by skimming off the transparent surface of the blood whilst it is coagulating. The blood when it coagulates separates into two parts, the *crassamentum*, or clot, and serum. The clot is formed by the coagulated fibrin enveloping the red globules and a portion of the serum: its consistence, therefore, depends upon the relative quantity of these constituents. When the fibrin is large in proportion to the other constituents, the clot is firm; when it contains much serum, it is loose.

The quantity of the *crassamentum* (the combination of the fibrin and red globules, with a variable proportion of serum, varies within wide limits, the lowest quantity observed in 1000 parts being 68, the greatest quantity 148, and the average 108 parts. The blood of men contains, according to Lecanu, nearly 33 parts more of the chief constituents of the *crassamentum*, viz. fibrin and red globules, than that of women: in the sanguine temperament they are also more abundant than in the lymphatic.

The number of the *red particles* evidently differs in different persons at different times, and it probably varies with age, sex, temperament, and state of health. The proportion of *fibrin* in the blood varies, according to Lecanu, from 1.360 to 7.235 parts. It is more abundant in arterial than in venous blood, in about the proportion of 5 to 4. Its average quantity is about three parts in a thousand.

The *serum* is a straw-coloured fluid, holding albumen in solution. On the application of a temperature of 167° Fahr., this coagulates, and the fluid which remains is called the serosity. The serosity consists of salivin, casein, lactic acid, and ozmazome, with salts (principally of soda) dissolved in water. The quantity of the several constituents of the serum varies in the two sexes, at different ages, and in different temperaments. The quantity of water is greater in females than in males, in the proportion of 79 to 77 nearly; it is in greater proportion in children and aged persons; and in the lymphatic temperament than in the sanguine. The quantity of albumen is nearly constant.

In addition to the parts now mentioned, the blood contains a variety of principles in minute quantity, which are destined to be removed from the body by the various excreting organs, especially by the kidneys. When these secretions are checked from any cause, the materials which ought to have been removed from the body accumulate in the blood, and may be detected by chemical reagents.

The blood is supposed to have an independent principle of life. The best argument in support of this view, is the fact that blood is developed in the ovum previous to the formation of vessels. Whether this be the case or not, the blood exercises a most important influence on the functions of all the organs of the economy, nor can its composition be materially changed without serious consequences to health.

The blood undergoes various changes in disease. These consist, (*a*,) in certain sensible changes; (*b*,) in variations in the relative proportions of its constituent parts; (*c*,) in the admixture of certain substances foreign to its composition in health.

(*a*) *Sensible changes*.—The *quantity* of blood is increased in plethora, and of course diminished in cases of hæmorrhage and after long abstinence. It is also said to be diminished in anæmia, but it is probable that the pallor of the surface which characterizes that disease, is occasioned by a deficiency of colouring matter. The *temperature* is increased in many diseases accompanied with a rapid circulation, as in severe inflammations and inflammatory fevers: on the other hand, it is diminished in languid states of the circulation, and especially in disorders accompanied by imperfect decarbonisation of the blood, as cyanosis. The *colour* of the blood is more florid in diseases accompanied with a rapid circulation, as in acute inflammations and inflammatory fevers: on the other hand, in languid states of the circulation, in diseases severely affecting the respiration, in cases where the whole of the blood does not circulate through the lungs, (cyanosis,) the blood assumes a darker hue. In advanced stages of fever, and in the cholera, the blood is not only of a darker colour, but otherwise materially changed from its usual state. The mode in which the blood *coagulates* is commonly regarded as an indication of disease, and a guide to treatment: as such it will be considered in the next chapter.

(*b*) *Variations in the relative proportions of its constituent parts*.—The quantity of the *clot* depends upon the degree of contraction of the fibrin, being greater where the fibrin contracts feebly, less where it is strongly contracted. It is also greatly influenced by the shape of the vessel into which the blood is drawn, and by many other causes. The *red particles* are in excess in plethora, and in defect in anæmia. They are more slowly reproduced than the other constituents of the blood, hence the long continuance of pallor after hæmorrhages. The *fibrin* is increased in acute inflammations, especially of the serous membranes, in

acute rheumatism, pneumonia, phthisis, erysipelas, cynanche tonsillaris, absorbent inflammation, &c. The greatest increase takes place in acute rheumatism, in which disease it is sometimes nearly three times as great as in health, and continues in excess after repeated bleedings. On the other hand, the quantity of fibrin is diminished in fevers which are not inflammatory, in cerebral congestions and hæmorrhages, in scurvy, in profuse hæmorrhages, and in inflammation of the mucous membranes. The fibrin is in excess in the pregnant female. The quantity of the *serum* increases as that of the *clot* diminishes. The quantity of *water* in like manner increases as that of the more solid ingredients decreases. It is in excess in anæmia, and in chronic diseases accompanied with great debility. The quantity of the *albumen* probably bears a near proportion to that of the fibrin : it is greatly diminished in cases of Bright's disease. The *salts* of the serum are unusually small in quantity in typhoid fever, and in cholera morbus.

To these facts, which are stated chiefly on the authority of Andral and Gavarret,* the following table of the variation observed in the quantity of the chief constituents of the blood may be added.

Fibrin varies between	10.5	and	0.9	per 1000 parts—average in health	3
Globules	-	-	185	21	- 127
Solid matters of serum	114		57	-	- 80
Water	-	-	915	725	- 790
Inorganic matters of serum	-	-	8	5	- 8

It is worthy of remark, that those states of system in which fibrin exists in unusually large proportion in the blood, are precisely those in which the cupped and buffed appearance of the blood is most strongly marked, and in which there is the greatest tolerance of the loss of blood. These conditions are acute rheumatism and acute inflammation, especially of the serous membranes ; and pregnancy.

(c) *Admixture of substances not found in the blood in health.*—These are of four kinds : 1. The results of mal-assimilation of the food. 2. The elements of the natural secretions and excretions. 3. Morbid secretions of the blood itself; and 4. Poisons introduced from without.

1. The only substances not naturally contained in any of the secretions or excretions, and which result from mal-assimilation in the stomach, are sugar and oxalic acid ; of which the former has been detected in the blood in very considerable quantities, and the latter, though it has not yet been detected, may be presumed to exist in it, as it is found in combination with lime in the urine.

2. The elements of the secretions and excretions accumulated in the blood in consequence either of disease of the proper excreting

* Annales de Chimie et de Physique, Nov. 1840.

organs, or of the excessive production of those elements during primary and secondary assimilation, are chiefly the following: urea, fatty matter in excess, colouring matter of the bile, cholesterine, free carbon, and casein.

3. Of the morbid secretions of the blood itself, the chief is pus, which under certain circumstances is absorbed from suppurating surfaces, and carried into the circulation.

4. Almost all poisons introduced into the stomach, by wounds, or by the unbroken skin, find their way into the blood, and may be detected there by appropriate tests. Among vegetable substances may be mentioned alcohol, hydrocyanic acid, camphor, opium, indigo, and rhubarb; among animal substances, musk; among minerals, arsenious acid, barytes, lead, copper, mercury, and silver. To these may be added iodine, ferrocyanate and nitrate of potass, &c.

The various constituents of the blood are separated from it, and thrown out among the textures of the body, or on the surface of membranes, or discharged by its various outlets. Of these, fibrin plays an important part in every process of reparation, water and serum is formed in the sacs of the serous membranes and in the cellular tissue, the red globules escape in peculiar states of debility, whilst in cases of inflammation, accompanied by loss of substance, a new fluid is formed, viz. pus. (See next chapter.)

The chyle and lymph which are continually added to the blood, bring with them many useful and some hurtful principles which must be excreted from the body. The organs by which this is effected are the lungs, the skin, the kidneys, and the liver.

The Lungs.—The blood arrives at the lungs of a dark red, and leaves them of a bright red colour. This change is due to elimination of carbonic acid gas. The importance of this function may be seen from the quantity of the gas formed in twenty-four hours. According to the lowest estimate, this amounts to 14,930 cubic inches, or 8,534 grains; according to the highest, 39,600 cubic inches, or 18,612 grains. The mean of the three estimates (Lavoisier and Seguin, Davy, and Allen and Pepys) is nearly 28,736 cubic inches, or 14,985 grains. The quantity of carbon removed from the blood will therefore be, according to the lowest estimate, 2,820 grains, according to the highest 5,148, and the mean of the three estimates will give 4,273 grains, or nearly ten ounces avoirdupois.* This estimate falls short by a quarter of an ounce of that given by Dr. Dalton. Air once respired contains nearly 6 per cent. carbonic acid; however frequently the same air is breathed, it never contains more than 10 per cent. The volume of the respired air is diminished by about $\frac{1}{4}$ of its volume. This decrease is probably owing to the absorption of oxygen. When pure oxygen is breathed, the quantity of carbonic acid given off from the lungs is increased. Dr. Prout's experiments show that the quantity of carbonic acid generated in a given time is greater between 11 A. M. and 1 P. M.; smallest between 8½ P. M.,

* See Müller's Physiology, vol. i. p. 308.

and 3½ A. M. If the quantity is increased at one time, it suffers a corresponding diminution at another. The quantity is diminished by depressing passions, by violent exercise, by spirituous liquors, tea, or vegetable food, or by the long-continued use of mercury. Carbonic acid is also given off in larger quantity when the barometer is low.

Besides carbonic acid, water is exhaled in large quantity from the lungs. In twenty-four hours this amounts to nearly 8,000 grains, or considerably upwards of 1lb. avoirdupois.

The chief function of the lungs, then, is to free the blood of carbonic acid and water. It is not yet known in what part of the body the carbonic acid is formed: all that is known is, that its separation from the blood is necessary to enable that fluid to act as the efficient stimulus to all the functions of the frame, and to minister to its growth and nourishment. The suspension of respiration for a few minutes is fatal to life, and the circulation of blood not purified by respiration exercises an influence positively injurious on all the organs of the body, but particularly on the nervous system.

Some interesting observations by Dr. M'Gregor show that the quantity of carbonic acid exhaled from the lungs is greatly increased in the first stage of small-pox, measles, and scarlatina, as well as in various chronic diseases of the skin. As these diseases decline, the quantity again gradually returns to its normal condition.

The *skin* performs functions of great importance in the economy; for it not only separates from the blood substances which would be injurious if retained in it, but also regulates the temperature of the body by the evaporation from its surface. The chief constituents of the cutaneous exhalation, or of the sweat, are water and carbonic acid. To these may be added nitrogen, ammonia in combination with lactic acid, (according to some with acetic acid,) osmazome, and a variety of salts. The quantity of carbon eliminated by the skin in twenty-four hours, amounts, according to Dr. Dalton, to a quarter of an ounce, being a very small fraction of that given off from the lungs. Sometimes carbonic acid is exhaled with nitrogen, sometimes nitrogen alone is given off, and at others, neither of them is present. The quantity of these gases also varies considerably; but it appears that nitrogen is most abundant after animal food, and carbonic acid after vegetable food. The quantity of these gases is increased by food and by muscular exertion. The total exhalation from the skin amounts, according to the estimate of Dr. Dalton, to 6¼ ounces in twenty-four hours. The more accurate experiments of Seguin give 7 grains per minute in a male in a state of rest, which would amount in twenty-four hours to little less than 1½lb avoirdupois. This quantity is certainly much too high for the entire day, though it is the result of careful experiments made for a short period.

The quantity of the cutaneous exhalation is increased by a dry and warm atmosphere, by air in motion, and by diminished

pressure of the atmosphere: on the other hand, it is lessened by moisture, by stillness of the air, and by increased atmospheric pressure. The aqueous exhalation is partly mere evaporation, and partly a secretion. The evaporation is affected by common physical agents, the secretion is increased by these and by internal causes, as by excitement of the circulation, provided that excitement does not rise too high. On the other hand, it is diminished in a state of complete rest. The perspiration is *diminished* where other secretions are greatly increased: thus the skin is dry in diarrhœa, diabetes, cholera, dropsy, &c. The perspiration is also diminished in the cold stage of intermittent and continued fevers, and at the commencement of all febrile affections—in these cases the secretion is deficient from the small quantity of blood circulating through the vessels of the surface. On the other hand, whenever the quantity of blood is greatly increased, as in acute inflammations, in the hot stage of fever, and in the febrile exanthemata, the same result follows. The secretion is *increased* in the sweating stage of intermittent fevers; in continued fevers of the less severe kind; in catarrhal and miliary fevers; and in inflammatory affections, when the febrile symptoms are not very severe—in these cases the quantity of blood sent to the skin is increased, but falls short of that which exists in the hot stage of fever. It is also increased where determination of blood to the skin is combined with debility of the capillaries, as in hectic fever, especially in that which attends phthisis pulmonalis, in puerperal fever, &c. In extreme debility, again, the perspiration is increased in consequence of the debility of the capillary vessels, though the quantity of blood circulating through those vessels is diminished. Such are the cold sweats, which precede dissolution. The *odour* of the perspiration, which is naturally sour, is heightened in catarrhal, rheumatic and arthritic diseases, in childbed affections, in intermittent fevers, &c. This acid odour is due to the increase of acetic and lactic acids. Sweats are sometimes partial, as in phthisis, sometimes general, as in the sweating stage of fevers. General sweats are commonly preceded by partial ones. The effect of remedies on the secretion of the skin is well known, some acting by diminishing the violence of the circulation when it is too rapid, others by increasing the action of the heart when the circulation is too languid. The passions of the mind also affect the exhalation from the skin, by exciting or depressing the heart's action.

The secretion of the *urine* removes from the body water, some effete animal matters, as urea and lithic acid, certain saline matters, and various foreign substances which have entered the circulation. In quantity, it amounts to more than half the solid and liquid ingesta. Its most important constituents are, water, urea, and lithic acid. These latter ingredients consist of the following elements:—

Urea contains	47	Nitrogen,	20	Carbon,	27	Oxygen, and	7	Hydrogen.
Lithic acid	31		40		27		2	

A glance at this table will show, that urea and lithic acid contain a very large proportion (urea nearly fifty per cent.) of nitrogen, and that they are the principal means by which this gas is eliminated from the system. These elements vary much with the quality of the food. They are increased by animal and diminished by vegetable diet. They are almost absent in infants at the breast, and go on increasing towards manhood. The quantity of the urine is increased by the suppression of other secretions, and diminished by their increase. This increase and decrease are most observable when the cutaneous exhalation is affected. As the urine is a secretion which attracts particular attention at the bedside, it will be more minutely examined in the next chapter.

The secretion of the *bile* has already been considered in speaking of the process of digestion. As the greater part of that secretion is excrementitious, and is expelled from the body with the *fæces*, it claims no farther notice in this place.

By the excretions which have now been examined, (those of the lungs, skin, kidneys, and liver,) the blood is freed from those matters which are either useless or hurtful. These excretions have been examined separately. It will be useful to consider them collectively, and to show what share each bears in removing from the blood those ingredients which are poured into it from the thoracic duct, the joint product of the chyle and lymph—of the food and of the effete textures of the frame. For this purpose, the experiments of Dr. Dalton may be employed. An average of fourteen experiments made on successive days in the month of March gave the following result, the urine and *fæces* being ascertained by weight, and the proportion of the secretion of the skin and lungs by calculation.

The quantity of ingesta amounted to 91 ounces. The egesta were as follows:—

Urine $48\frac{1}{2}$ oz., *fæces* 5 oz., exhalation from lungs and skin, $37\frac{1}{2}$ oz.; of which $30\frac{3}{4}$ oz. by the lungs, and $6\frac{3}{4}$ by the skin.

Thus it appears that of the whole amount of the ingesta, nearly one-half was excreted by the urine, a third by the lungs, about a thirteenth by the skin, and an eighteenth by the bowels.

By far the largest proportion of these excretions, and consequently of the food and drink from which they may be considered as supplied, consists of water. In the whole 91 ounces the quantity may be estimated at 76 ounces, and the water contained in the several excretions may be thus stated:—

Urine $45\frac{1}{4}$, *fæces* $3\frac{3}{4}$, lungs $20\frac{1}{2}$, skin $6\frac{1}{2}$. Total 76 oz.

Thus it appears, that of the superfluous water contained in the blood, three-fourths are removed by the kidneys, somewhat more than a fourth by the lungs, rather less than one-twelfth by the skin, and about a twentieth by the bowels.

The separation of water from the body is evidently an important use of these excretions, and it is easy to understand how one of these organs may become vicarious of another in this respect. Thus when

the exhalation from the skin is increased by exercise or by any other cause, the urine is diminished; when, on the other hand, as in diabetes, the quantity of the urine is increased, the skin becomes dry and harsh. The functions of the lungs and skin, in like manner, are closely connected. When during exercise the skin is moist, the respiration is free; but if the skin being dry, the circulation is at the same time excited, the respiration is difficult and frequent; but the moment moisture breaks out upon the skin, the lungs are relieved as by a charm, the respiration becomes natural and easy, and the body is freed from the load which oppressed it. The pedestrian will recognize the truth of this statement.

The quantity of water removed by the bowels being comparatively small, has little effect on the other secretions; but if increased by the operation of a purgative, the urine is diminished in quantity, and in violent diarrhœa it is often entirely suppressed. The exhalation from the lungs is probably affected by the quantity of the secretions poured out by the other organs, but as that does not admit of measurement, no accurate statements can be made on this point.

Next to the water which is thus removed from the system, the most abundant material excreted is carbon. The proportion in which this substance is eliminated by the different organs may be stated as follows:—

Urine $\frac{1}{2}$ oz., fæces $\frac{1}{2}$ oz., lungs $10\frac{1}{4}$ oz., skin $\frac{1}{4}$ oz. Total $11\frac{1}{2}$ oz. A certain proportion of the carbon contained in the fæces is furnished by the bile, a secretion extremely rich in carbon, containing as it does about eighty per cent. of it. The remainder of the carbon contained in the fæces has never formed a part of the circulating fluid. Hence, the blood is purified of its carbon by the lungs, kidneys, skin, and liver. Of these organs the lungs excretes by far the larger proportion,—so large a proportion that no single organ, nor all of them jointly, can supply the place of the lungs, when their functions are much embarrassed.

The lungs and skin excrete carbon in combination with oxygen, forming carbonic acid, the kidney in combination with nitrogen and oxygen, with a small proportion of hydrogen, and the liver in combination with hydrogen, but with scarcely any nitrogen. As the carbon is similarly combined in the secretion from the lungs and skin, it is easily seen how the functions of the skin may become vicarious of those of the lungs. The relief afforded to the lungs during exercise by free perspiration, probably arises in part from the excretion of carbonic acid. The colliquative sweats in phthisis pulmonalis seem to point in the same direction. That the functions of the liver and lungs are very closely connected, the slightest acquaintance with the diseases of those organs shows: that the one may be vicarious of the other is shown by the large size of the liver in the fœtus, as compared with its size in the adult. The essential constituents of the urine (urea and lithic acid) contain carbon in considerable quantity. The formation of these sub-

stances in excess may depend upon disordered function of the lungs, as well as on mal-assimilation of the food in the primæ viæ.

Nitrogen is at one time absorbed, at another time exhaled, by the lungs ; it is exhaled by the skin in variable, but probably not in large quantity ; it is nearly absent from the bile, but the appropriate organ for its secretion seems to be the kidney. In what degree other excretions may be vicarious of it in this respect is not yet known.

The secretions of the skin, of the kidneys, and of the liver, all abound in salts ; one of these organs may therefore, to a certain extent, become vicarious of another in removing these matters from the system.

In the similarity of the matters excreted by the several organs of the body, we cannot but recognize a provision for maintaining the normal constitution of the blood under the less severe functional disorders of those organs. The efforts made by one organ to supply the place of another, probably account for some of the more familiar symptoms of disease. When these efforts are altogether unavailing, the constitution of the blood becomes seriously altered, and life itself is compromised. A careful study of the elements secreted by the several organs, cannot fail to contribute much to the right understanding of disease.

Having now examined the constitution of the blood, of the various materials out of which it is formed, and of the excretions by which it is freed from useless or hurtful matters, it remains to consider the mechanical arrangements by means of which the blood is renewed and purified, and subsequently distributed through the frame ; in other words, to examine the functions of absorption, secretion, nutrition, and circulation.

It will be convenient to examine these functions in the following order :—the action of the heart ; the motion of the blood in the arteries ; the function of the capillaries ; the veins ; and the absorbents.

PHYSIOLOGY AND GENERAL PATHOLOGY OF THE CIRCULATING SYSTEM.

The heart's action.—The heart is the centre of two incomplete circulations ; one through the lungs, beginning at the right ventricle, and ending at the left auricle ; the other through the body, commencing at the left ventricle, and ending at the right auricle ; the two together forming a complete circulation, an uninterrupted stream of blood. A third circuit may be said to consist of the coronary arteries and vein, the former arising from the commencement of the aorta, the latter opening into the right auricle. The parts which compose this circle, consist of arteries, veins, and intermediate capillaries, all of which are always, and in all states of the living body, full of blood. The heart is the prime source of the circulation through the vessels. Contracting upon its contents, more or less frequently, in different

persons, and in the same person at different ages and under different circumstances, the ventricles send out at each contraction the blood which they have received through the auricles from the large venous trunks. The quantity expelled at each beat in a healthy adult is estimated at about two ounces. The total quantity of the blood has been stated very differently by different authors; it is probably about thirty-two pounds. Assuming this to be the quantity, and taking the pulse at 70, it is obvious that a given portion of blood could not complete its circulation through the body in less than three minutes and a half. Positive experiments, however, made by Hering, seem to prove that the circulation may be completed in 25 or 30 seconds. Müller estimates it at from one to two minutes. The force with which the blood is expelled by the ventricle has been more correctly determined at somewhat more than four pounds.

The arteries—The blood sent out by the heart is distributed to every part of the body by the arteries. These are highly-elastic tubes, admitting of expansion both in a transverse and longitudinal direction, and adapting themselves by contraction to the volume of their contents. With each contraction of the heart, they are both expanded and slightly curved. That they undergo a positive increase of size has been shown by the ingenious experiments of Poiseuille. In the carotid artery of the horse it amounted to $\frac{1}{3}$ of the capacity of the vessel. The larger arteries, by yielding to the impulse of the blood and re-acting upon it, cause a delay in its motion which would not occur in the case of rigid tubes; hence the pulse is somewhat later in the arteries remote from the heart, than in those near to it. This same elasticity also equalizes the motion of the blood in the smaller vessels, and causes it to flow in a continued stream. It also accounts for their empty state after death, the blood which they contain being forced into the veins. In old age this elasticity is lost by the ossification of the vessels. The arteries are proved beyond a doubt not to possess any muscular fibres; hence all the phenomena observed in them are due to elasticity alone. To explain some of these phenomena, it is necessary to assume that the degree of their elasticity is dependent upon causes strictly vital.

The dilatation of the arteries caused by the blood injected into them by the heart, cannot be seen by the eye, and has been proved to exist only by the use of ingenious instruments. But the large arteries may be seen to throb. To what then is this throbbing due? To the longitudinal extension of the vessel with each beat of the heart. The vessel, in fact, is stretched and curved outwards by the forcible injection of blood. If now the finger be applied to the vessel with a tolerably firm pressure, this effort at change of place is felt. But this is not all, for the pressure exerted by the finger is resisted by the blood forced into the artery at each beat of the heart, and this resistance is dis-

tinctly felt. These two things together, the change of place which the artery undergoes, and the resistance to pressure offered by the blood injected by the heart, constitute the pulse, and these two elements of the pulse may be recognized by the careful observer. The pulse will be resumed in the next chapter.

The capillaries are the smallest vessels in the body. They form a net-work, between the meshes of which the proper substance of each organ lies, and they establish a communication between the last divisions of the arteries, and the commencement of the veins. The small arteries have no other termination, and the veins no other origin, but this; and there are no vessels terminating by open mouths. The capillaries are distinct vessels, with membranous parietes.

Microscopic observations have shown that the blood flows through the minute arteries and capillaries with a constant and agreeable motion. In young animals, however, and in adult animals in a state of debility, the blood is accelerated with each pulse of the larger arteries; whilst in extreme debility the red particles have been observed to recede somewhat after each pulse. The motion of the blood in the capillaries is entirely dependent on the heart's action, its constant and equable flow on the elasticity of the arteries. The motion of the blood is less rapid in the capillaries than in the arteries, which may be explained by the great resistance offered by the capillaries themselves; a resistance calculated at from $\frac{2}{3}$ to $\frac{3}{4}$ of the force of the heart. It appears that all the red particles sent out by the heart traverse the capillaries, and are returned by the veins, none being arrested in the tissues, or contributing to nutrition.

The capillaries, as has been stated, are tubes with thin membranous parietes, resembling the arteries in being destitute of muscular fibres. In health they perform the important functions of nutrition and secretion; in disease they are the principal seat of those changes which we designate by the terms *inflammation*, *congestion*, &c. A knowledge of the real nature of these changes is of the utmost importance to the practitioner.

In health we are familiar with some marked changes which these minute vessels undergo, and these changes will enable us to understand disease. The emotion of shame causes the cheek to blush; the emotion of fear blanches it. Warmth, generally or locally applied, produces redness of the skin; cold, on the other hand, makes the skin pale; exercise likewise reddens the surface, and continued rest restores it to its usual colour. Now, the blush of shame, the redness produced by heat, and the glow from exercise, are all examples of enlargement of the capillary vessels, and the consequent increase of the quantity of blood which they contain; whilst the pallor produced by fear, or cold, or rest, are examples of the opposite condition.

Here, then, we have three distinct causes of what is called de-

termination of blood to the skin. In the first case, an emotion of the mind acts as the cause; in the second, a local application to the capillaries themselves; in the third, the increased action of the heart. From the first example it appears that the capillaries may be increased in size, without any increased action of the heart; for if it were due to that cause, the blush would not be confined to the cheek: the second shows that local applications will affect the capillaries in the same way, without disturbing the heart's action; and the third proves that precisely the same result may follow from the stronger and more frequent contraction of the heart itself. The cases in which paleness of the skin occurs are equally instructive, proving as they do the local effect of emotion in contracting the capillaries, the equally local and direct effect of cold, and the remote effect of a tranquil state of the heart's action.

To return to the state of the capillary vessels when the colour of the skin is heightened. That state is one of dilatation. How is that dilatation caused? It has been stated that the capillaries are not muscular; if they were, their dilatation might be explained by the relaxation of their muscular fibres: but they are elastic, and in order that they may dilate, they must be expanded by force, or else have their elasticity suspended for a time. Which of these conditions then occurs? In the last example adduced, that of the skin becoming red from exercise, the capillaries are obviously dilated by the additional quantity of blood forced into them by the heart; but, in the two first cases, the cause is strictly local, and in no way dependent upon the heart's action. Here, then, we have examples of the capillaries dilating without any force to fill them; in the one case, in consequence of an emotion, in the other, of a local application. But this local application itself (heat) is of a nature to expand the substance, whether living or dead, to which it is applied; therefore the effect may be regarded in the light of a mere physical change, and not as a proof of any vital expansion of the vessels. This being granted, there yet remains in the act of blushing an undeniable proof of a *vital* expansion of the capillary vessels; an expansion that is peculiar to living beings; the cause of this expansion an influence conveyed through the nerves, the *modus operandi* of this influence a momentary diminution or suspension of the elasticity of those vessels. It is difficult to realize the idea of elasticity dependent upon and modified by nervous influence; difficult, because we see the very structures which are endowed with this elastic property, retaining it long after life is extinct. But a little consideration will remove the difficulty, by suggesting the analogy of other parts, which though endowed with properties acknowledgedly vital, retain those properties long after the extinction of life; such as the muscles, which in some animals respond to stimuli for many hours after their removal from the body; and yet whilst they belong to the living frame, the

degree of their contractility, as well as their contractions themselves, varies constantly with the state of the nervous influence.

It appears, then, that in one instance at least, there is no other way of accounting for the enlargement of the capillary vessels, than by a diminution or momentary suspension of their elasticity. Now in inflammation this same enlargement of the capillary vessels occurs ; and the important question arises, is it due to the same cause? Take a simple case. A grain of sand gets into the eye, pain is produced, and in a short time the vessels of the conjunctiva become filled with red blood, and obviously enlarged. Here there is no action of the heart to account for the enlargement of the vessels, for the other eye, which is equally affected by the general circulation, is not inflamed. The change, then, is strictly local. It cannot arise from the arteries leading to the inflamed part sending more blood into the small vessels, for these arteries are not muscular, and therefore cannot affect the local circulation by their contraction. What then can give rise to the dilatation of the capillaries but a temporary loss of their elasticity, and what can account for this but an influence transmitted through the nerves to the coats of the vessels? Suppose another case. A small piece of ice is applied to a finger. The immediate effect is to contract the vessels, but as soon as it is removed the pale skin becomes red ; redder than the surrounding skin. Here again the influence of the heart's action in injecting the capillaries is out of the question, and we have a strictly local effect produced, consisting in a contraction of the vessels followed by dilatation.

The contraction of the capillaries, which is here produced by cold, has been shown, by experiments under the microscope, to follow on the application of all substances capable of producing inflammation, and to be succeeded, after a variable interval, by dilatation of the vessels. Hence the objection which might be urged against this example, viz. that the contraction is a mere physical effect of cold, loses its force, and the general fact remains, that agents capable of exciting inflammation first act by contracting the capillaries, and that this contraction is followed by dilatation. Can this be explained? Perhaps thus. It is a general law that all stimuli applied to any part of the body call that part into action for a time, and that that action is dependent upon nervous influence ; but that nervous influence suffers exhaustion proportioned to its intensity and duration, and that exhaustion produces in the part affected a condition the very reverse of that which existed when the nervous power was in full force. Apply this to the case under consideration, and it will stand thus. The stimulant applied to a part determines the nervous influence to the capillaries of that part, and the function of those capillaries, viz. their elasticity, is for the time called into full play, exhaustion ensues, and then that same function is paralyzed ;

in other words, the vessels lose their elasticity, and yield to the blood which flows into them. Microscopic observations have further shown that during this first period of contraction the flow of the blood is more rapid, but that when the vessels become dilated the circulation is retarded. It has also been shown that vessels which in a healthy state are too small to admit the red globules of the blood, now convey coloured blood, and that the globules permeating the coats of the vessels find new channels for themselves in the surrounding textures.

Such are the changes which take place in the inflamed part; but they are not long confined to the capillaries, for the arteries leading to them, and the veins arising from them, suffer the same dilatation; and if the inflammation be severe and extensive, the larger arteries and veins themselves participate; and thus large portions of the body, a hand, a foot, a limb, or an internal organ, become one congeries of enlarged vessels. Of course these vessels contain a much larger quantity of blood than those of the corresponding part of the body. Thus, if severe inflammation attack one hand, it contains much more blood than the other; the radial artery of that side is evidently enlarged; and if a vein of that side be opened, it pours forth much more blood than the vein of the opposite side.

The enlargement of the arteries leading to an inflamed part is due partly to the same cause as the original enlargement of the capillaries themselves, viz. a loss of elasticity, and partly to that increased action of the heart which follows upon severe local inflammation. This increased action of the heart sends blood in increased quantity to every part of the frame, and this is *symptomatic fever*. If this increased action of the heart exist in an extreme degree, the fever is violent; if the nervous system suffer much, it is accompanied with that disturbance of the functions of the brain and nerves which is termed irritation, and we have *constitutional irritation*, or *irritative fever*, produced. If the system has been long used to the stimulus of ardent spirits, or if the patient has lived freely, the loss of the accustomed stimulus, added to the increased flow of blood to the vessels of the brain, may give rise to that peculiar state which we call *delirium tremens*. Should the power of the constitution have been previously exhausted, the symptomatic or irritative fever assumes the form of *typhus*, in place of the milder form of *synochus*, which it takes in the strong and robust.

From what has been said it appears that in every change which the capillary vessels undergo, the heart or the capillaries themselves are first affected; but that when severe inflammation exists, both are ultimately involved, the heart sending forth more blood, and the capillaries receiving more. In this state the *heart's action*, which is *muscular contraction*, is increased; the *action of the vessels*, which is *elastic re-action*, is diminished. There is, then,

no such thing as increased action of the arteries, or of the capillaries, in the sense in which that term is commonly used : that which used to be called *increased* action, is in fact *diminished* action.*

The enlargement of the capillary vessels in inflammation is quickly followed by effusion. If the seat of inflammation be the cutis, as in the case of a burn, serum is thrown out from its surface under the cuticle, and a blister rises : if a mucous or serous membrane is inflamed, fluid exudes from its surface : if the cellular membrane be its seat, the effusion takes place into its cells. This effusion varies with the intensity and nature of the inflammation. The lowest degree of inflammation in these parts merely increases the quantity of their natural secretion—of serum in the case of the serous membrane, of mucus when the mucous surfaces are inflamed. A higher degree of inflammation causes the effusion of coagulable lymph (fibrin) or of pus. The increased natural secretion of the serous membranes is dropsy ; that of the mucous membranes, flux. Both these membranes, when the inflammation is more intense, pour out fibrin or pus. Thus the pleura secretes fibrin, which glues its surfaces together, and which becoming organized forms permanent adhesions ; from the same cause arise adhesions of the peritoneum. The mucous membranes, too, in states of severe inflammation, pour out coagulable lymph, which sometimes takes the shape of the tube in which it is formed. This occurs in the larynx in croup, in the bronchial tubes in a peculiar form of bronchitis, in the intestines, in the urethra, &c. These secretions assume so completely the shape of the tube in which they are formed, as to be sometimes mistaken for the lining membrane itself. Examples of the effusion of pus are, in the case of the serous membranes, empyema, in that of the mucous membranes gonorrhœa, &c.

When the capillaries, dilated in inflammation, return to their natural size, and any fluid which may have been poured into the surrounding textures is absorbed, the inflammation is said to terminate by *resolution* ; when fluid is thrown out, by *effusion* ; when coagulable lymph is formed and organized, by *adhesion* ; when pus is effused, by *suppuration* ; when the part dies, by *gangrene*.

When inflammation attacks the cellular membrane, whether in the skin or in the parenchyma of internal organs, it takes different courses according to its intensity. If the inflammation is slight, it terminates in *resolution* ; if more severe, *effusion* may take place ; if more severe still, the part *dies*. If a small part only dies, provision is directly made for its separation from the body. This is effected by the effusion of fibrin and pus from the living structures

* See these truths forcibly stated in Dr. Billing's "First Principles of Medicine." Consult, also, on the subject of Inflammation, Dr. Alison's excellent paper in Lib. of Pr. Med.

bordering upon it—the fibrin is deposited in the form of a membrane around the dead part, the pus within the fibrin, and thus the dead part is separated from the living. This collection of pus around a dead portion of cellular membrane, is called an *abscess*, the *walls* of which are formed by the effused and organised fibrin. Sometimes the constitution is not strong enough to build up and organize a wall of fibrin about the dead part, and then the pus finds its way into the surrounding cellular texture, and a *diffused abscess* is the result ; or the inflammation is of a peculiar character, as in erysipelas, and suppuration takes place with little or no adhesive inflammation. The fibrin thrown out around a dead portion of cellular membrane, and forming the walls of an abscess, as has been stated, becomes organized by vessels, which either form within it, and then connect themselves with those of the surrounding parts, or are gradually extended into it from those parts. These newly-organized portions of fibrin are arranged in the form of small rounded vascular points placed side by side around the cavity, and called *granulations*. From the surface thus created fresh pus is formed, which causes the abscess to increase in size, and to press with increased force on surrounding parts. Some of these parts yield to the pressure, and then the abscess is said to *point*. If the abscess is near the surface, the skin itself offers the least resistance ; it is therefore protruded and stretched more and more till it bursts. If an internal organ (as the liver) is the seat of abscess, its firm parenchyma offers more resistance than the loose texture of an adjoining intestine ; hence the abscess exerts its chief pressure upon the coats of the intestine. This pressure sets up adhesive inflammation of the two layers of serous membrane ; they are glued together by coagulable lymph ; the peritoneum and the coats of the intestine thus become one continuous texture through which the abscess, continually increasing, forces its way, till it bursts and discharges its contents.

When the cellular membrane is divided by a wound, and the two edges of the wound are brought close together, fibrin is effused, which becoming organized, the wound heals ; a narrow red line being left at first, which in process of time becomes pale. This is called a *cicatrix*, and the part is said to have healed by the *first intention*. But the part may not heal in this simple manner, and then an open sore or *ulcer* is formed, presenting the same characters as the walls of an abscess which has burst, viz. a collection of granulations.

These granulations, like those of an abscess, secrete pus, which moistens them and protects them from the air, whilst the pus which is nearest the surface, drying into a scab, renders the protection more complete. The new granulations, once completely organized, secrete fresh coagulable lymph, and this in its turn is organized so as to form new granulations ; and thus the ulcer is at length filled up to a level with the surrounding skin, and covered by a layer of

cuticle. The various appearances presented by the granulations, and the changes which they undergo with alterations in the general health, form a subject of interesting and instructive study to the surgeon.

Gangrene has been mentioned as one of the terminations of inflammation, and the death of a limited portion of the cellular or other texture has been described as the cause of abscess. The common boil may be mentioned as an example of a more extended death of the cellular tissue. But gangrene may take place without leading to the formation of an abscess. Thus, it may attack a limb, in consequence of the extreme debility of the circulation in it, and beginning in the foot extend upwards, involving the entire circumference of the limb, until it reaches a part where the circulation is active enough to allow of adhesive inflammation, when coagulable lymph will be thrown out in a circle dividing the sound from the dead parts; granulations will be formed, pus effused, and at length a natural amputation of the dead member will be effected. Thus, in consequence of the different effect produced by different degrees of inflammation, and of the various secretions thrown out in different stages of the process, the body is enabled to set limits to its own diseases, and to repair the most severe injuries. Sometimes gangrene takes place without any accompanying inflammation, as in a limb of which the arteries are ossified, or in cases of poisoning with ergot of rye: this is *dry* gangrene.

A complete description of inflammation, including its causes, its phenomena, its terminations, the various modifications which it undergoes in different states of health, in every variety of constitution, and in every texture of the body, would exceed the limits of this work. What has been said is merely intended to show the important part which the capillary vessels have to perform, and the general character of the changes which they undergo.

Congestion is a state of capillaries closely allied to that of inflammation. It consists of a passive enlargement of those vessels, unaccompanied by the symptoms of inflammation, unattended by effusion either of lymph or pus, but sometimes combined with an increase of the natural secretion of the part. This enlargement of the vessels is the effect of debility, and as such is apt to continue in parts in which the symptoms of acute inflammation have been subdued. It is of common occurrence in the aged, and in persons exhausted by long suffering. In addition to the capillary vessels, it involves chiefly the veins, whilst inflammation has its principal seat in the arteries. This seems to be implied in the term *venous congestion*. Pressure is a common cause of this state; thus we have congestion of the veins of the leg after long standing, congestion of the vessels of the head from wearing a tight cravat, congestions in the lungs from impediments to the respiration, &c.

Hæmorrhage is a common consequence of this state of conges-

tion ; but it sometimes is of a more active character, and appears to flow immediately from the arteries. It is sometimes caused by the rupture of an artery, as in most cases of hæmoptysis ; at other times, as in hæmorrhage from the mucous membranes, it seems to flow from the capillaries or from the veins.

There yet remain to consider two important functions performed by *capillaries*, viz. those of *nutrition* and *secretion*. *Nutrition* appears to consist in the effusion of liquor sanguinis into the interspaces of the capillary vessels, and the attraction by the living solid of those parts of that fluid out of which they themselves were originally formed. These parts are all built up of cells in some shape or other.

Secretion takes place either in cells or on the surface of simple membranes, or in glandular structures, which consist of such membranes folded into a variety of shapes for the purpose of creating a large surface in a small space. The internal or secreting surfaces are covered with granules (epithelium) of different sizes and shapes in different parts ; the external surface is surrounded with a net-work of capillary vessels and veins. The secretion formed from the blood of the capillaries permeates the membrane, filling the cells, if it has that form ; or appearing on its surface, if it is a smooth extended membrane ; or collecting in various ducts, if the membrane assumes that shape.

An example of secretion into cells is afforded by the adipose cellular tissue, which contains an oily fluid, the fat, destined to give roundness to the form, to facilitate motion, to protect the external parts from cold, and to serve as a store of nourishment. Examples of secreting organs in the form of membranes are the serous membranes (those lining visceral cavities—the pleura, the peritoneum, the arachnoid, and the synovial membranes of joints) ; the mucous membranes (that lining the alimentary canal and the parts communicating with it, and that lining the urinary passages and organs of generation) ; and, lastly, the skin, a compound organ containing a variety of secreting glands.

Glands, in the usual acceptation of the term, are of three kinds—1, mere collections of blood-vessels, as the spleen, the supra-renal capsules, the thyroid, the thymus, and the placenta ; 2, lymphatic glands, which are similar congeries of lymphatic vessels ; and 3, true secreting organs, as the lungs, the liver, the kidneys, the breasts, &c. These organs all consist of an excretory duct, which, if we trace it from its trunk, divides into branches, and these again into others of smaller size, until the smallest terminate in blind extremities of various shapes, called cells, cryptæ, acini, &c. On the outside of these minute terminations, the capillary blood-vessels ramify, and the appropriate secretion permeating the invisible pores of these vessels, drops into the cell, crypt, or acinus, and thence flows into the duct. The blood which is not used in the secretion is returned by appropriate veins.

Secretion, like nutrition, is subject to differences in degree and

in kind. The natural secretion of a part is increased by increased flow of blood, provided severe inflammation be not present; increased perspiration from exercise, and diarrhœa from slight inflammation of the mucous membrane of the bowels, are examples of this: it may also be increased by debility of the capillary vessels, when the circulation is languid, as in the cold sweats preceding dissolution. The nerves, too, have great effect on the secretions, as is seen in the flow of tears from grief, joy, &c., and in the effects of fear or anxiety on the skin, kidney, and bowels. On the other hand, the natural secretion of a part is diminished when it receives a small quantity of blood; as is the case with the skin in the cold stage of fevers; or when it receives much more than its usual quantity, as in the hot stage. In this latter case, as soon as the fever subsides, and the quantity of blood sent to the skin is diminished to a certain point, the sweating stage begins. Mental emotion, likewise, checks some of the secretions. Thus, fear, which increases the secretion of the skin, checks that of the salivary glands, and the mouth becomes dry and parched. But secretion varies in *kind* as well as in degree; in other words, the secretions are liable to a variety of morbid changes. Thus, the serous membranes, which in health secrete but a small quantity of serum, under a certain degree of inflammation pour out an increased quantity, and dropsy results; a higher degree causes effusion of liquor sanguinis; a still higher, of fibrin; a different and perhaps higher degree, of pus. The mucous membranes, according to the degree of inflammation, secrete a serous fluid, or fibrin, or pus, or all these secretions blended in different proportions. They may all be observed in the course of a severe attack of coryza.

The veins.—The veins are larger than the arteries, and have no elastic coat. The veins of the extremities also differ from the arteries in being provided with valves which prevent regurgitation, and give support to the column of blood which they contain. The circulation of the blood through the veins is effected partly by the impulse of the heart continued through the capillaries; partly by the contraction of the muscles of the extremities, which, aided by the position of the valves, presses the blood towards the heart; partly by the movements of the respiration; and partly, as some suppose, by the suction of the heart itself.

At each inspiration, the cavity of the chest is enlarged by the descent of the diaphragm, and the elevation and tilting outwards of the ribs. The enlargement thus effected tends to produce a vacuum, which must be prevented by the entrance of air, or blood, or both. Experiments have shown that the motion of the blood in the large veins is thus accelerated. That this effect on the circulation is produced, is shown by the admission of air into a wound in the larger venous trunks, but its influence does not extend beyond the axillary vein. It has also been shown experimentally, that at each systole of the heart a tendency to a vacuum exists in the pericardium, which

is filled up by the blood of the large veins distending the auricles. The assistance given to the venous circulation by inspiration, is somewhat counteracted during expiration, when the pressure exercised on the contents of the chest causes regurgitation of blood into the larger veins. There is, however, a balance in favour of the circulation, the effect of inspiration being greater than that of expiration. When the right auriculo-ventricular valve admits of regurgitation, the blood flows back into the descending cava and jugular vein, causing a venous pulse, and counteracting to a certain extent the effect of the contraction of the heart just mentioned.

Experiments have shown that poisonous substances introduced into wounds soon find their way into the veins. This proves either that the veins themselves absorb, or that the capillaries which terminate in the veins possess this power. It is through this absorption into the circulation that poisons act; hence the efficacy of ligatures applied above wounds, of the abstraction of the blood below the ligature, and of the application of cupping glasses, which answers the double purpose of a ligature and evacuator. The subject of absorption demands, however, a few words more.

Absorption is of two kinds; the absorption of fluids, and the absorption of solids, or interstitial absorption. The capillaries, the veins, or both, have the property of absorbing fluids; but in addition to these, the lacteals and the absorbents, properly so called, are provided, the one for the absorption of the chyle from the intestines, the other for the absorption of lymph from every part of the body.

Absorption is certainly effected in more ways and by more means than one. Living and dead tissues allow the passage of fluid and gaseous matters through them. To this process the term *imbibition* is applied.

If two gases are in contact with the moist surfaces of a bladder, one being within it, and the other external to it, both will permeate the bladder till they are equally mixed. A gas likewise will permeate a moist bladder to mix with a fluid within it. This takes place in the lungs. Again, if a vessel be filled with water, and a moist bladder be tied over its mouth, so that the fluid is in contact with the bladder, and a salt be strewed over its surface, it will be dissolved by the water which permeates the pores of the bladder. If a tube filled with a solution of salt or sugar, and closed by a piece of bladder, be placed in water, the water permeates the bladder, mixes with the solution, and rises in the tube. At the same time a portion of the fluid contained in the tube traverses the bladder in an opposite direction, and this interchange takes place till the fluids on both sides of the bladder have become homogeneous. If the arrangement is reversed, and the denser liquid is external to the bladder, and the rarer liquid in the tube, the liquid in the tube passes through the bladder, and gradually sinks to a lower level. These phenomena

have been named by Dutrochet "endosmose" and "exosmose." Matters in solution pass into the capillaries, and thence into the venous blood by this process of "endosmose," which goes on the more rapidly as the denser fluid (the blood) contained within the vessels is no sooner diluted than it gives place to a fresh portion, and thus endosmose takes place more completely and goes on more constantly than in fluids at rest. By "endosmose," then, matters held in solution, provided the solution is not of greater density than the blood itself, find their way into that fluid.

This process of absorption by the capillaries is very rapid, so that in a part free from epidermis it is almost instantaneous, and minute portions of fluid, or of any substance held in solution, may not only be absorbed, but may be distributed through the circulating system in from half a minute to two minutes. In this way the rapid action of the more energetic of the poisons may be explained. One poison only, hydrocyanic acid, acts too rapidly to have its fatal effects thus explained; but experiments have shown that even this subtle poison must be absorbed in order that it may destroy life. Its rapid action, then, can only be explained on the supposition that being highly volatile and expansive, it diffuses itself through the textures more rapidly than the blood circulates. The rapidity with which absorption takes place is well illustrated by the rapid passage of certain salts from the stomach to the kidney. In one experiment made by Westrumb, prussiate of potash was detected in the urine in two minutes from the time of its being taken into the stomach.

Many circumstances affect the rapidity with which imbibition and absorption take place. Galvanism is the chief of these. Thus, Fodere has shown, that when sulphate of iron is introduced into the peritoneum, and prussiate of potash into the pleura, five or six minutes usually elapse before the two substances combine, but their combination is instantaneous when a slight galvanic current is passed through the diaphragm. This fact explains the efficacy of galvanism in promoting the absorption of fluids. Distension of the vessels renders absorption less rapid; depletion, on the other hand, accelerates it. Hence, the use of venæsection in dropsy. Imbibition takes place more slowly in parts covered by dense membranes. This is the case with the skin, whose power of absorption is much increased by removing the cuticle. To facilitate absorption by the skin friction is used, by which means medicines and nourishment may be introduced into the system.

The absorption of fluids, provided they are of less density than the blood, is thus easily accounted for by endosmose, and this probably takes place chiefly through the coats of the capillaries or veins. It is by this means that poisons find their way into the system. The absorbent vessels seem destined to take up and restore to the circulation the liquor sanguinis, which has been

thrown out by the capillaries into the several textures of the body. They rarely contain either matters introduced from without, or abnormal secretions of the body itself. The absorbents leading from poisoned wounds, and from simple punctures in certain unhealthy states of the system, are very apt to become inflamed, the inflammation often extending to the absorbent glands and exciting inflammation and suppuration in them. The absorbents are also most probably the instruments by which interstitial absorption (absorption of the structure of the body itself) is brought about.

Of disordered function of the absorbent vessels little is known. Formerly all dropsical effusions were attributed to some fault of the absorbents, and remedies were given to promote absorption by stimulating those vessels into activity. There can be no doubt that the functions of the absorbents, like those of other vessels, vary in degree at different times and under different circumstances; but as the veins have been proved to possess the power of absorption as well as the lymphatics, it is difficult to assign to each their proper sphere of activity, whether in health or disease. If it could be clearly shown that the proper function of the absorbents was to take up merely such portions of the liquor sanguinis as had not been expended in nutrition, or such elements as result from the decomposition of the effete structures of the body, we should know what part the absorbents play in dropsical diseases. But there seems no sufficient reason for assigning to the absorbent vessels either of these functions, to the entire exclusion of the veins. It has been shown, for instance, by direct experiment, that the veins absorb poisons, but it is no less clearly demonstrated by disease, that poisons excite inflammation in the entire course of absorbent vessels, and in the glands through which they pass; and this is attributed, and probably with justice, to the absorption of the poison by these vessels. But, whatever may be the true function of the absorbents, there can be no doubt that their influence in the production of dropsies has been much exaggerated. These effusions arise in various states of the system, and from various causes. Mechanical obstruction, inflammation, and venous congestion, all cause effusion of serum; an effusion too abundant to be removed by the unaided though still healthy action of the absorbent vessels. If the obstruction be overcome, or the venous congestion removed, or the inflammation subdued, the effusion ceases, and time alone is required to enable the absorbing vessels, whether veins or lymphatics, to take up the fluid which has been poured out.

The well-known efficacy of venous distension in preventing absorption, and of depletion in promoting it, point at once to the most efficacious means of removing dropsical effusion, viz. blood-letting, and the increase of the several secretions. If with the dropsy there is sufficient strength of constitution, these means

will suffice for its removal ; if not, tonics must be combined with the antiphlogistic measures.

The absorption of the solid structures has also been attributed to the increased action of the lymphatics, but perhaps without sufficient reason. Pressure, friction, and electricity, as well as mercury and iodine, are as likely to affect the capillaries which are the cause of the morbid growth, as the lymphatics or veins which are instrumental in removing it. Moderate pressure, by giving support to the capillaries ; stronger pressure, by still further diminishing their size ; friction and electricity, by stimulating their coats, and restoring their contractility ; and iodine and mercury, by a local action on those vessels, whether through the skin, or more circuitously through the circulation ;—the cessation or gradual removal of such tumors by these causes may be much more satisfactorily explained than by an action upon the absorbents. In the case both of dropsies and tumors, the result is the same, whether the capillaries, ceasing to secrete fresh fluids or solids, the absorbents by degrees remove that which has been effused ; or the capillaries, continuing to secrete, the absorbents are excited to corresponding increase of activity. The only difference is this, that according to the former supposition, the cause is permanently removed ; according to the latter, the effect is merely counteracted. The first supposition seems most feasible.

STRUCTURAL PATHOLOGY.

Alterations of structure arise from two causes ; abnormal nutrition, and morbid secretion.

Nutrition may be excessive or defective. The former is called *hypertrophy*, the latter *atrophy*. The principal cause of *hypertrophy* is increased action : this is shown in the muscles of the athletes ; in the heart when it encounters some obstacle to the circulation, and is obliged to contract with additional force to overcome it ; in the mammae of the female when secreting milk ; in the mucous membrane of the bladder exposed to constant irritation from stone, gravel, &c. *Atrophy* arises from opposite causes ; from disuse of parts, as of the muscles in the sedentary, in the paralytic, and in the bedridden ; or from obstruction to the flow of blood by ligatures, bandages, &c. Atrophy is usually accompanied by paleness of the parts affected, hypertrophy by increased redness.

But in addition to these differences in degree, there are others in kind ; as *softening*, *induration*, *transformation*. *Softening* may arise either from an absence of those constituents of a part from which it derives its solidity, as of the earthy matter of bone in mollities ossium, or from all the constituent parts of the texture being softer than usual, as in softening of the brain. *Induration* may arise from many causes—from the crowding of many particles into the space commonly occupied by a few, as in the ivory-like

hardening of bone; from the deposition of fibrin, as in the hardened edges of ulcers; from transformation of one structure into another, as of fibrous tissue into cartilage, and cartilage into bone; from compression, as in the lungs in cases of empyema; from obstruction by fluid or solid matter, as in pulmonary hepatization, pulmonary apoplexy, &c. *Transformation* of one tissue into some other naturally existing in other parts of the frame, is a familiar change. It occurs in the gradual conversion of the coats of arteries, and of the muscular structure of the heart into bone, and in the conversion of a portion of subcutaneous cellular tissue into a synovial sac.

Morbid secretion.—Coagulable lymph, the only one of the secretions which is capable of being organized, becomes a sort of matrix in which a variety of adventitious growths are deposited, such as the cellular, the serous, the fibrous, the cartilaginous, or the osseous. These adventitious growths are usually determined by the nature of the texture in or upon which they are formed; thus they resemble serous membrane in the cavity of the pleura or peritoneum, they are often cartilaginous in joints, and bear a close resemblance to muscle in the uterus. Such formations are called *analogous*, because they are similar to those naturally forming part of the body. When such formations have no resemblance to natural structure, they are termed *heterologous*.

Heterologous formations.—The products of inflammation already examined are mostly due to local causes, though they are modified in some degree by the state of the constitution. Those now to be considered are dependent upon a constitutional taint, that is to say, upon some cause diffused through the system. This fact is proved by their general diffusion over all parts of the frame, and their existence in organs of widely different character and composition, by their removal from a part affected being soon followed by their appearance in some other organ, and by direct experiment, which has succeeded in producing one at least of these diseases, by submitting animals to bad diet and other unwholesome influences.

The formations belonging to this class are *tubercle*, *carcinoma*, and *melanosis*.

Tubercle is a morbid substance deposited on the surface of membranes, or in the texture of organs. It presents itself in two different forms—the one whitish-grey, semitransparent, and dense; the other yellow, opaque, and friable. The first may be changed into the second, but the second is never transformed into the first. The grey tubercle is deposited in small isolated portions, as in the air-cells of the lungs, constituting miliary tubercles, or on the surface of serous membranes. The yellow variety is found in the same situations as well as on the surface of mucous membranes, and in the substance of the several organs—in the intestines, in lymphatic glands, in the liver, spleen, brain, uterus, &c. It assumes different forms according to its situation, sometimes being

collected in a distinct mass, at others diffused as a homogeneous cheesy matter. The chemical properties of this substance are not characteristic. It may be resolved into albumen, fibrin, gelatin, salts of soda and lime, and water. It is sometimes, though rarely, deposited before birth; is rarely met with before the fourth year; is frequent between the fourth and fifth; less frequent, again, from this time till puberty; most frequent of all between puberty and the age of fifty. The lungs are its most common seat, so that after the age of fifteen it is almost never met with in other organs without existing in them at the same time. The state of constitution (*tuberculous cachexy*) which leads to their deposition may be either inherited or acquired.

Carcinoma.—This term was originally applied to a malignant ulcer supposed to bear a resemblance to a crab, (*καρκίνος* cancer,) but it now comprises many changes of structure which have little in common in their physical characters. Dr. Carswell divides carcinoma into two species, *scirrhoma* and *cephaloma*. The varieties of *scirrhoma* are scirrhous pancreatic sarcoma, tissu lardace, matière colloïde, cancer gelatiniforme; those of *cephaloma* are vascular sarcoma, mammary sarcoma, and medullary sarcoma. According to Dr. Hodgkin, all these forms of carcinoma consist of compound cysts varying in their solid and fluid contents, growing from broad bases, or from narrow peduncles which spring from a single spot, and giving to the tumor a radiated appearance: the smaller cysts are enveloped in a larger one. The various appearances presented by these tumors are due in a great measure to the inflammation which takes place in them and in the surrounding textures, and to the entire or broken state of the several cysts themselves. Carcinoma, like tubercle, is a general disease of the system, assuming different shapes according to the tissue or organs which it attacks. The *cancerous diathesis*, like the tubercular, may be either inherited or acquired, but the disease in either case belongs to a later period of life.

Melanosis.—This is an unorganised product, of a dark brown, dull bistre, or sooty-black colour. It is deposited in masses with or without cysts, or in patches on the surface of membranes. Sometimes it is met with in small points, and occasionally it has been found liquid in accidental cavities. Its most frequent seat is the liver, but it is occasionally found in the eye, the skin, the brain, the lungs, the kidneys and other glandular organs. Its chemical constituents are albumen, fibrin, and the salts usually found in the blood, with a colouring matter abounding in carbon.

Besides the liquid and solid morbid secretions already enumerated, we sometimes encounter secretions of *gas*. The principal seat of these abnormal secretions is the alimentary canal, but they have been found in other viscera, as the urinary and gall bladders, and the uterus. They have not been submitted to any careful analysis, but there is no reason to doubt that they are strictly speaking,

secretions, and not the result of decomposition of the contents of the several viscera in which they are found.*

THE NERVOUS SYSTEM.

The vital principle, which, in some shape or other, endows every part of the frame, and even the blood itself, with properties altogether different from those of unorganized matter, seems to be more especially connected with the nervous system. The brain, as the organ of the mind, is the immediate source of volition, and the part to which all impressions on the nerves of sensation are ultimately referred; the spinal cord, a continuation of certain parts of the brain, is the immediate origin of the greater part of the nerves both of sensation and volition, and both together form the joint source from which all the nerves of sensation and voluntary motion arise, from which the mandates of the will are sent forth, and to which the intelligence of the senses is conveyed. In addition to these important parts of the nervous system, there is a separate centre of nervous influence in the sympathetic, which connecting itself, in a manner little understood, with the nerves of motion and sensation, presides over the functions of those organs which are the most essential to life, and is the cause of the greater part of those movements which are independent of the will, of many of those sensations by which life is preserved, and of those chemical changes which are peculiar to organized beings. For the important movements of respiration, moreover, a peculiar set of nerves is provided.

But there is still another function, and a corresponding set of nerves, to which the attention of the profession has been strongly directed by Dr. Marshall Hall and Professor Müller,—the reflex function and the excito-motory system of nerves. There are certain parts of the body, chiefly internal surfaces, and especially their external openings, which, when irritated, excite contraction of the muscles most nearly associated in the functions of those parts. Thus, if the lining membrane of the air passages is irritated, the respiratory muscles are thrown into violent action. Here there is no exercise of volition, and yet there is violent muscular contraction. Observations in cases of paralysis with loss of sensation and voluntary motion, and experiments on decapitated animals, have further shown, that for the production of these effects it is not necessary that sensation or volition should be present. Hence it became necessary to suppose the existence of a separate set of nerves; one going from the skin, or mucous membrane, to the brain or spinal marrow; and the other, from those organs to the muscles. The absence of common sensation and volition at once pointed to the spinal marrow and not the brain as the centre of

* For a clear and concise account of some of the subjects treated of in this chapter, consult Dr. Symonds's "Pathological Introduction," in Library of Practical Medicine.

union of these two sets of fibres; and what theory has pointed out as necessary, the scalpel, in the hands of Mr. Grainger, has shown to be true. The following scheme, therefore, will represent the several orders of nerves, and the relations which they have to the brain and spinal marrow.*

1. The cerebral, or sentient and voluntary, of which the brain is the centre.

2. The true spinal, or excito-motory, of which the true spinal cord is the centre.

3. The ganglionic, or the nutrient, secretory, &c., of which the sympathetic forms the principal portion.

The first order of nerves comprises all the nerves of *sensation*, (the olfactory, the optic, the auditory, the gustatory, and the nerves of touch,) and all the nerves of voluntary motion. The common centre of all these nerves is the cerebrum and cerebellum. The greater part of the nerves of touch or common sensation may be said to unite with the greater part of the nerves of voluntary motion in forming the external portions of the spinal marrow, and in this manner to communicate with the brain.

The second set consist also of two orders of nerves, of which the one pass chiefly from the internal surfaces to the interior parts of the medulla oblongata and spinalis, and the other from the same parts to muscles having peculiar actions subservient chiefly to ingestion and egestion. Some fibres of the same order of nerves are probably distributed to other parts of the body, as the skin and muscles of voluntary motion. That part of the spinal marrow to and from which these nerves run, is called by Dr. Marshall Hall the *true* spinal marrow, in contradistinction to those parts of it which are formed by bundles of cerebral nerves. The motions due to this system are termed *excited*.

The third class of nerves, or the ganglionic, is divided by Dr. Marshall Hall into the *internal* ganglionic, or the sympathetic, including some few fibres of the pneumo-gastric; and the *external* ganglionic, embracing the fifth nerve and the posterior roots of the spinal nerves. These latter nerves are supposed to be destined for the nutrition, &c. of the external organs.

The functions corresponding to these several divisions of the nervous system, then, are: 1, sensation and voluntary motion; 2, excitements to action without sensation, and combined motions without will; and 3, nutrition, secretion, and the motions connected with them.

The nerves consist of minute fibres, enclosed in sheaths; distinct through their entire course, and terminating in the parts to which they are distributed, either by free isolated extremities, or by loops between every two fibres, or by a net-work like blood-vessels. Experiment has made us acquainted with the functions of the more important nerves of the body, but has left much yet to be discovered. It has also thrown much light on the laws which

* See Dr. Marshall Hall's Principles of the Theory and Practice of Medicine, p. 242, et seq., and his Lectures on the Nervous System; also, Grainger on the Spinal Cord.

govern the transmission of nervous influence, though it has left the nature of that influence involved in the same obscurity which hangs over the real essence of light, heat, or electricity.

The effect of the division of a nerve is familiar to every one. If the nerve be one of sensation, irritation of the branches or trunk of the nerve below the point of division causes no pain; if it be a nerve of voluntary motion, neither the will nor a stimulus applied to the nerve above the point of division can cause the muscle to which it is distributed to contract. On the other hand, if the voluntary nerve be irritated below the point of division or the sentient nerve above it, motion takes place in the one case, and sensation in the other; the sensation being referred to the parts supplied by the extremities of the nerve. This law of sensation is strikingly illustrated in cases of amputation of an arm or a leg, where irritation of the divided extremity of the nerve is referred to the fingers or toes of the lost limb, and that even for years after its removal. A knowledge of the fact that irritation of the trunk of a sentient nerve produces pain, not in the trunk itself, but in the parts to which its branches are distributed, is of constant application in the treatment of disease, and tends to destroy our confidence in the division of nerves as a remedy for pains in the parts which they supply. A great many cases of *tic-doloreux* have been found to depend upon some cause of irritation as a tumor or spicula of bone existing at the origin of the nerve.

Although pressure applied to a sentient nerve causes pain in the parts supplied by its branches, a still stronger pressure produces pain in the trunk of the nerve itself. Severe local injury to a nerve of sensation or voluntary motion destroys its power as a conductor of nervous influence, but it affects the nerve itself only locally; for irritation of the portion of the uninjured nerve which is in connexion with the brain, produces sensation, and that of the portion of nerve in connexion with the muscles causes muscular contraction. When, however, a nerve of motion is stretched violently through its whole length, it loses its property of exciting muscular contractions, and sometimes the muscle itself loses its irritability, and cannot be made to contract by any stimulus, however powerful.

Experiments on animals have brought to light some properties of the nerves, which may be advantageously borne in mind by the pathologist. In the first place it has been proved beyond a doubt, that all stimulants applied to the nerves in the dead body, act in nearly the same way, and produce effects differing merely in degree. Of such stimulants, the electric and galvanic fluids are the most effectual, and they have been accordingly employed in almost all experiments on the properties of the nerves. These experiments have shown, that the nerves, when stimulated by galvanism, do not act as mere conductors of the galvanic fluid, for the muscles contract when the galvanic current is made to pass transversely through the nerve; and the muscles cannot be made to contract by any degree of mechanical irritation applied to a nerve of sensation,

whilst the slightest irritation of a nerve of motion gives rise to very strong contractions of the muscles. Hence, then, it appears that there resides in the nerves themselves a property of exciting muscular contractions on the application of stimuli, independent of the brain and spinal cord. It has been further shown, that this property may be exhausted by the continued application of a stimulus, and returns again after an interval of rest.

These experiments on the bodies of animals have been corroborated by others made during life on the human subject ; and it has been satisfactorily proved, not only that all stimuli, whether mechanical, chemical, or electrical, act in the same way, but that they cause the several nerves to which they are applied to manifest the characteristic properties with which they are endowed. Thus, irritation of nerves of common sensation causes pain ; of nerves of motion, muscular contraction ; of the retina, the sensation of light ; of the auditory nerve, that of sound. The stimulus of galvanism, too, excites in each organ of sense the sensation proper to it—taste in the tongue, a peculiar smell in the nose, light in the eye, a musical sound in the ear.

Some of the stimulants which have been mentioned admit of application in disease. Of these, heat, cold, and electricity are the most important. Both heat and cold cause the muscles to contract, and both in excess destroy the irritability of the muscles. Cold water injected into an artery causes contraction in the muscle which it supplies ; and this fact has been taken advantage of in cases of uterine hæmorrhage after delivery, by injecting cold water into the vessels of the still-adhering placenta. The efficacy of cold applied externally or internally, especially if its application is sudden, in causing contraction of the uterus, is well known. The good effects of electricity and galvanism in exciting muscular contractions have been manifested in some cases of paralysis.

The nervous power which after death is exhausted by the continued application of stimulus, is exhausted also in the living body, and in both cases rest is required for its restoration. The effects of this exhaustion on the entire frame are repaired by sleep ; in parts of the body by repose or change of action, which is but a form of repose. The effects produced in nerves of sensation or motion by the application of stimuli, are very remarkable. If the stimulus be very powerful, it may entirely destroy the excitability of the nerve, though applied only momentarily, as in the case of a flash of lightning producing permanent blindness. The same stimulus may at once annihilate the nervous power of the brain and spinal cord, and produce sudden death. Permanent paralysis may arise from the same cause. A weaker stimulus applied for a longer time may produce the same effect. Snow blindness, from the continued strong reflection of light on the retina, is an illustration in point ; the paralysis of the muscles which sometimes follows violent and long-continued exercise is another example of the same kind.

Still weaker stimuli, or the same stimuli applied for a shorter

period, exhaust the excitability of the nerve, and cause fatigue. Thus, if we gaze for a long time at the same colour, the eye becomes fatigued and insensible to the impression of that colour ; if we keep the same muscles in action only for a few minutes, as when we hold the arm extended, we feel extreme fatigue. The same result follows if we continue standing in the same position, but the slightest change of posture affords instantaneous relief.

Extreme exhaustion of the nervous power is always accompanied by severe pain. Thus, after the long-continued application of the stimulus of light to the eye, the sensibility of the retina is so increased, that even a feeble light produces intense pain, and the stimulus of extreme cold or heat applied to the skin, gives rise to acute suffering. In like manner the long-continued action of the muscles, as in walking, produces the most excruciating agony.

The application of stimuli, then, to the nerves of sensation or voluntary motion, produces, according to its degree and duration, entire destruction of the nervous power, or great exhaustion of it, accompanied in extreme cases by severe suffering ; and the functions of the nerves are not restored till after an interval of rest proportioned to the degree of the previous exhaustion. Experiment has shown, that the brain and spinal cord are the sources whence the restorative influence emanates, and that nerves which have been permanently cut off from those centres lose their property of exciting the muscles to contraction.

As all stimuli applied to the nerves produce more or less exhaustion of the nervous excitability, it follows that no medicine acting as a stimulus can strengthen the nervous energy. But there is a class of remedies which have the opposite effect, viz. that of deadening the excitability of the nerves, and, if applied in a concentrated form, of entirely destroying it : these are the *narcotics*. This has been proved both by experiments on animals, and by observations on the human subject. If the ischiadic nerve of a frog be dissected and allowed to hang in a solution of opium or morphia, it is entirely deprived of excitability. This, however, does not extend beyond the portion of the nerve to which the narcotic is applied.

Paralysis of the voluntary muscles produced by placing the leg of a frog in a solution of opium, or of hydrocyanic acid ; of the heart by the application of infusions of opium and tobacco ; of the intestines by opium and ticunas, (all of which effects have been observed in the experiments of Monro, Coullon, Wilson Philip, and Morgan and Addison,) are instances of the same kind. Similar local effects are produced in the human body, as evidenced by the loss of contractile power in the iris from the local application of extract of belladonna, by the paralysis of the muscles of the hands caused by the handling of lead, by the loss of sensibility in the lips and tongue occasioned by chewing monkshood, and in the fingers by the vapours of strong hydrocyanic acid.

Such is the local effect of narcotic poisons on the nerves. The *modus operandi* of narcotic poisons taken into the stomach, or other-

wise introduced into the system, is a point of great interest in physiology, and of practical importance in the treatment of disease. It has been already shown that poisons, however they may be introduced into the system, enter the circulation, and of course are brought into close contact with the nerves: this, then, is but another form of local application, and must be followed by local effects. But as the whole nervous system would in this way be brought under the influence of the poison, no local effects would be perceived unless the poison had a specific action on some one part of the body. The fact of such local action occurring has been placed beyond a doubt by experiments on animals. Thus, Müller having divided all the vessels and muscles of the thigh of a frog, poisoned the animal with *nux vomica*, and found that the irritability of the sound leg was lost much sooner than that of the leg of which the vessels and muscles had been divided. This loss of irritability in the sound leg could be attributed to no other cause than the circulation through it of blood containing the poison, and the consequent local effect of the poison on its nerves. But though the local action of poisons on the nerves is thus established, it is evident that such local action can only produce dangerous or fatal effects by acting on the more important organs of the body, viz. the brain and spinal marrow, the heart, or the lungs; and as these organs would all be locally affected by the poison, it is unnecessary to seek for the cause of death in the local effect produced on parts of less importance to the economy. We may safely assume, then, that poisons prove fatal by their action on one of these three organs, and most probably by their action on the nervous centres.

In the case of poisons introduced into the blood, and proving fatal in such a limited period as has been proved sufficient to allow of their circulation through the body, that is to say, in more than twenty-five seconds, there is little room for further inquiry into the precise mode of their operation; but the fact that one poison (hydrocyanic acid) has been known to prove fatal in as short a space of time as four seconds, suggests new inquiries as to the precise mode of operation, not only of this poison, but of narcotic poisons in general. In the case of poisoning with hydrocyanic acid, there is every reason to believe that death takes place before the blood tainted with the poison can have been carried to the nervous centres: hence the fatal effects must be primarily due to a local action of the poison, and secondarily, to a reflected action on the nervous centres. Now it has been proved experimentally, that the "narcotic action" of poisons "does not react from a particular point of a nerve on the brain," or if it do so react, it is very slowly; and moreover, that the effect of hydrocyanic acid on a sentient nerve may be strictly local; hence it is highly improbable that the fatal influence of the poison is conveyed to the brain by the ordinary nerves of the part to which it is applied, and no feasible supposition remains but the one which has been rendered probable by the experiments of Morgan and Addison, that poisons

act primarily on the nerves distributed to the coats of the blood-vessels, and that these nerves convey the fatal impression to the nervous centres. These experiments, however, are far from conclusive, and have failed to carry conviction to the minds of those who have most carefully examined them. A true theory of the mode of action of narcotic poisons is still a desideratum. But whatever may be the true explanation of the action of those poisons, the fact of their exercising an important influence upon the nerves and nervous system generally, is clearly established.

Another fact which has been proved by experiment is, that those poisons which excite strong muscular contractions, produce their effects through the circulation, and not by immediate application to the nerves themselves. Thus, strychnine applied in powder to the moist spinal cord of the frog, excites no twitchings of the muscles; in order to do so, it must first enter the circulation. So, also, when an animal is poisoned with opium or strychnine, if the nerves of the extremity are divided, the spasms in that limb cease; and if the spinal marrow is cut through before an animal is poisoned with upas or angustura, the parts supplied by the nerves coming from the lower portion of the cord are not convulsed. These experiments prove that narcotics do not excite contractions of the muscles by their direct action on the nerves, but through the medium of the spinal cord and brain. The general symptoms of poisoning, therefore, may be safely attributed to the action of the blood, tainted with the deleterious substance, on the nerves of the blood-vessels, or on the central organs of the nervous system.

The foregoing observations apply chiefly to the nerves of sensation and voluntary motion, which have the brain and certain portions of the spinal cord for their origin and centre. There yet remain to be examined, as of great importance to the physician, the functions of the sympathetic nerve and the excito-motory system of nerves.

The sympathetic.—The functions of this nerve are three-fold: it presides over the involuntary motions of the more important viscera of the body; it is the medium by which all impressions are conveyed from those parts to the central organs; and it regulates the process of secretion and nutrition in every part of the frame. With regard to the first property of the sympathetic—that of presiding over the involuntary motions of the important viscera—it has been ascertained by experiment, that the parts which this nerve supplies, as the heart, the intestinal canal, &c. continue to move long after they are separated from their connexion with the rest of the sympathetic system, and even after their removal from the body, and that the contractility of these parts is preserved longer than that of the voluntary muscles. The effects of stimuli applied to the sympathetic nerve, are of longer continuance than that of stimuli applied to the nerves of voluntary motion; and the motions thus excited are either rhythmic, as in the heart, or continuous, as the peristaltic movements of the intestines. All the parts

supplied with nerves from the sympathetic, are, to a certain extent, independent of the brain and spinal marrow. Thus, the heart will continue to beat long after the division of its nerves, after severe injury of the brain and spinal cord, and even after its entire removal from the body. That the spinal cord influences the contractions of the heart has been proved experimentally; that the brain affects them is shown by the familiar effect of mental emotions upon them: on the other hand, when the mind is tranquil, the heart's contractions are few in number, and in sleep they fall much below the number during our waking hours. There is good reason also to believe, that as the parts supplied by the sympathetic are strongly affected by influences emanating from the brain and spinal cord, so the sympathetic is dependent for its supply of nervous power upon those centres.

The impressions made on the nervous fibres of the sympathetic are not usually conveyed to the brain; in other words, they are not of the nature of sensations; but violent causes of irritation may give rise to sensation, either in the parts supplied by nerves from the sympathetic, as in enteritis, or in those supplied by cerebro-spinal nerves. In this latter case, the painful sensations are usually experienced in the extreme parts of the organs affected: thus, we have itching of the nose and anus from the irritation of worms in the intestines, and pain and itching in the glans penis from disease of the kidneys and bladder. These are examples of pain reflected from the sentient nerves of the spinal cord. Irritation in the intestines, or a disordered condition of the uterine functions, are familiar causes of reflected sensations of a still more marked character, such as the acute pain in the abdominal muscles occurring in hysterical females, accompanied by tenderness of the spine itself, and removed by remedies applied to that part. The same irritation conveyed to the spinal marrow, and accompanied by tenderness there, may be reflected from the same parts on the nerves of voluntary motion, giving rise to a long list of spasmodic diseases: such as convulsions, chorea, and tetanus, in children from intestinal irritation; hysteria affecting the muscles of voluntary motion, but especially those of respiration, arising in adults from the same cause; vomiting and hiccup from irritation of the intestines, kidneys, uterus, &c.

The sympathetic nerve has been shown to preside over the processes of secretion and nutrition, and consequently over the functions of the parts concerned in these important processes—the capillary vessels, therefore, and the arterial system generally, fall under its influence. Of these, the organic functions of the sympathetic, and of the degree in which they are dependent upon the brain and spinal cord, less is known than of its other properties. There is reason, however, to believe, that the sensations of cerebro-spinal nerves are reflected from the spinal marrow on parts supplied by nerves from the sympathetic, as in syncope from impressions on sentient nerves. Instances of the reflected action of the organic fibres of one part on those of another are very numerous. Thus, inflam-

mation of the testicle may be replaced by that of the parotid, erysipelatous inflammation of the skin by that of the brain, gouty inflammation of an extremity by a similar inflammation of an internal organ, rheumatic affections of a joint by that of the heart. So, also, with secretions: the secretion of the skin, for instance, may be replaced by that of the kidney. In this case, perhaps, the effect is less exclusively due to nervous influence than in the former. The suppression of habitual secretions, whether natural or acquired, gives rise to similar reflex actions of the organic nerves. The suppression of the menstrual discharge, for instance, is sometimes followed by a periodical discharge of blood from the lungs, which scarcely admits of any other interpretation than the one now assigned. The suppression of an hæmorrhoidal discharge may give rise to apoplexy, the drying up of an ulcer to a similar disease of a distant part. These cases, however, admit of explanation on the supposition that a temporary state of plethora is produced which finds relief in the part most predisposed to take on diseased action. It is probable that all cases of metastasis are partly due to a reflex action of the organic nerves, partly to the quantity and quality of the circulating fluid, and partly to the predisposition of the several organs to take on diseased action.

In speaking of the phenomena of inflammation, certain changes in the size of the capillary vessels were attributed to nervous influence. The enlargement of the capillaries in blushing, and their contraction from the emotion of fear, were shown to be independent of increased action of the heart, and to be strictly local phenomena. It was also shown that as these small vessels possess no muscular fibres, these changes in their calibre can be attributed to nothing else than a modification of their elasticity, and this modification itself was attributed with equal reason to nervous influence. Assuming this explanation to be correct, it is obvious that it must apply with equal force to the larger arteries, which are supplied with the same nervous influence, and possess the same elastic property. This is rendered highly probable by the peculiar character of the pulse which accompanies the first stage of severe febrile and inflammatory affections; a character strongly marked, and furnishing an evidence of the real state of the vessels, almost as complete as the visible redness of the surface in cases of inflammation does of enlargement of the capillary vessels. The pulse here spoken of is distinct from that of health, and from that present in the after stages of these affections: it is present with the first feeling of indisposition, and continues till the characteristic marks of the disease have made their appearance. It is a frequent, full, weak, and compressible pulse, conveying to the finger the most distinct impression of a relaxed and flabby coat, and readily explained by the loss of elasticity already spoken of. In the indisposition which ushers in attacks of scarlet fever, erisipelas, cynanche tonsillaris, &c., it is always present, and always most distinct in its character. On the strength of this symptom alone,

the strong analogy of the capillary vessels may be extended to the larger arteries, and it may be confidently stated, that there is one state of system, at least, in which the larger vessels undergo the same change as the capillaries in inflammation. Is not this condition due to some change in the state of the organic nerves supplying the coats of the blood-vessels? Does not that change consist in a withdrawal of the nervous influence from the vessels? And is not a diminution of nervous power the direct effect of the poison which is the cause of these diseases? On the other hand, in certain cases, as of ague, &c., may not this same state of the larger vessels follow upon an increased action of the vessels of the entire system; that is to say, upon a temporary increase of their elasticity, just as in inflammation a dilated state of the capillary vessels follows upon the contraction produced by the application of a stimulus? In the general, as in the local affection, may we not have first the application of a stimulus, accompanied by an increase of nervous influence and consequent contraction of vessels, and then, as the necessary consequence, diminished nervous influence, and relaxation of vessels? Substitute increased elasticity of the extreme vessels for *spasm*, and we have Cullen's theory of fever, with this difference, that this increased elasticity of vessels is a state of short continuance, not overcome by a reaction in the centre of the circulatory system, but yielding to that diminished elasticity which follows as certainly upon increased action (that is increased elasticity) as blunted sensibility upon over-exertion of the organs of sense, and fatigue from long-continued or violent action of the muscles. This is theory, and as such is introduced here with some fear that it may be thought out of place.

The sympathetic nerve, as the name implies, is assumed to be the organ of many of those combined sensations, motions, secretions, &c., which have received the name of *sympathies*. The discovery of the reflex system of nerves has traced some of these to a different source; but from whatever cause they arise, they well deserve the attention of the physician. The different parts of the same tissue are said to sympathise with each other: thus, in catarrh, inflammation is readily communicated from one part of the mucous membranes to another; inflammation of one serous membrane is sometimes followed by that of another, as peritonitis by pleuritis; gouty or rheumatic inflammation of the fibrous tissues of a joint with the same inflammation of the same tissue in the heart; inflammation of one tract of absorbent vessels by that of the glands through which they pass; and inflammation of the veins of the uterus with that of the same vessels in other parts of the body. Different tissues are also said to sympathise with each other, but this happens more rarely. Sometimes, for instance, an inflammation commencing in the mucous membrane of the intestine extends to the muscular and thence to the peritoneal coat; so also, severe inflammation of the muscles of the side (*Pleurodynia*) may extend to the pleura. The sympathy between the skin and mucous mem-

branes is familiar to every observer. The viscera and their investments likewise sympathise with each other. Thus, diseases of the substance of the lungs, heart, liver, uterus, ovaries, testicle, &c., are often accompanied by more or less inflammation of the serous membrane which covers them. The sympathies of entire organs with each other are still more important. These may be classed as follows: * 1. Sympathies between organs which have similar structure and function; as between the salivary glands, the heart and blood-vessels, the stomach and intestines, and the several parts of the nervous system. 2. Sympathies between organs of different texture, but belonging to the same system: as the chylopoietic, the uropoietic, the generative, the respiratory system, and the united respiratory and circulating system, viz. the lungs and heart. 3. Sympathies of the more important viscera with the central organs of the nervous system: as in the affection of the brain which follows intestinal irritation in children, and the affections of the stomach attending injuries of the brain. 4. Sympathies between organs not connected in any of the foregoing ways, and only to be explained on the principles of reflection: such are the sympathy of the parotid gland and testicle; of the mamma, and uterus; of the larynx, the respiratory organs, and the glands which secrete the hair, with the parts of generation.

In all these sympathies the nerves play an important part; but the several parts of the nervous system also sympathise with each other. Thus, the nerves of the surface and the central organs of the nervous system react upon each other; the affection of the central organs in fever causing the various conditions of the skin; and shocks of different kinds applied to the skin exciting the brain and spinal cord. Thus, cold water poured on the head, restores the brain exhausted by long-continued inflammation, and dashed in the face or thrown on the chest, removes an hysterical fit, excites the nervous centres in cases of narcotic poisoning, restores persons in the state of syncope, and is among the most efficacious remedies in asphyxia. In all these cases the central organs are roused into activity by the shock applied to the surface.

The sensitive nerves sympathise with sensitive, the motor with motor, and the sensitive and motor with each other. The optic, the olfactory, the auditory, and ciliary nerves of the two sides are affected at the same time and in the same way, and an affection of the one side often leads to a similar affection of the other: thus, inflammation of one eye is often followed by inflammation of the other; deafness of one ear by deafness of the other; alterations in the size of one pupil by a similar alteration in the size of the other. This sympathy between nerves of sensation, extends also to nerves of different kinds and functions: thus, a strong light on the eye produces tickling in the nose, tickling the feet throws the whole body into convulsions, certain sounds put the teeth on edge, a tumor on a nerve may produce pain or spasms in parts of the body in no way

* See Müller, vol. 1. p. 312.

connected with it. To phenomena of this kind the term *radiation of sensations* has been applied. Sympathies of motor nerves with each other occur in all associated movements. Those of motor with sensitive nerves belong to the class of excited or reflected motions.

To the same class belong the important phenomena of associated movements excited by nerves which do not convey sensation. A very considerable part of the motions which take place independent of the will may be safely referred to this head. The following plan, taken from Dr. Hall's work on the Diseases and Derangements of the Nervous System, will exhibit the extent and importance of that system to which he has given the name of excitomotory, and save the necessity of more minute detail.

<i>Incident motor branches.</i>	<i>Reflex motor branches.</i>	<i>Excited actions.</i>	
I. Trifacial, arising from			
a. The eye-lashes.	The trochlearis } oculi,	Protective and other	
b. The alæ nasi.	The abducens } oculi,	movements of the eyes	
c. The nostril.	The minor portion of the fifth	and eyelids.	
d. The fauces.	Orbicularis } from the	Of the iris?	
e. The face.	Lavator alæ nasi } facial.	(Facial respiratory	
		movements.) Sneezing,	
		laughing, &c. &c.	
II. The Pneumo-gastric			
from			
a. The pharynx.	The pharyngeal.	Of the { In ingestion	
		pharynx, { of food, suc-	
			tion, deglu-
			tition, &c.
b. The larynx.	The laryngeal.	Larynx, { Closure of	
			glottis, &c.
c. The bronchia.	The bronchial, &c.	Motions of the air-pas-	
		sages in respiration and	
		of œsophagus and sto-	
		mach in digestion.	
d. The cardia, kidney,	The œsophageal and cardiac.		
and liver.			
III. The glosso-pharyn-	The myo-glossal.	Associated movements	
geal.		of tongue and pharynx.	
IV. The posterior spinal			
form			
a. The general surface.	The spinal accessor y,	Movements of the	
		muscles of respiration.	
b. The glans penis and	Diaphragmatic, } from	Expulsion of fæces,	
clitoridis.	Intercostal, } the	urine, and semen, and	
c. The anus.	Abdominal, } spinal.	of the fœtus in partu-	
d. The cervix vesicæ.		rition.	
e. The cervix uteri.	The sphincters, the } from	Retentive movements of	
	expulsors, the } the	the sphincters, viz. of	
	ejaculators, the } sacral.	the cardia, of the val-	
	Fallopian tubes, } of the	sphincter ani, sphincter	
	the uterus, &c.	vesicæ, (neck of ute-	
		rus?) vesiculæ semi-	
		nales?	

Tone and irritability of muscular system.

The two first columns of the foregoing table are taken from Dr. Hall's work, with slight alterations; the third column is added from a subsequent table, showing the physiology of the true spinal system, with many transpositions and some additions, the excited actions being placed opposite to those divisions of the two first columns with which they have the most obvious connexion. The excited actions in the third column are not produced by irritation of the incident nerves of the first, but correspond more closely with the excited action of the reflex motor branches of the second column. Thus, the incident motor branches of the nostrils, when irritated, will produce not merely the facial respiratory movements, but will also throw the muscles of respiration into violent action. So likewise irritation of the bronchial incident nerves will excite not merely the muscular fibres of the bronchial tubes, but the muscles of expiration also in the act of coughing.

The following table presents the pathology of the true spinal system, according to Dr. Hall:

PATHOLOGY OF THE TRUE SPINAL SYSTEM.

Diseases of the Incident nerves.

- | | | | | | |
|------|-------------------------------------|--------------------------------|--|-------------------------------|---|
| I. | Dental]
Gastric
Intestinal | } Irritation
in
Infants. | { 1. Crowing inspiration.
2 Strabismus, spasm of the fingers and toes,
strangury, tenesmus, &c.
3. Convulsion.
4. Paralysis. | | |
| II. | Gastric
Intestinal
Uterine | | | } Irritation
in
Adults. | { 1. Hysteria.
2. Asthma.
3. Vomiting, hiccup, &c.
4. Epilepsy.
5. Puerperal convulsions, &c. |
| III. | Traumatic tetanus, hydrophobia, &c. | | | | |

Diseases of the reflex or motor nerves,

- | | | | |
|----|--------------------------|-----|------------|
| I. | SPASM. | II. | PARALYSIS. |
| | a. Spasmodic tic. | | |
| | b. Torticollis. | | |
| | c. Contracted limbs, &c. | | |

Diseases of the spinal marrow itself.

- I. Inflammation and other diseases.
- II. Diseases of vertebræ and membranes.
- III. Counter pressure, &c. in diseases within the cranium.
- IV. Centric epilepsy, tetanus, &c.
- V. Convulsions from loss of blood, &c.*

* For an exposition of Dr. Marshall Hall's views, see "On the Diseases and Derangements of the Nervous System, in their Primary Forms, and in their Modification by Age, Sex, Constitution, Hereditary Predisposition, Excesses, General Disorder, and Organic Disease. By Marshall Hall, M.D., &c. 1841;" or, Med Chir. Review, Oct. 1841.

The condition of the nervous system and that of other functions of the body reciprocally affect each other ; but this mutual dependence is so strikingly displayed in the case of the circulation and the nervous centres, as to merit a separate consideration in this place.

The effect of the emotions and passions, and of all violent exertions of the body on the heart, is a matter of daily observation, and so surely does the circulation participate in every change of the nervous system, that it becomes the best test of the degree and amount of that change. Every violent exertion of different muscles, and every long-continued exercise of the same muscles, strongly excites the pulse ; and rest not only restores it to the frequency which it had before the effort, but for a time reduces it below that number. The various causes of excitement to which the body is exposed during its waking hours, affect the circulation in the same way. It is in consequence of the fatigue produced by these causes that the pulse falls towards evening, and regains its frequency when the body has been refreshed by sleep. Precisely the same effects are produced by disease. In febrile affections, for instance, the pulse during the height of the disorder is much more frequent than in health, but as soon as the disease has passed away, the pulse falls many beats below its natural frequency, to regain that frequency again as health and strength return. Another remarkable fact, established by careful observation of the pulse is, that the body is much more affected by all causes of excitement when it is in full possession of its strength than when it is exhausted by fatigue. Thus all stimuli—muscular exertion, food, drink, and even mental application—produce a much greater effect on the circulation in the morning than at night, and not only a greater effect, but one of much longer continuance. So, also, if two persons be submitted to the same stimulus, the pulse of the stronger will be most affected by it ; if a healthy man, and one just convalescent from fever, take the same food, the circulation of the healthy man will be most accelerated.

But there are states of debility in which the heart's action, in place of being less frequent, is more frequent than in health. This occurs in a more advanced stage of convalescence when the patient begins to recover his strength, and also in the decline of febrile affections, so long as any degree of fever continues. In this state stimulants have the effect of lowering the pulse ; the action of stimulants, therefore, becomes a useful test of the condition of the patient. A greater degree of debility in the absence of actual disease is characterized by a very small and very frequent pulse ; but such debility is rarely met with, except as the consequence of diminution in the quantity of the circulating fluid, whether from excessive loss of blood or from increased discharges.

When exhaustion of the nervous power is accompanied by local disease, whether functional or structural, that state of system ex-

ists to which the name of *irritation* is given. Irritation is observed in cases of slow convalescence from fever, in which some local affection has supervened; as an immediate consequence of severe injuries in subjects debilitated by previous disease or bad habits of life, and as a more remote consequence in sound constitutions. In those latter cases, the injury itself produces the same nervous exhaustion which bad habits or previous disease had occasioned in the former.

Another effect of the nervous system on the circulation is *syncope*. This, which consists in a temporary arrest of the heart's action, may be caused by any violent shock sustained by the nervous centres, originating from without, as in accidents, or within the brain itself, as in the case of fainting from violent emotions. Sometimes the heart is paralyzed by the shock, and death is the result.

There is still one other mode in which the nervous centres act upon the circulation. When the brain suffers pressure, the heart is remotely affected, and the same result follows a similar injury to the upper portion of the spinal cord. In these cases the heart beats less frequently than in health. The heart is also affected in the same way in some cases of hysteria. Here the cause is more obscure.

The effect produced upon the nervous centres by changes in the state of the circulation are more important even than those which the circulation suffers from alterations in the state of the nervous system. The exhaustion which follows on strong nervous excitement has its counterpart in the exhaustion produced by loss of blood. The sudden loss of a large quantity of blood produces syncope or death, partly by depriving the heart of its due amount of stimulus, and partly by paralyzing the nervous centres. The abstraction of a small quantity may give rise to the same state of debility which follows upon febrile affections, but this can only take place where the frame is quite free from local disease, whether functional or structural. When the loss of blood is occasioned by a severe wound, or occurs in a person affected with local disease, or of a broken constitution, the debility is accompanied by some nervous excitement, and *irritation* is the consequence. The same effect follows when the quantity of the circulating fluid is diminished by profuse discharges, as leucorrhœa, diarrhœa, &c. In all these cases there is some local affection—in the case of the wound, inflammation and its consequences; in the case of the broken constitution, some visceral disease; in leucorrhœa, diarrhœa, &c. some local disturbance—and in all these cases the state of debility is exchanged for that of irritation. An excessive and continued drain of natural secretions, as in menorrhagia, hyperlactation, &c., leads to the same result. The puerperal state, combining as it does nervous exhaustion, loss of blood, a local affection, and a sudden change of the equilibrium of the fluids, presents the most vivid pic-

ture of that state to which the name of irritation has been given. In this condition of irritation, as in that originating in the nervous centres themselves, we have the frequent and quick pulse, easily excited by mental emotion or by strong and sudden impressions on the organs of sense, and this is accompanied by a great variety of nervous affections. The functions of the brain itself suffer; and we have, according to the degree of the irritation, mental excitement, delirium, or mania; the nervous influence conveyed to the muscular system betrays the same derangement under the forms of restlessness, jactitation, convulsions, and spasms in the voluntary muscles, and frequent or irregular breathing, laughing, crying, sighing, sobbing, yawning, &c. in the muscles of respiration; the nerves of sensation, participating in the general derangement of the nervous system, may become unusually acute, giving rise to an intolerance of light and sound, and an excessive sensibility of surface. The stomach likewise sympathises with the nervous centres, and there is nausea, vomiting, hiccup, &c.

Such are some of the phenomena of the state of irritation—a state which, whether it originate in the nervous system, or in the circulation, displays nearly the same character, and requires the same treatment. It is aggravated by depletion, and relieved by those remedies which impart strength whilst they soothe excitement. A combination of narcotics and tonics, or of narcotics and stimulants, (for stimulants act as tonics in such cases,) is the remedy indicated, and opium fulfils this indication better than any other.

The influence of the nervous system over muscular movements has already been alluded to; and two classes of movements have been described, the involuntary and the voluntary; the former excited by certain changes in the condition of the incident or excitor nerves giving rise to corresponding changes in the reflex or motor nerves, and the latter by the will. In health these two sets of muscles execute their appropriate movements; in disease, or in peculiar states of system, the one takes on the character of the other, the involuntary muscles obeying voluntary impulses, and the voluntary muscles performing involuntary contractions.

A well-authenticated example of involuntary muscle being subject to the influence of the will, occurred in the case of Colonel Townsend, who possessed the extraordinary faculty of stopping the beat of his heart at will. This case is nearly unique. But examples of the voluntary muscles being subject to other influences besides those of the will, are both numerous and varied. The associated reflex movements of voluntary muscles produced by an influence transmitted from the peripheral extremity of an incident nerve to the spinal marrow, have already been mentioned. Some of the most striking examples of involuntary actions of voluntary muscles observed in disease, are, chorea, hysteria, epilepsy, catalepsy, convulsions, tetanus, hydrophobia. Of these dis-

eases, some depend on a direct influence transmitted from the nervous centres, but the majority are examples of a reflex action.

When the contractions affect the same muscles for a certain space of time, producing a fixed and rigid state of the parts affected, they are said to be *tonic*; when the muscles are alternately contracted and relaxed, they are called *clonic*. Tetanus, hydrophobia, and catalepsy, are examples of *tonic* spasm; chorea, hysteria, and epilepsy, are forms of *clonic* spasm: convulsions are sometimes of one kind and sometimes of the other.

In chorea and hysteria, voluntary and involuntary impulses are strangely blended; but the degree of control which the will exercises is widely different in the two cases. When a patient affected with chorea wills a movement, the involuntary action mixing with the voluntary effort causes grotesque distortions; and attempts at restraint only increase the action of the muscles; but the movements of the hysteric patient are less grotesque, and can be restrained by a strong effort of the will.

Convulsions afford an example of unmixed involuntary contraction. They are commonly a form of reflex action; but when they follow the loss of blood, there is reason to believe that they arise from the sudden removal of that nervous influence which maintains the tone and the equilibrium of the muscles. As soon as this is withdrawn, the flexors, which are the strongest, contract, and the extensors being put on the stretch, are in their turn brought into action, and thus an alternate or clonic contraction of the two sets of muscles takes place: but as there is a balance of strength in favour of the flexor muscles, they at length overpower the extensors, and if death ensue, the fingers and toes are found flexed. Convulsions, therefore, are often the last movements of a living body; they are also the most efficient cause of restoration from syncope; for when the circulation has nearly ceased, and the heart does not receive blood enough to excite it to action, the contraction of the muscles of the limbs forces the blood of the veins towards the heart, and thus tends to re-establish the circulation. The trembling of the limbs from cold, which is a low degree of convulsion, has the same beneficial effect in restoring the circulation of the blood.

The nerves of sensation, like those of voluntary motion, are subject to various derangements. Sensation may be lost, (anæsthesia,) or exalted, (hyperæsthesia,) or perverted, (dysæsthesia.) The loss of sensation which sometimes accompanies paralysis of the voluntary muscles is an example of anæsthesia affecting the nerves of touch, amaurosis of anæsthesia of the optic nerve, &c. Intolerance of light and sound, violent hunger and thirst, &c., are examples of hyperæsthesia. The various kinds of pain and the anomalous sensations of hysteria and hypochondriasis, are instances of dysæsthesia. In some hysteric females there appears to be diminished sensibility of the nerves of touch, with increased sen-

sibility of other nerves, the sensibility appearing to be withdrawn from the one to be concentrated in the other. Hence some of the most remarkable phenomena of nervous affections, and of that state induced by the manipulations of the magnetisers.

There still remain to be considered two functions closely dependent upon the nerves, though connected more or less with the changes which are constantly taking place in the fluids and textures of the frame :—the generation of heat and electricity.

Animal heat.—The causes of the production of animal heat are still subjects of controversy, but there seems little room to doubt that the functions of respiration, secretion, and nutrition, are all more or less subservient to its generation : it has also been shown experimentally, that the nerves exercise an important influence upon the temperature of the body. Though the precise effect which each of these causes has in the production of animal heat has not been determined, observation has shown that its amount varies greatly in different states of the system. The temperature of those internal parts of the body which are most accessible, viz. the mouth and rectum, is about $97\frac{1}{2}$ or $98\frac{1}{2}$ Fahr. That of the blood is about 101° . A difference, however, has been observed to exist in parts near to and remote from the centre of the circulation ; thus, Dr. J. Davy observed, that the temperature of the axilla being 98° F., that of the loins was $96\frac{1}{2}^{\circ}$, that of the thigh 94° , that of the leg 93° to 91° , and that of the sole of the foot 90° .

In disease, remarkable deviations from the standard have been observed both in excess and in defect. Thus, the temperature of inflamed parts has been found as high as 105° to 107° , and that of the whole surface has reached the same degree in some cases of fever, and risen still higher (to 112°) in scarlatina. On the other hand, in cases of morbus cæruleus and in the cholera, the temperature has been observed as low as $77\frac{1}{2}^{\circ}$ or 77° . In most cases of disease the increase and decrease of temperature bears a pretty exact proportion to the rapidity or slowness of the circulation ; but remarkable exceptions to this rule have been observed. Thus, Dr. Hastings, in his work on inflammation, states, that in several cases of fever the pulse has been remarkably infrequent, whilst the temperature has been very high ; the pulse, for instance, being 45 when the temperature of the body was 105° . In cases of hydrocephalus, the same observer has counted a pulse of 60° or 70° , with a temperature of 100° . These facts seem strongly to favour the opinion which attributes the generation of animal heat mainly to the nervous system.

Electricity.—The facts ascertained with regard to free electricity in man, are the following :—as a general rule the electricity is positive, but in the female more frequently negative than in the male ; it is more abundant in persons of a sanguine temperament than in the lymphatic, greater in the evening than in the morning ; greater when the temperature of the body is high than when it is low ; it is in-

creased by spirituous liquors, and reduced to zero in rheumatic affections. The free electricity of the body is generally of very feeble intensity, but in peculiar states of system the body has given out sparks in great abundance.

THE MIND CONSIDERED MORE ESPECIALLY IN ITS RELATION TO THE BODY.

The organ of the mind.—The brain, considered as the material instrument of the mind, deserves attention, inasmuch as it differs in important particulars from all other viscera. Those of the abdomen are contained in a yielding cavity with muscular parietes, those of the chest in a cavity consisting partly of bone and partly of muscle, but allowing of a considerable increase and diminution of size in all directions ; but the brain is shut up in an unyielding cavity of bone. All these cavities are air-tight, but that of the cranium alone is both air-tight and unyielding, at least in the adult. It follows, then, that whilst all the cavities of the body must always be full, the cranium alone must always contain the same amount of matter, for the atmospheric pressure of 15 lbs. on every square inch of the surface of the body keeps the brain full, as it does a syphon. Now the brain consists of a mass of nervous matter, supplied with blood by a large number of vessels, and there is no reason to believe that this matter can suffer compression any more than so much water, at least the strongest pressure which can be exerted upon it in the living body would probably not be perceptible to the most delicate instrument. It is also an undoubted fact, that so long as the arteries and veins contain their due proportion of blood, the brain is not affected either by an increase or diminution of the pressure which it ordinarily sustains. A man who descends in a diving bell thirty-four feet below the surface of the water, sustains an additional pressure of 15 lbs. on every square inch of his body, and yet his brain does not suffer. On the other hand, a man ascending a lofty mountain, or going up in a balloon, has the pressure on his body, and consequently on the vessels of his brain, materially diminished, and yet his brain is not affected. Thus, the inhabitants of some of the valleys among the Andes, who live as far above the sea as the summit of Mont Blanc, suffer only half the pressure which the body has to bear at the level of the sea, and yet they enjoy health both of mind and body. Again, the head of the infant suffers severe pressure during birth, and the yielding cranium of the child allows of large accumulations of fluid, and yet the brain suffers nothing during birth, and often very little in hydrocephalus.

Mere pressure, then, does not affect the functions of the brain, and yet men are said to die of pressure on the brain. When blood or serum or lymph are found on the surface or in the ventricles, or a tumor in the substance of the brain, or a larger

quantity of blood than usual in some of its vessels, death is said to have been occasioned by pressure. This statement is incorrect; pressure there is none. How, then, is the fatal result to be accounted for? Simply thus: the brain, like all other organs of the body, is dependent for the due performance of its functions on its supply of blood, and a tumor or fluid within the cranium, by occupying space there, deprives the brain of a quantity of blood equal to its own size; and the functions of the brain suffer in proportion to the loss, which it sustains. The functions of the brain most open to observation are voluntary motion and sensation; both of which are lost or greatly impaired. The less obvious functions, that is to say, the supply of nervous power to the more important viscera, especially those of circulation and respiration, are equally impaired: hence the infrequent pulse and respiration.

Loss of sensation and voluntary motion, and infrequent pulse and respiration, are among the most prominent symptoms of apoplexy; and all the others, whether occasional or constant, admit of the same ready explanation. When the supply of blood is cut off at once, as by the sudden pouring out of blood in the more common form of apoplexy, the symptoms are often more strongly marked, though the quantity of blood effused is very small, than in cases of slow effusion of fluid or the slow growth of tumors within the cranium, in which cases the brain adapts itself by degrees to the new circumstances in which it is placed. Sometimes the quantity of blood effused is too small to account for the serious disturbance of the functions of the brain by the mere displacement of a few drops of the circulating fluid. Of these cases there is a ready explanation in the fact, that instances have occurred in which all the symptoms of apoplexy have been present without a single morbid appearance after death, except a disproportionate quantity of blood in the veins; and it is highly probable that the cases of apoplexy now alluded to, combine with the small effusion of blood this same want of balance in the circulation. If the fatal effects of such small effusions of blood appear inexplicable on this supposition, they are to the full as difficult of explanation on the received principle of pressure.

There are cases of apoplexy, then, (that is to say, cases in which the functions of the brain are greatly impeded,) in which no other cause can be assigned but a want of balance in the circulation. Is this an efficient cause? Without doubt it is. Suppose the extreme case, that the arteries contain scarcely any blood, while the veins are full of it; it is obvious that the brain is in a worse condition than if it received no blood at all, or its vessels were filled with warm water: for the venous blood of which it is full, is a positive poison. When the venous blood is less decidedly in excess, the functions of the brain, of course, suffer less; and these slighter disturbances in the balance of the two circulations proba-

bly account for the various conditions of the mind in our waking and sleeping hours. On the other hand, if the circulation through the arteries be increased, instead of torpor of the functions of the brain, we have those of excitement, heightened sensibility, violent muscular contractions, violent delirium, raving madness, &c.

This balance of the circulation may be disturbed in various ways. Blood may be accumulated in the veins by pressure upon the jugular veins themselves, or by pressure on the carotid arteries. As the change of arterial into venous blood is constantly going on, an arrest of the circulation in either direction will have the effect of increasing the quantity of venous blood in the brain, and this will be followed by sleep, more or less profound, by coma or apoplexy. Pressure, then, is one disturbing cause. An arrest of the heart's action, by putting a stop at once to the circulation through the brain, produces syncope, which differs from apoplexy merely in degree, the one arresting every function of the body, the other merely oppressing them more or less. A very feeble action of the heart will be attended with the same result, for the arteries of the brain receiving little blood, and the changes from arterial to venous blood still going on, the brain must contain but a small quantity of arterial blood, and must consequently perform its functions imperfectly. Hence the deep sleep or coma which often attend extreme debility, and hence the turgid condition of the veins of the head when death follows upon hæmorrhage or other debilitating cause. In these cases, however, the effusion of serum generally accompanies the turgescence of the veins. The incautious use of the lancet in cases of inflammation of the brain often produces this very derangement of the circulation. The bold practitioner, not content with reducing the circulation through the arteries and veins to a state of equilibrium, carries depletion to the extent of greatly diminishing the quantity of the circulating fluid, and enfeebling too much the action of the heart. The consequence is, that the arteries receive little blood, the veins contain an undue proportion, the circulation through the brain becomes languid, the capillaries lose their elasticity, and pour forth serum into the ventricles or on the surface, and the patient dies comatose. Increased action of the heart, on the other hand, causes the brain to receive an undue proportion of arterial blood; hence the delirium and other symptoms of violent excitement which attend severe inflammation and inflammatory fevers.

All the organs of the body require, for the due performance of their functions, that the blood should traverse them with a certain degree of rapidity; a sluggish circulation therefore is attended with sluggish functions. This observation, of course, applies to the brain in common with all other parts of the frame: the effect, therefore, of a sluggish circulation through that organ will be a torpor in the functions which it performs—this torpor constitutes, according to its degree, sleep or coma.

Sleep comes on for the most part at that period of the day, and

in that posture, in which the circulation is the most sluggish, viz. at night and in the horizontal posture. Now it has been already stated that, as a general rule, the pulse falls towards evening, and it may be added, that it is less frequent in the horizontal than in the erect position of the body. These two circumstances, then, which favour a slow circulation of the blood, also favour sleep, and partly explain its occurrence. But other causes must be taken into account, as the darkness and silence, the absence of the usual impressions on the senses, and the exhaustion of the nervous system. This exhaustion reacts upon the circulation, and the circulation in its turn reacts upon the brain. Sleep, then, may be considered as due partly to exhaustion of the nervous system itself, partly to the absence of impressions on the organs of sense, and partly to the languid circulation through the brain. The negation or absence of any of these conditions produces wakefulness. Intense cold, which is another familiar cause of sleep, probably acts, partly by causing an accumulation of blood in the interior organs of the body, and partly as a direct sedative. A languid circulation through the brain will result in either case. In the cold stage of ague, the same state of circulation exists, and the same condition of brain. When this is of long continuance or of great severity, deep sleep or coma occurs.

Among other causes of this state, may be mentioned, repletion, and a certain stage of intoxication. The sleep which follows full meals may perhaps be explained by the circulation through the brain of the products of digestion not yet fully converted into blood ; spirituous liquors act as a poison, stimulant in a small dose, and narcotic in a larger one.

The circulation through the brain varies much with the posture of the body. In the erect posture the heart, in sending blood to the brain, has to oppose the force of gravity, but in the horizontal posture the heart has but little resistance to overcome. Hence, when the heart is feeble and the system drained of blood, a sudden change from the recumbent to the sitting or erect posture will sometimes cause fatal syncope ; and, on the other hand, a patient who has fainted in the erect posture, is soon restored by being laid on the back. When the head is dependent, the return of the venous blood to the heart is opposed by gravity ; the balance of the circulation is therefore destroyed, and coma is threatened. Apoplexy has been sometimes induced by sudden stooping, as in the act of tying a shoestring.

The fact, that the flow of blood to the head is favoured by the recumbent, and retarded by the erect posture, suggests the treatment to be adopted in cases of disease of the brain. Where there is high arterial action, the head should be raised ; where there is much debility, the body should be placed horizontally. Such changes of posture are often attended with the best effects : thus instances are recorded in which pain, intolerable in the horizontal posture, has been at once removed by assuming the

erect position. When it is desirable to produce a sudden and strong effect on the system by the abstraction of blood, the patient should be placed in the erect posture, for the heart soon loses the power of sending blood upwards to the brain, and fainting follows as a consequence.

Cerebral excitement is directly opposed to the states of sleep and coma, and arises from an opposite state of the circulation through the brain. The degree of violence displayed bears a pretty exact relation to the rapidity and force with which the arterial blood is circulated, and to the strength of the patient. In the strong and robust, the outward manifestations of the disturbance which the brain is suffering are violent, and the muscles contract with great force; but if the strength is much exhausted, the loud talking of furious delirium is exchanged for low muttering; the violent muscular efforts for subsultus tendinum, and the distinct impressions on the senses for the *muscæ volitantes*.

The mind, acting through the brain as its instrument, exercises an important influence on the body. Some of the modes in which this influence is displayed have already been alluded to. It only remains to present the subject in a more connected form.

In speaking of the nervous system, two classes of nerves have been described—those of sensation and those of voluntary motion. To these correspond two orders of mental faculties, the intellectual and the affective. Sensation, perception, thought, judgment, imagination, are operations of the intellect. Love, fear, hope, ambition, pride, vanity, &c., belong to the passions or emotions. A law of association governs both, and each is subject to the influence of habit. As the intellectual faculties become possessed of the materials of thought solely through the senses, it is upon the senses that they react; but as the emotions and passions aim at their own gratification through the agency of the will on the voluntary muscles, or prompt to action as an escape from threatened evil, it is in them that they display their power. Hence the influence of the intellect on the body is much less than that of the emotions. Of the intellectual faculties, the imagination is that which has the strongest affinity with the emotions and passions, for its operations, like theirs, are attended by excitement. It seems, indeed, to hold a middle place between the intellect on the one hand and the passions on the other; adding vigour and originality to thought, whilst it lends attraction to the objects of desire, and gives intensity to every effort by which they can be compassed. Hence the two-fold power of imagination.

Imagination is the only intellectual faculty which exercises a direct influence on the bodily organs; those organs being, as already stated, the organs of sense. It acts by producing in them, or in the parts of the brain with which they communicate, the same state which is usually brought about by external objects actually present to them. All the organs of sense,—the eye, the ear, the nose, the palate, the skin—may become the theatre of these

false impressions, but the eye is the most liable to be affected by them. These false impressions on the organ of vision are called *ocular spectra*, or *spectral illusions*.

Spectral illusions occur in many different states of system, and vary in their intensity. Sometimes they occur to imaginative persons in perfect health, sometimes to persons suffering from indigestion, or debilitated by long illnesses, or after mental excitement, or in consequence of suppressed discharges. They have every degree of intensity, from a flash of light, a circle of colours, or an indistinct outline, to a perfect picture not distinguishable from a real object. In some instances they can be called up at will, in others they are quite involuntary, and in others they are partly involuntary and partly subject to the will. Müller states that in his case they are involuntary; the poet Goethe could call them up by an effort of the will, but had no power over them when once produced.* Several interesting cases of ocular spectra, so closely resembling real objects as not to be distinguishable but by the most careful exercise of comparison and judgment, are related by Sir David Brewster, in his work on Natural Magic, and by Sir Walter Scott in his "Demonology and Witchcraft." That of Nicolai, the Berlin bookseller, is not the least remarkable, and was distinctly traced to the suppression of an habitual discharge of blood by hæmorrhoids, the immediate exciting cause being a violent fit of passion.

During sleep, false impressions on the senses are of frequent occurrence, and constitute dreams, which have the air of reality, from not being corrected, as in the waking state, by the judgment. Dreams are often accompanied by actions of the voluntary muscles, and persons talk or walk in their sleep. The actions, in these cases, are in conformity with the train of thought passing through the mind, and the senses are active only within the circle of those thoughts. This is somnambulism.

In mania, false sensations are of frequent occurrence, are believed as realities, and are interpreted according to the delusion which exists, thus becoming compound delusions. The madman believes in the reality of these sensations, because he has lost the faculty of comparison, and in as far as such sensations constitute madness, belief is the test of its existence. The essence of all aberrations of intellect is a belief in the reality of the workings of the fancy; belief, therefore, becomes the chief test of intellectual mania.

The influence of the passions and emotions on the body is much

* See Müller, part vi. p. 1397. I may here state, that, when a feeble and sickly child, I possessed the power of creating ocular spectra at will in a very remarkable degree. I could design on the dark ground, and on a small scale, any picture however complicated, filling in object after object with all the outlines and colours true to nature. During this period, my imagination was uncommonly active in sleep, occasioning dreams of the most fearful kind. As my health improved I lost this power of creating images at will, and since my seventh year have never regained it, though I have suffered occasionally from false impressions on the sense of hearing.

more extensive than that of the imagination ; for the imagination, in the strict sense of the term, and acting without the passions, affects only the organs of sense, whilst the passions acting with, or excited by, the imagination influence not the senses only, but almost every part and every function of the body. Thus fear, acting through the imagination, creates false sensations ; as in the curious case of a thief to whom, in common with other suspected persons, a stick of a certain length was given, with the assurance that the stick of the thief would grow by supernatural power. The culprit, imagining that his stick had actually increased in length, broke a piece off, and was thus detected. A similar anecdote is told of a farmer who detected depredations on his corn-bin, by calling his men together and making them mix up a quantity of feathers in a sieve, assuring them, at the same time, that the feathers would infallibly stick to the hair of the thief. After a short time one of the men raised his hand repeatedly to his head, and thus betrayed himself.

It is unnecessary to multiply examples in proof of the influence of the emotions on the senses. The power which they exercise over the secretions is equally well known. The Indian method of detecting a thief, by causing all the suspected persons to chew a portion of rice and to spit it out upon a leaf, is a familiar illustration of this. The anxiety of the culprit arrests the flow of saliva, and the unmoistened rice convicts him. In the greater number of instances, however, the effect of the emotions is to increase the secretions ; thus, fear causes diarrhœa and profuse perspiration ; anxiety increases the flow of urine ; both grief and joy that of the tears. The effect of the emotions on the muscular system is strongly marked ; the exciting passions cause laughing, crying, sobbing, &c., with spasmodic contraction of the features. The exciting passions also give strength to the muscles,—the depressing passions, as terror, on the contrary, paralyse the muscles of the face and of the entire body, including the sphincters. The influence which the emotions, whether exciting or depressing, have upon the entire circulating system, from the centre to the extreme capillaries, has already been alluded to ; their long-continued effect accounts for the diminished nutrition attendant upon anxiety and over-exertion of the mind.

The cure of ague, paralysis, &c. by a strong impression on the imagination, evinces still more strongly the power of the mind over the body.

The reaction of the body on the mind is a subject of much interest, but of too great extent to receive more than a passing notice in this place. Melancholia, hypochondriasis, and hysteria, are instances of the effect which the important organs of the body, especially those of the abdomen and the uterine system of the female, have upon the mind. The same local irritation which, confined to the spinal marrow, impairs or altogether perverts the action of the voluntary muscles, seems, when it extends to the

brain, to rob the higher faculties of the mind of their usual control over the imagination, and to give rise to states of intellect closely bordering on insanity ; witness the extraordinary deceptions practised by the hysteric female ; and often persevered in at the expense of pain and privation, under which nothing short of a strong delusion could support her.

To complete this outline of physiology and general pathology, it would be necessary to say something of the generative system, especially in the female. Some of the disorders of that system, as far as they react on the general health have already been glanced at ; the narrow limits of this work prevent more minute details. Some important portions of physiology which have been but cursorily mentioned in the present sketch, will be more carefully and minutely examined in the next chapter.

CHAPTER V.

EXAMINATION OF SOME OF THE MORE IMPORTANT SYMPTOMS AND SIGNS OF DISEASE.

THE subjects contained in this chapter are arranged nearly in the order in which they were treated in the former. They are the following : Examination of the blood and urine ; of the abdomen and chest ; of the pulse and respiration.

THE BLOOD.

It is usual to examine the blood after its abstraction by bleeding, with a view to a more accurate knowledge of the state of system in which the remedy was prescribed. The appearance supposed to indicate the existence of inflammation, to justify the past abstraction of blood, and to warrant a fresh recourse to the lancet, are a buffed surface or coat, and a cupped appearance. When the blood presents both these characters, it is said to be *buffed* and *cupped*. It is of great importance to understand the nature and causes of this peculiar arrangement of the different parts of the blood, as this knowledge will go a great way in deciding the question at issue—whether it is or is not a sign of inflammation ?

The buffy coat has been proved to depend on the existence of a layer of liquor sanguinis free from red globules on the surface of the clot ; the hollow or cupped appearance arises from the strong contraction of the fibrin of this portion of liquor sanguinis. Hence the buffy coat must depend upon the more or less complete separation of the liquor sanguinis from the other portions of the blood, and the cupped appearance upon the face with which the fibrin contracts.

According to this view, the formation of the buffy coat may be brought about by more causes than one. If the red globules retain their natural specific gravity, while that of the liquor sanguinis is diminished, or if the red globules have a greater specific gravity than usual, whilst the liquor sanguinis has its normal density, the red globules will sink rapidly, and the separation between the upper and lower parts of the clot will be complete. The opposite conditions of the two portions of the blood will, of course, produce opposite results. If, whilst the contractility of the fibrin remains the same in two cases, the quantity is increased in one and diminished in the other; the clot will be large in the one case and small in the other; on the other hand, if the quantity of fibrin remaining the same in two cases, the contractility is great in the one and small in the other, we shall have the cupped appearance in the former, whilst the surface of the clot will remain comparatively flat in the latter. The thickness of the buffed surface will depend upon the quantity of the liquor sanguinis which has separated from the rest of the clot; and this quantity will vary with the time which elapses before the fibrin begins to contract. The slower the coagulation, therefore, the thicker the buffy coat. A great diminution in the quantity of the red globules will, of course, favour the complete separation of the liquor sanguinis. Hence this may be a cause of the buffy coat.

In the process of coagulation, then, there are two stages or steps—separation of liquor sanguinis; and, contraction of fibrin. The quantity of the liquor sanguinis, and the consequent thickness of the clot, will vary directly as the rapidity of the coagulation and the comparative density of the globules: the surface of the clot, will be flat or hollow, as the contraction of the fibrin is more or less firm, and the entire clot will be large or small, as the quantity and contractility of the fibrin is increased or diminished. If the contractility is slight, the serum will be imperfectly pressed out of the liquor sanguinis, and the serum and red globules from the remainder of the clot; if, on the other hand, the fibrin contracts strongly, it will diminish the size of both portions of the clot. It is because the upper part of the clot consists entirely of liquor sanguinis, whilst the lower contains all the elements of the blood, (liquor sanguinis and red globules,) that the upper portion is always smaller than the lower; hence the clot is not unlike a cupping-glass in shape.

The separation of the liquor sanguinis and the degree of contraction of the fibrin, which so greatly modify the appearance of the clot, are themselves influenced by a variety of causes. Thus the separation is more complete, and the buffy coat, *cæteris paribus*, more strongly marked when the blood is drawn in a full stream into a deep vessel: the reverse takes place when the stream is slow and the vessel shallow. The temperature of the blood itself, and of the place in which it is kept, also exerts an influence, warmth being favourable to its complete separation. The size of the

stream and the depth of the vessel probably affect the separation by retaining the warmth for a longer or shorter period.

The contraction of the fibrin is strongly influenced by the shape of the vessel in which the blood is drawn. Thus, in one experiment performed by Dr. Babington, the clot formed in a pear-shaped vessel weighed scarcely half that formed from the same blood in a common pint basin; that is to say, the fibrin contracted more firmly and pressed out a larger quantity of serum and red globules in the former case than in the latter. Seeing that such slight causes can influence the formation of the clot, it is scarcely to be expected that much reliance should be placed on the cupped and buffed appearance of the blood as a sign of inflammation, unless great precautions are used to ensure an accurate resemblance of one observation to another in every respect. The value of this sign, however, must be decided by an appeal to facts; and for these we are indebted to M. Andral.* The following table presents the results which he obtained from a large number of observations. The results are here stated in per centage proportions:

Acute rheumatism and pneumonia: well-marked	
buffy-coat in	93 per cent.
Acute amygdalitis (cynanche tonsillaris)	75
Pulmonary tubercle	69
Chlorosis	64
Lead colic	30
Bronchitis (including capillary bronchitis)	28
Pleuritic effusion	26
Chronic rheumatism	22
Hypertrophy of the heart and intermittent fever	15
Cerebral congestion	13
— hæmorrhage	9
Typhoid fever (uncomplicated with pneumonia)	0
Albuminuria	
Rubeola: and scarlatina (uncomplicated with nephritis)	

It will be observed, that the four first diseases on the list are those which have been already shown (p. 26) to be accompanied with a positive increase of fibrin, whilst chlorosis is characterised by an excess of fibrin as compared with the quantity of the red globules. Hence, then, the existence of the buffy coat may be assumed to depend either on an absolute or relative increase of fibrin. Andral also states, that when the blood contains fibrin in excess, coagulation goes on more slowly than where it is deficient. "The increase of the relative proportion of the fibrin to the glo-

* Gazette Médicale: and Med. Chir. Rev., Oct. 1841.

bules may occur in two conditions: 1, the quantity of the globules being normal, that of the fibrin may rise from 3 or 4, the standard in health, to 10; under such circumstances the formation of the buffy coat is uniform and constant, its thickness and consistence being proportionate to the excess in the relative quantity of the fibrin. This is the case in all the genuine phlegmasiæ, in which there is a real and absolute increase of the fibrin:—2, The quantity of the fibrin may be normal, but that of the globules may be considerably reduced. Now in this case, although there is no absolute excess of the fibrin, a genuine and well-marked buffy coat, with retracted and puckered edges, may be formed on the blood, although there be no inflammatory disease present. Hence we observe the phenomena in the blood of chlorotic girls.”

The mere presence of the buffy coat, therefore, is by no means an indication of the existence of inflammatory action; all that it indicates is, that there is an alteration in the relative quantities of the fibrin and the red globules, or an excess, either absolute or relative, of the fibrin. The fact that the buffy coat may occur in diseases not characterised by acute inflammation, as in the second and third divisions of the table, should put us on our guard against placing too much reliance on the phenomenon as a sign of pre-existing inflammation sufficiently severe to justify the further abstraction of blood.

THE URINE.

Healthy recently-voided urine is transparent, of a light amber colour, and of an aromatic odour. It has a bitter taste and a slight acid reaction. As it cools it loses its aromatic odour, and assumes a smell which has been called *urinous*. After exposure to the air for a few days, the urine acquires an ammoniacal odour and an alkaline reaction, a white slimy pellicle forms on its surface, and small white crystals of phosphate of ammonia and magnesia are deposited on the sides of the vessel.

Quantity voided in twenty-four hours.—This varies in different persons, and in the same person at different times and under different circumstances. The following are the estimates of authors:—Haller, 49 oz.; Keill, 38 oz.; Prout, 32, (30 oz. in the summer and 40 in the winter;) Christison, 35 oz.; Rayer, 21—57 oz.; Dr. Dalton's experiments on his own person give 48½ oz. (month of November,) 51½ (month of June.) The average of these experiments and estimates is about 41 ounces. Cold climates and cold weather increase the quantity; hot climates and hot weather diminish it. It is greater during the day than at night. The total quantity of urine is more than half the solid and liquid ingesta. The solid contents of the urine amount to about 6⅔ per cent, and the quantity of solid matter voided daily amounts to 2½ oz. avoirdupois. Of this 1½ oz. consists of urea.

The quantity of the urine is also increased whenever the pulmonary and cutaneous transpiration is suppressed, in the cold stage of intermittent fever, under the influence of strong nervous excitement, and in hysterical and hypochondriacal paroxysms. In such cases the character of the urine is not changed, the quantity of water only being increased. This increase, without any change in the composition of the urine, may amount to 30 or 40 pints daily. The quantity of the urine may also be increased with a deficiency or with an excess of urea, or it may contain sugar, as in diabetes mellitus, or chyle. The quantity is diminished, on the other hand, by increase of the cutaneous and pulmonary transpiration, by profuse diarrhœa, by hæmorrhage, or dropsy, in many forms of acute inflammation, and in the inflammatory stage of fever. It is suppressed, or greatly diminished, in inflammation of the kidney.

Density of the urine.—1,010, (Thomson,) 1,015 winter, and 1,025 summer; (Prout) 1,015 for adults, and 1,010 including children; (Willis) 1,012—1,017; (Venables) 1,016; (Macgregor) 1,005 to 1,030; (Muller) 1,029; (Christison) 1,005—1,033 for adult and middle age. (Dr. J. C. Gregory.) According to the accurate observations of this observer, the greatest range for the same individual is 21 degrees, the ordinary range from 1,016 to 1,031, and the average of 363 experiments on 50 individuals, 1,022.5. The average for 5 individuals whose urine was examined between 20 and 50 times, each was 1,025.2. The density is greater in males than females; it increases from childhood to manhood, and falls again in old age; it is increased by hot weather, by much exercise, by free perspiration, by a very dry diet, by animal diet, by substances containing much azote, and by the meal of dinner. It is diminished by cold, by sedentary habits, by a watery diet, by vegetable food, by acids and alcoholic fluids. It is at its average in the morning on waking; it falls considerably after breakfast; it rises again gradually after mid-day; it sinks again immediately after dinner, but in a few hours rises higher than at any other time; and in the course of the night gradually returns again towards its average.*

The density of the urine in disease may vary from 1,001 to 1,055; and as the density in health does not appear to fall below 1,005, nor rise above 1,033, it follows that any number less than 1,005 and above 1,033 should be regarded as a sign of disease, and any number approaching either limit ought to attract attention. A less density than 1,005 points to an increase in the quantity of the urine, with a diminution of some of its solid constituents. A greater density than 1,033 strongly indicates diabetes mellitus, though 1,030—1,035 has been observed in cases of increased secretion with excess of urea.

The *solids* discharged have been known to amount in the day to 36 oz. avoird., and to fall as low as 11 grains.

The *colour* of the urine in health is inversely as its quantity;

* See Christison, Lib. Med. vol. iv. p. 216.

when the urine is scanty, it is high coloured; when it is abundant, limpid. The urine first passed in the morning is usually of a higher colour than that passed later in the day. The urine is pale in all diseases accompanied with an increase of quantity; whilst the natural colour is deepened by a decrease in the quantity. It may be white or bluish-white and turbid from the admixture of chyle, milk, mucus, or pus, or of the earthy phosphates in excess; deep yellow or greenish yellow, from bile or the cystic oxide; dark red or purplish, from the admixture of the purpurates, as in inflammatory diseases; yellow-red, as in hectic and the sweating stage of intermittent fevers; brownish or cherry-red, from the admixture of the red particles of the blood; black, from the admixture of melanic acid; blue, from the cyanuric acid, &c. It is worthy of note, that many substances taken with the food may give a similar colour to the urine with that produced by blood. This is the case with rhubarb, madder, beet-root, corn-poppy, cherries, mulberries, and logwood.

The natural *odour* of the urine is wanting where it is in large quantity and of a pale colour, and increases as the urine diminishes and deepens in colour; it is altered by various articles of food; it is aromatic in many nervous affections, ammoniacal in injuries of the spinal cord, putrid from the admixture of pus, mucus, ichor, &c., in diseases of the urinary organs, and in the last stages of putrid fevers, sweetish in diabetes mellitus. The *taste* is sweet in the last-named disease.

Analysis of healthy urine.—According to Berzelius, 1,000 parts of healthy urine contain 67 of solid matter, and are composed of 30 of urea, 17 of lactates and colouring matter, 18 of alkaline and earthy salts (chiefly chlorides, sulphates and phosphates of soda, potash, and ammonia,) 1 of phosphates of magnesia and lime, and 1 of lithic acid. Silica and fluorides of calcium?

The urine secreted after the digestion of food differs widely from that which is secreted after fluids have been taken. The former, the "*urina chyli*," contains, according to Nysten, thirteen times as much urea, sixteen times as much lithic acid, and four times as large a quantity of salts, as the latter the "*urina potus*." The first urine passed after a meal with which much water is taken, would probably be found to be nearly allied to the "*urina potus*," but to contain somewhat more animal matter. In addition to the constituents of the urine mentioned above, other substances pass into it from the stomach. Some of them, as chyle and sugar, pass unchanged, others are decomposed. Many substances, as has been stated, may be detected in the urine very soon after their introduction into the stomach: thus, prussiate of potash has been detected in from 2 to 10 minutes.

*Analysis of the urine in disease.**—The tests in common use are

* See Analysis of Blood and Urine in Health and Disease, by G. O. Rees, M.D.

turmeric and litmus paper, heat, and nitric acid : muriatic acid, solution of caustic ammonia, solution of alum, solution of ferrocyanate of potash, and solution of bichloride of mercury, are less frequently employed. *Turmeric paper* is changed from yellow to brown when moistened by an alkali. Blue *litmus paper* is changed to a red colour if moistened by an acid. *Heat* throws down albumen, and the phosphates when in excess. *Nitric acid*.—A few drops throw down a dead white precipitate of albumen; it throws down lithic acid after the lapse of some hours; it precipitates the colouring matter of bile of a green colour, but if added in excess, it changes it quickly to a dingy red, and afterwards to a brown; it also detects urea in excess, when added to urine in equal quantity, by the formation of crystals of nitrate of urea. Moreover, it produces a cloudiness in urine containing certain essential oils. *Muriatic acid* precipitates lithic acid, and the colouring matter of the bile. It throws down the latter of a green colour, whatever quantity may be added. *Caustic ammonia* throws down the earthy phosphates as a white precipitate. The solutions of alum, ferrocyanate of potash, and bichloride of mercury, are occasionally used to detect albumen.

These tests are sometimes applied to clear urine, and sometimes to urine containing deposits. The substances held in solution in clear urine may be the natural constituents of the secretion in excess, or substances foreign to its healthy composition. Of the former, urea is the most important; to the latter class belong sugar and albumen.

Urea.—This principle in excess gives a high specific gravity to the urine (1,032 or more.) It may be detected by adding to a small quantity of urine in a watch-glass an equal bulk of strong nitric acid. If this be kept in a cool place, crystals of nitrate of urea are formed. If the quantity of urea be small, we must evaporate before applying the nitric acid.

Albumen.—Tests, heat and nitric acid. These must always be employed at the same time. For heat will throw down the phosphates if they are in excess, and the acid may render the urine turbid if it contain any essential oil, as that of cubebs or copaiba. Should the phosphates in excess co-exist with an essential oil, both heat and nitric acid would throw down a white precipitate. The addition of an acid will dissolve the phosphates; the essential oil may be separated by ether, after which the urine will have its usual reaction.

Sugar.—The presence of sugar may be sometimes detected by the taste, but this is not to be depended upon. On evaporating the urine to the consistence of a syrup, the sugar may be identified by this means. Another test is the formation of oxalic acid by the addition of nitric acid and heat. The most delicate test, however, according to Dr. Christison,* is the process of fermentation

* Lib. Pract. Med. vol. iv. p. 249.

with yeast. On adding yeast to diabetic urine, and raising the temperature to 30° , effervescence takes place, a brisk discharge of gas ensues, and a yellowish liquid is formed, which has the odour of beer, and yields an alcoholic liquid by distillation. This test discovers one part of sugar in 1,000 parts of healthy urine of the density 1,030. "It is further an easy and the only correct mode of ascertaining the quantity of sugar. Every cubic inch of carbonic acid gas given off by fermentation, corresponds in round numbers with one grain of sugar, or forty-seven of gas to forty-five of sugar. Hence the quantity of sugar may be easily found by filling a graduated tube with mercury, leaving space enough for a little more than the requisite quantity of urine, which is then to be introduced; next filling up what remains of the space with yeast, and with the finger on the open end of the tube, reversing the tube in a vessel of mercury; and then placing the apparatus where it may be exposed to a heat of 70° or 80° for twelve or twenty-four hours." The specific gravity of the urine is the test commonly employed at the bedside. This affords certain evidence of the existence of sugar only when it exceeds 1,035, which is probably about the highest specific gravity of urine containing urea in excess. The specific gravity of diabetic urine ranges from 1,020 to 1,050. Hence, a specific gravity above 1,020 should excite attention, and lead us to examine into its cause. The quantity of solid matter contained in diabetic urine may be calculated by multiplying the excess of the specific gravity of the urine above that of water by the quantity of the urine, and the product by 0.00233. Ex.—suppose 312 ounces discharged per day, of the specific gravity 1,050; then we multiply 312 by 50, which gives 15,600, and multiplying this by 0.00233 we have 36.3 oz. or $36\frac{1}{2}$ oz. of solid matter discharged per day.

Urinary deposits.—These consist either (a) of substances which, being naturally contained in the urine, are in too large quantity to be held in solution by it, or which being in their normal quantity are decomposed by some other principle in excess; or (b) of animal products not naturally contained in that fluid. To the former class belong lithic acid, lithate of ammonia, the earthy phosphates, &c.; to the latter the red particles of the blood, pus, mucus, &c.

a. The first class of deposits consists of the following:

1. Red crystalline sediment—Lithic acid with colouring matter of the urine.
2. White crystalline sediment—Triple or ammoniaco-magnesian phosphate.
3. White amorphous sediment—Triple phosphate, and phosphate of lime.
4. Pink sediments—Lithate and phosphate of ammonia.
5. Yellowish or nut-brown sediment—Lithate of ammonia and soda, earthy phosphates, and colouring matter of urine.
6. Reddish brown or lateritious sediment—Alkaline lithate,

(chiefly lithate of soda) earthy phosphates, (occasionally,) colouring matter of urine, and alkaline purpurate.

- | | |
|----------------------|--------------|
| 7. Oxalate of lime | } Very rare. |
| 8. Carbonate of lime | |
| 9. Cystic oxide | |

Tests.—Lithic acid. Insoluble in water, soluble in caustic potash, and precipitated from this menstruum by the addition of an acid, granular and colourless: dissolved by nitric acid with effervescence, and on evaporation to dryness yields a red or pink colour, changed to violet by the addition of ammonia. The substances contained in 2, 3, 4, 5, and 6, consist of a mixture of colouring matter with the alkaline lithates and the earthy phosphates in variable proportions. These are easily distinguished both from each other, and from certain secretions which may resemble them. This is done by shaking the sediment up in the urine, and applying heat to the turbid fluid. If the sediment dissolves, it consists of the alkaline lithates, and chiefly of lithate of ammonia; if, on the other hand, the fluid remains turbid, the deposit consists of the earthy phosphates, or of organic matter in the form of pus or mucus. These may be readily distinguished by the addition of muriatic acid, which dissolves the phosphates, but not the organic matters.* If urine containing lithates also holds albumen in solution, the urine first becomes clear and then turbid on the application of heat.

The *phosphates* possess the following properties. They are soluble in acetic and muriatic acids, but insoluble in liquor potassæ. The phosphate of *ammonia* yields ammonia, when treated with liquor potassæ; and the phosphate of *lime* is detected by the addition of oxalate of ammonia to the solution of the phosphate in acetic acid. If, after the addition of oxalate of ammonia, a precipitate be caused by ammonia, the ammoniaco-magnesian phosphate is present. As the phosphate of ammonia commonly exists in union with magnesia, forming the ammoniaco-magnesian phosphate, the disengagement of ammonia on the addition of liquor potassæ is presumptive evidence of the existence of the ammoniaco-magnesian phosphate. If the oxalate of ammonia and the liq. ammoniæ both occasion a precipitate, phosphate of lime and ammoniaco-magnesian phosphate are both present. The mixture of these two is peculiarly fusible before the blow-pipe. The *lithates* present the same chemical properties with the uncombined lithic acid; the *lithate of ammonia* when dissolved in liq. potassæ gives off ammonia. *Soda* in combination with lithic acid may be detected by the yellow colour given to the outer flame of the blow-pipe.

Oxalate of lime.—This, which is a common constituent of urinary calculi, sometimes exists in the urine as a deposit. It may be known by its insolubility in water, liquor potassæ, acetic acid, and warm nitric acid. It is soluble in cold nitric acid, and converted at a red heat into *carbonate of lime*, which may be detected

* Rees. Analysis of Blood and Urine, p. 145.

by dissolving with effervescence in muriatic acid. The *cystic oxide* sometimes exists in the urine in the form of a fine impalpable powder, forming a scum on the surface, a deposit, or a floating cloudiness. Its presence may be suspected where the urine is greenish yellow, muddy, and of a mixed odour of fetid urine and the sweet briar. It possesses the following characters: it is soluble in dilute muriatic acid, insoluble in tartaric, acetic, or citric acid, soluble in liquor potassæ, precipitated from this solution by solution of bicarbonate of ammonia, and it possesses a very peculiar odour when heated.*

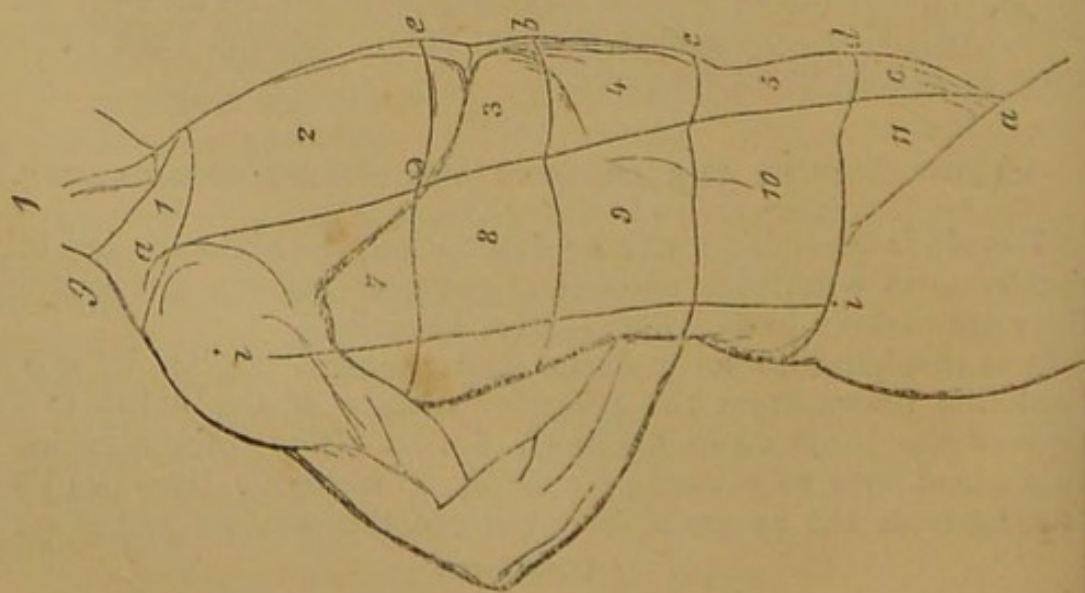
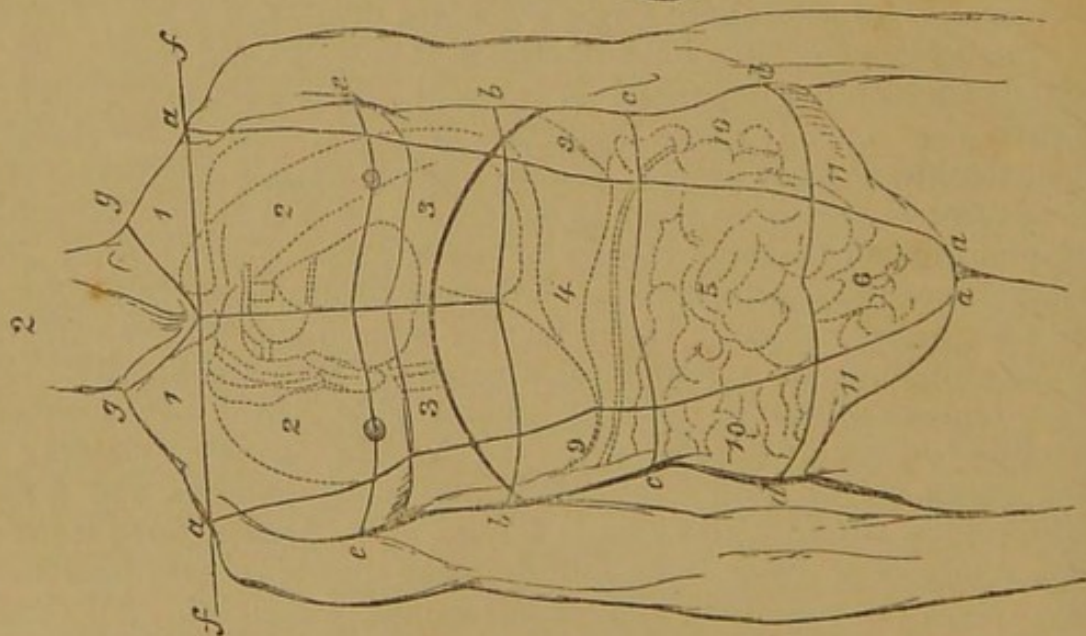
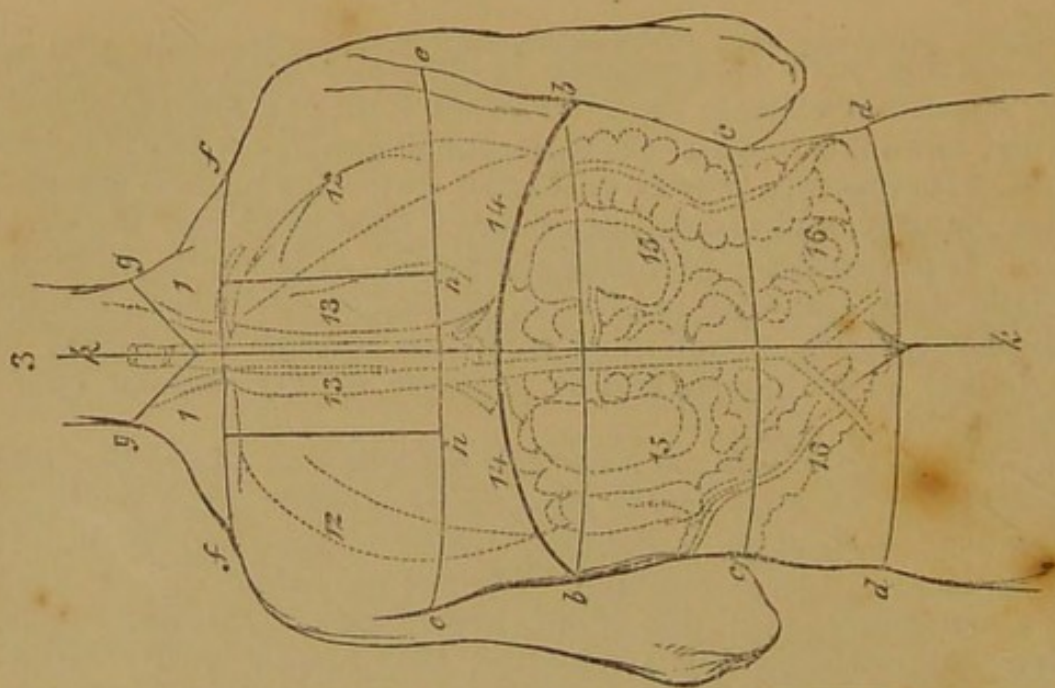
(b) *Animal products not naturally contained in the urine, and appearing for the most part in the form of deposits. Red particles.* This sediment is at once distinguished by its peculiar colour. It may be identified by becoming of a bright red colour when treated with a concentrated solution of muriate of soda. *Pus and mucus.* When these exist in small quantity, they are not easily distinguished. *Pus* commonly forms a distinct deposit of a yellowish or greenish yellow colour, but sometimes it is white and may be confounded with other deposits. It is easily diffused through, but not soluble in, urine; it resists the action of acids, and it becomes a flocculent mass when heated. *Mucus* when in small quantity remains in solution in the urine; when in excess the urine is ropy, unaffected by boiling, and rendered cloudy by a few drops of acetic acid. At other times the mucus is found adhering to the vessel in the form of a ropy glairy mass. When in very large quantity, the urine is always alkaline and ammoniacal, a condition which generally indicates organic disease in the kidneys or bladder. *Bile.*—Properties: insoluble in water, readily dissolved by liq. potassæ, yielding a fine green colour with dilute nitric and muriatic acids, and a red colour with strong nitric acid. *Chyle, milk, semen, fatty matter,* and *phosphorus* have been found in the urine; as also blue and black deposits, consisting of peculiar animal principles. All these are rare. Various substances have also been mixed with the urine with a view to impose on the medical man. Against such impositions he should be on his guard.

EXAMINATION OF THE ABDOMEN AND ORGANS OF DIGESTION.

The Abdomen.—To facilitate description, the abdomen has been divided into a number of distinct parts or regions by imaginary lines drawn from fixed points.—(See Figures.)

It is divided into an anterior and posterior region by a vertical line drawn from the posterior margin of the axilla to the crest of the ilium on each side (*ii. fig. 1*). The anterior region is subdivided into nine smaller ones by two oblique lines (*aa.*) extending from the acromial extremity of the clavicle to the spine

* Christison.



of the pubis, and three horizontal lines extending round the abdomen, the first at the level of the ensiform cartilage (*bb*), the second on the last short rib (*cc*), and the third on the anterior superior spinous process of the ilium on each side (*dd*). The three central regions thus formed, are named in the order from above to below, the epigastric (4), the umbilical (5), and the hypogastric (6); the three lateral regions, taken in the same order, are, the right and left hypochondriac (9), the right and left iliac (10), and the right and left inguinal (11). The posterior region is divided into four smaller regions by a vertical line (*k* fig. 3), following the course of the spine, and by a continuation of the three transverse lines (*b, c, d*) just described. These four regions are the inferior dorsal right and left, (15,) and the lumbar right and left, (16).

The organs situated in each of these regions are as follow:—The *epigastric* contains the middle portion of the stomach with its pyloric extremity, the left lobe of the liver, the lobulus spigelii and hepatic vessels, the pancreas, the cœliac axis, the semilunar ganglion, and part of the vena cava, aorta, vena azygos, and thoracic duct. The *umbilical* contains the omentum and mesentery, the transverse portions of the duodenum and colon, and some convolutions of the jejunum. The *hypogastric* is occupied by the bladder and a portion of the omentum and small intestines. Behind the bladder lies the uterus in the female, and the rectum in the male. The *right hypochondriac* region contains the right lobe of the liver and the gall-bladder, part of the duodenum and ascending colon, the renal capsules, and part of the kidney: the left contains the large end of the stomach, the narrow extremity of the pancreas, the spleen, part of the colon, the renal capsules, and upper part of the kidney. The *right iliac* region contains the cæcum, with the termination of the ilium and the commencement of the colon; the left, the sigmoid flexure and part of the descending colon. A small portion of the cæcum and of the sigmoid flexure of the colon are contained in the right and left inguinal regions respectively.

Of the posterior regions, the *right inferior dorsal* contains a part of the colon and lower two-thirds of the right kidney, the *left* the spleen and lower two-thirds of the left kidney. The *right lumbar* contains the cæcum; the *left*, the sigmoid flexure of the colon.

When any of the organs are distended or enlarged, they encroach upon surrounding parts, and occupy adjoining regions. Thus, the distended stomach or bladder may encroach on the umbilical region; the distended colon may rise into the epigastric; the enlarged liver or spleen may descend into the right or left iliac region, &c.

The *size and shape* of the abdomen vary with age and sex. In the child, the abdomen is large; in the spare adult, small; in the female it is naturally pendant, presenting an enlargement in the hypogastric region. In persons of sanguine and nervous temperaments, it is small; in the phlegmatic, and in the melancholic, it is

more commonly large. It varies in size, in the same person, with the full or empty state of the stomach, the quantity of gas contained in the intestines, the distension of the bladder, &c. It is enlarged in pregnancy. Ascites, ovarian dropsy, tympanitis, hydatids, enlargement of the liver or spleen, and various morbid growths attached to the several organs, may also greatly increase the size and alter the shape of the abdomen. In examining the abdomen, we employ three methods,—inspection, manual examination, and percussion.

By *inspection* we ascertain the size, form, and movements of the abdomen. The size is increased by any of the causes just specified; the form, too, is altered, either throughout the entire cavity, or in parts, according as the cause is extensive or limited. The history of changes of form is very important. Thus, the gradual, uniform, and central enlargement of pregnancy, the lateral enlargement in the first stage of ovarian dropsy, the equal and gradual growth of ascites, &c.—all form important means of diagnosis. The movements of the abdominal parietes are not less important, especially those of respiration. Thus, in peritoneal inflammation, respiration is performed by the chest alone; the same absence of motion in the abdomen is seen in severe rheumatic affections of its muscles. On the other hand, in pleuritis, and in severe rheumatic affections of the muscles of the chest or of the diaphragm, the respiration is performed chiefly by the muscles of the abdomen. Again, when the abdomen is greatly distended from any cause, the action of the abdominal muscles is nearly suspended, and respiration is performed by the chest and diaphragm. When the distension is still greater, the viscera are pressed against the diaphragm, and respiration is performed solely by the muscles of the chest.

By the *touch*, we gain further information as to the size, form, shape, and degree of tension of the abdomen. We also ascertain its temperature and degree of sensibility. The *temperature* should be compared with that of other parts of the body. In acute inflammation of the peritoneum, and in severe febrile affections accompanied with abdominal inflammation, it is greatly increased, and has a peculiar pungency. In ascertaining the degree of *sensibility*, pressure should first be made gently, and with the open hand. If the slightest touch produces pain, we may be sure that the disease is superficial (either on the skin itself or in the peritoneum): and the absence of inflammation of the skin will show that the seat of tenderness is the peritoneum. If a slight touch produces no pain, we apply stronger pressure. If deep and moderately strong pressure occasions rather a feeling of soreness than of acute pain, we may conclude that inflammation of the mucous membrane of the stomach or intestines is present. Direct pressure of this kind sometimes produces very slight pain when the peritoneum is inflamed; in such cases, a lateral pressure, causing the peritoneum to slide over

the intestines, occasions extreme pain. In colica pictonum, strong pressure relieves pain, and forms an important means of diagnosis. Muscular pain, also, is relieved by gentle pressure, gradually increased; but, on the removal of the pressure, the muscles are thrown into action, and acute suffering is produced. But even during the application of the hand pain may occur, from the sudden contraction of the muscles in the act of expiration. Hence the necessity of applying this diagnostic mark with some caution.

In applying pressure to the abdomen, we should always mark the expression of the countenance, as this is much more to be depended on than the answers of the patient. When much tenderness exists in the abdomen, the patient is apt to throw the muscles of the abdomen into rigid tension, so as to shield the contents of the cavity from pressure. In this case, we must wait till the contraction passes off, and seize the opportunity of applying pressure when the attention has been diverted, or whilst the patient is speaking.

If in the examination of the abdomen any tumor has been discovered, or we are anxious to ascertain the state of any of its contents more accurately, it will be necessary to relax the muscles of the abdomen, by placing the patient on his back, with the head slightly raised and bent forward, the arms extended by the sides, the thighs bent nearly at right angles on the trunk, the knees apart and turned outwards, and the feet resting on the bed in contact with each other. When so placed, the patient must be desired to use as little muscular effort as possible, and the attention must be diverted from the examination which is going on. In this relaxed state of the abdominal parietes, the position of tumors, and the extent of the enlargement which the viscera may have undergone, may be readily ascertained.

Another mode of examination is by *percussion*. This may be performed either directly with the fingers, or by striking on a plate of ivory or wood. Applied over any of the hollow viscera containing air, percussion elicits a clear sound. This sound is somewhat modified, if the air be mixed with fluid. Percussion, on the other hand, elicits a dull sound when applied over any of the solid viscera, over collections of fluid, over the hollow viscera when entirely free from air, or over solid tumors formed within the cavity.

Percussion combined with touch may be employed in detecting the presence of fluid. This is best done in the upright posture. It consists simply in placing the palm of the hand on one side of the abdomen, with a firm but gentle pressure, and tapping sharply with the other hand on the part of the abdomen directly opposite to it. If fluid be present, a peculiar vibrating shock is experienced, which is not easily mistaken. Percussion with the points of the fingers is useful in distinguishing muscular pains of the abdomen. A slight touch throws the muscles into action, and produces pain.

This sign, combined with the absence of pain on firm pressure, gradually applied, and the recurrence of the pain on the sudden removal of the pressure, together with the effect of every movement of the affected muscles, effectually distinguishes muscular pains from those arising from disease of deeper-seated parts.*

The condition of the alimentary canal is revealed in part by the state of the tongue; in part by alterations in the functions of the stomach and intestines, as vomiting, purging, &c.; and in part by the character of the substances rejected.

The *tongue* does not present the same appearance in all healthy persons. In some it is habitually clean, in others slightly furred; in some florid, in others pale; in some compact and firm, in others flaccid and indented by the teeth; in some it is protruded in a relaxed state, in others strongly contracted and drawn to a point. Even in the most healthy persons it is covered with a thin white fur in the morning before taking food. In disease, it presents a great variety of appearances. It is swollen in inflammation of the tongue itself, in severe diseases of the adjacent parts, in salivation from mercury, and in malignant disease: on the other hand, its size is diminished where much emaciation is present. Its *form* varies with the mode in which it is protruded. Its *colour* coincides, to a certain extent, with that of the general surface. Thus it is florid in plethora, pale in anæmia, and livid in certain diseases of the heart and lungs, which greatly affect the respiration. The colour of the tongue also depends upon the state of the digestive organs. Thus it is universally red, or red at the tip or edges, or both, in some cases of acute inflammation of the mucous membrane of the stomach and intestines. It is also morbidly red and tender in some forms of fever, in well-marked cases of scarlatina, and in typhus fever after the disappearance of the fur. The *papillæ* of the tongue are elongated and florid, and protrude through the white coating of fur in scarlatina; a similar appearance exists in some cases of acute dyspepsia. A *fur* collects on the tongue in almost all severe diseases. Thus the tongue is loaded with a white fur in the first stages of fever, in catarrh, in most severe inflammations, and in acute rheumatism. In more advanced stages of fever, a thick brown or black coating collects, or the tongue is dry, parched, and tender. A dry brown fur exists in cases of local irritation, the tongue becoming moist and clean as the irritation subsides. In dyspepsia, the appearances of the tongue are very variable. Sometimes a thick fur collects at the base of the tongue, while the edges and apex are of a bright red; sometimes the fur extends over the whole surface, and is accompanied by indentations formed by the teeth, or by deep transverse cracks. In constipation, the tongue is often covered with a brown fur; at other times, it presents no unusual appearance. The mode in which the tongue is *protruded* is often

* For more minute information on this subject, consult Cycl. of Pract. Med., Article Exploration of the Abdomen. By Dr. Forbes.

characteristic. It is tremulous in extreme debility, or under the influence of fear, as also in cases of idiopathic fever with debility. It is protruded with difficulty when dry; slowly and hesitatingly in diseases accompanied by stupor, in which cases it is withdrawn after an interval, and as if in consequence of deliberation. In partial paralysis the tongue is protruded either towards the sound or the affected side of the face.

The *gums*, from their proximity to the tongue, may be mentioned here, though they are signs rather of the state of the circulation than of the digestive organs. The gums are florid in plethoric states of the system; pale in anæmia; livid in cases where the function of respiration is much impeded; swollen and dark in scurvy and purpura hæmorrhagica, in which diseases they bleed on the slightest touch; swollen with an inflamed line in cases of salivation; marked with a blue line at the margin of the teeth in poisoning by lead.

The *lips* and lining membrane of the mouth, like the gums, inform us as to the state of the circulation. They are also dry and parched where the tongue is similarly affected. Aphthæ occur on all these parts as an idiopathic affection, especially in young children, and towards the close of febrile and inflammatory affections.

The existence or absence of thirst, and the odour of the breath, are points to be attended to in inquiring into the state of the digestive organs. The foul odour of the breath in cases of constipation, in many forms of dyspepsia, in cases of scurvy, in advanced stages of typhus fever, and especially in gangrene of the lungs, should not pass unnoticed. The odour of spirits, laudanum, &c. may also assist us in certain doubtful cases.

The functions of the stomach and intestinal canal suffer more or less in almost all diseases, whether affecting the canal itself, or other parts of the system. In all febrile affections, in the more severe inflammatory diseases, in affections of the head, &c., the stomach sympathizes. Loss of appetite is the most common consequence of disease, whether of the stomach, or of other important organs. *Vomiting* occurs in inflammation of the mucous membrane of the stomach, by whatever cause produced; in obstruction to the passage of the food through the pylorus, as in cancer of the stomach; in permanent obstruction to the passage of the fæces through the intestines, as in ileus and strangulated hernia. It is the first effect of concussion of the brain, and a frequent precursory symptom of apoplexy. It accompanies the passage of gall-stones, and is commonly present in severe inflammation of the kidneys. It is also one of the most constant symptoms of pregnancy. The substances rejected from the stomach are food, mucus, clear acid liquids, bile, blood, pus, and, in some cases, fæces. The blood is usually dark-coloured and in clots, sometimes with and sometimes without food.

The *bowels* are variously disordered; sometimes confined, from torpor, from the absence of their natural stimulus, or from mechanical obstruction; sometimes relaxed from inflammation of the mucous membrane, whether caused by previous constipation, unwholesome food, purgative medicines, or irritant poisons: strong mental emotions also sometimes give rise to diarrhœa. The alvine discharges may consist of mucus, tenacious lymph, or pus, as in inflammations of the mucous membrane of the canal, the nature of the secretion depending on the degree of the inflammation; or they may consist of blood poured out by the vessels of the intestines generally, or by the enlarged veins of the rectum (piles). They may consist chiefly of ill-digested food, which happens in *tabes mesenterica*, &c. They may be pale from the absence of bile, unusually yellow from its excess, green, as often happens in children, dark and offensive, from the long retention of feculent matter, or from morbid secretions of the liver. They often contain portions of hardened fæces or scybala. It is important in all doubtful cases to distinguish those discharges which flow from the general surface of the intestines, from such as are the product of local disease in the rectum. When, therefore, pus or blood is discharged with the motions, the presence or absence of tenesmus, piles, &c. should be ascertained.

EXAMINATION OF THE CHEST.

External Examination.—An examination of the external conformation of the chest must precede all inquiries into the diseases of parts contained within it. To facilitate such examination, the chest, like the abdomen, has been divided into regions, by lines drawn from fixed points. (See Figures, p. 84.) There are four vertical lines: 1, along the middle of the sternum, from its upper to its lower extremity; 2, along the whole length of the spine; 3, from the posterior margin of the axilla to the spine of the ilium on each side (*i*); 4, along the spine of the scapula, on each side, meeting the transverse lines, presently to be mentioned, above and below (*h*): an oblique line (*aa*) from the acromion to the spine of the pubis on both sides; and four transverse lines: 1, round the lower part of the neck, sloping downwards to the upper end of the sternum anteriorly, and the last cervical vertebra posteriorly (*g*); 2, round the upper parts of the chest, in the line of the clavicles (*f*); 3, round the middle of the chest, crossing the nipples anteriorly and the inferior borders of the scapulæ behind (*e*); 4, round the lower part of the chest, on the level of the ensiform cartilage (*b*). By these imaginary lines, the chest is divided into the following regions: Two superior (right and left humeral, 1); four anterior (right and left subclavian, 2, and right and left mammary, 3); four lateral (right and left axillary, 7, and right and left sub-axillary, 8); and six posterior regions, (right and left scapular, 12, right and left intra-scapular, 13, and right and left subscapular, or superior dorsal, 14).

The principal parts contained within the cavity of the chest are the lungs and heart, of which the former occupy by far the largest portion. Of the two lungs the right is larger than the left, but the left longer than the right, its apex rising somewhat higher, and its base sinking lower. The base of both lungs rests on the diaphragm, and the two are separated from each other by the mediastina, of which the middle contains the heart. The lungs, applying themselves closely to the diaphragm, descend much lower behind than before, being there prolonged into thin lappets. The size of the chest corresponds closely with the size of the lungs, and is liable to various deformities in consequence of diseases affecting those organs. The shape of the chest is also altered in certain diseases of the heart and large vessels.

The size and shape of the chest, and the number and character of the respirations, may be determined by *inspection*, *manual examination*, and *measurement*.

Inspection.—A well-formed chest is large in all its dimensions, uniformly rounded, and free from all irregularity in the bony parietes. The spine should be straight, or in very strong men, especially those who use the right arm much, curved almost imperceptibly towards the right side. It appears at first sight symmetrical; but when measured, the right side will be found larger than the left by about half an inch, and there is naturally somewhat more fulness above and immediately beneath the left than the right clavicle, which results from the left lung rising higher than the right. The chest is larger in males than in females; in the latter it is commonly distorted by the use of stays. Women are also more subject than men to distortions of the spine. These facts must be borne in mind in examining the chests of females.

The first glance at the chest enables us to form a judgment of its size. A more minute examination is necessary to detect deviations from its accustomed form. The chief distortions affecting both sides of the chest alike, are those arising from the use of stays in the female, and constrained posture in the male. Of the latter, the most remarkable is the flattened chest of the shoemaker. Alterations in the shape of both sides of the chest also arise from diseases affecting equally both lungs; as tubercles, leading to contraction, especially in the subclavian region, and dilatation of the pulmonary cells (emphysema) causing a considerable enlargement chiefly about the middle of the chest. Alterations in the shape of one side only, or of a limited portion of one side, may arise from more than one disease of the corresponding lung. Pleuritis, both acute and chronic, causes an enlargement of the affected side, but in certain cases the same disease produces contraction. In hydrothorax, also, the size of the affected side is increased. The same result follows pneumothorax. When the dilatation is extreme, the intercostal spaces are often raised to a level with the ribs. More partial changes arise from circumscribed pleurisy and limited ad-

hesions. In advanced cases of phthisis, the position of a cavity is often indicated by the falling in of one of the intercostal spaces. Inspection also enables us to ascertain the character of the respiration; whether abdominal, as in acute pleurisy, or acute pleurodynia, or thoracic, as in acute diseases of the abdomen, and severe rheumatic affections of the abdominal muscles or of the diaphragm.

Manual Examination.—By this, as by inspection, we ascertain the developement of the muscles, the thickness of the parietes of the chest, the presence of obesity or emaciation, of œdema, emphysema, &c. Heat and soreness of the skin, the existence of local tenderness, from whatever cause, or of muscular pain, may be ascertained by the same means. The skin of the chest is preternaturally hot in pneumonia, and in all inflammatory affections of the lungs. Firm pressure in the intercostal spaces often causes pain when the pleura is inflamed, either generally or partially: this partial tenderness occurs in phthisis pulmonalis, when the pleura covering a cavity is inflamed, or when a collection of pus is making its way externally.

Muscular pains exist in pleurodynia, whether idiopathic or the consequence of violent efforts in coughing. Such pains are distinguished by slight percussion with the points of the fingers, by the movements of the arms or trunk, by the sudden and sharp pain produced by a deep inspiration, and by the absence of pain on firm and gradual pressure, with its recurrence when the support is suddenly removed. Percussion with the fingers throws the muscles visibly into action through the whole length of their fibres, and, in certain cases, causes remarkable partial and transverse contractions. These are best seen in advanced cases of consumption, when they are sometimes accompanied by severe pain. These partial contractions are not confined to the muscles of the chest, but may be excited in the biceps and in every other muscle of the body. In cases of pulmonary consumption these contractions are often most readily produced on the side most affected.

Measurement.—This is effected by means of a graduated tape, stretched from one point of the chest to another. It is principally employed to ascertain the relative size of the two sides of the chest. For this purpose, one end should be applied to the spine, and the tape carried horizontally round the two sides of the chest; and to ensure accuracy, the tape should be made to pass over the two nipples, or at the same distance above or below them. The chest should first be measured after a full expiration, and then after a deep inspiration: by watching the movement of the tape we may measure the degree of expansion which both sides of the chest undergo. This will give us useful information as to the condition of the lungs. In making these measurements, the fact already stated, viz. that the right side of the chest is naturally larger than the left by half an inch, must be borne in mind. The progressive enlargement or diminution in the size of the chest which

accompanies certain forms of disease, may also be ascertained by repeated measurements; but such measurements require to be made with great care, in the same position, and in the same condition of the cavity of the chest.

Attempts have been made to ascertain the capacity of the *lungs*. For this purpose two plans have been proposed—one by Mr. Abernethy,* the other by Dr. Lyons.† The former method consists in making the patient take as deep an inspiration as possible, and then causing him to expire through a bent tube, communicating with an inverted jar containing water. The quantity of water displaced is a measure of the capacity of the lungs. A person in good health, with sound lungs, can displace six or eight pints. If the quantity displaced is much less than this, we may infer that the lungs are diseased, or compressed from without. “Muscular debility or spasm,” says Mr. Abernethy, “may occasionally make the result doubtful, yet in general I believe it will afford useful information.”‡ The other method proposed, consists in measuring the length of time required to empty the chest after a complete inspiration. To render the expiration continuous and complete, the patient is required to count from one upwards, as far as he can, slowly and audibly; and the number of seconds during which he is able to count, is noted by a watch. The time occupied is a sort of measure of the capacity of the lungs. Dr. Lyons fixes the limit of time for perfectly healthy persons at thirty-five seconds: this is too low; for in more than one trial I have myself continued to count for forty seconds. In confirmed phthisis, Dr. Lyons says, that the period of expiration never exceeds eight, and is frequently less than six seconds; whilst in pleurisy and pneumonia it may range from four to nine. This test is subject to greater fallacy than Mr. Abernethy’s, but may admit of useful application.

Examination of the Chest by Percussion and Auscultation.—The ear is employed in two ways in examining the chest: in listening to the sound occasioned by percussion of the parietes of the cavity, and in listening to the sounds produced in the chest itself by the motion of its contents. Both these modes of examination are included in the meaning of the term auscultation; but it is usual to designate the first *percussion*, and the second *auscultation*.

Percussion.—If the chest, instead of containing a variety of solid parts, were filled with air, it would yield, when struck, a sound like that of an empty barrel or drum; if, on the contrary, it were filled with solid animal substance, it would sound as dull as the arm or thigh. But containing, as it does, a spongy organ, the lung, including in its tissue a large quantity of air, it yields, when struck, a hollow sound, but one less hollow than that which it would give

* Essays, part ii. p. 157.

† Ed. Med. Journal, vol. xxxviii. p. 453.

‡ See on this subject Cycl. of Pract. Med., vol. i. p. 376. Art. Exploration of the Chest, by Dr. Forbes.

if empty. The more air it contains the more hollow it sounds; hence the sound is clearer during inspiration than during expiration. If, again, the texture of the lung be so altered as to admit a larger quantity of air, the chest yields a clearer sound: this takes place in emphysema. On the other hand, if the lung from any cause admit less air than usual, the sound becomes more dull: this happens in congestion of the lungs, in inflammation, in tubercular deposition; as also when fluids, collecting in the sac of the pleura, compress the structure of the lung, as in hydrothorax and empyema. But if, instead of fluid, air should exist in the cavity of the pleura, the sound, instead of being more dull, would be more hollow, than if the healthy lung were in contact with the chest.

The chest then yields a hollow sound when it contains air, a dull sound when air is excluded; the degree of hollowness or dullness depending upon the quantity of air. But there is another cause which influences the nature of the sound, viz. the thickness of the parietes of the chest itself. If two chests contain exactly the same quantity of air, that will give the clearest sound which has the thinnest parietes. If the walls of the chest are padded with muscle or fat, the sound becomes more dull. In the healthy chest, then, the clearness of the sound will vary directly as the quantity of lung beneath the part struck, and inversely as the thickness of the parietes in that part.

The lungs are in close contact with the walls of the chest on both sides in the upper and middle part. On the right side they extend to about the level of the sixth rib in front, of the eighth rib at the side, and still lower behind. At the centre of the chest the lungs reach the fifth rib; on the anterior portion of the left side, they extend to the seventh rib; laterally they reach the eighth; posteriorly they descend still lower. The diaphragm separates them from the liver on the right side, from the stomach in the region of the epigastrium, and from the spleen and colon on the left side posteriorly. The mass of the liver in the right hypochondrium explains the dull sound caused by percussion below the level of the sixth rib; the stomach, which usually contains flatus, accounts for the clearer sound heard on the left side.

The lungs are in close contact with the walls of the chest in every part, with the exception of the small portion to the left of the sternum, occupied by the heart: in this position the chest yields a dull sound, and all enlargements of the heart extend the limits of this dullness. Whenever the substance of the lung is thin, the sound, on percussion, is modified by the viscus lying immediately behind it: thus, below the fourth rib, the layer of lung lying in front of the liver is thin, and the sound is consequently intermediate between that of the chest above and below it, more dull than the upper part, less so than the lower. In this position, and in all cases where a thin layer of healthy lung lies in front of a solid organ or consolidated portion of lung, gentle percussion elicits the clear sound of the

healthy lung, strong percussion that of the solid substance behind it. The parts of the chest which yield the clearest sound are those which are least covered with muscle, viz. the space immediately beneath the clavicle, the axilla, and the posterior parts of the chest, with the exception of the scapulæ.

In examining the chest, the patient should be placed in the erect or sitting posture, and, if possible, in an open room. All curtains, bed-clothes, &c. dull the sound. The chest should be bare when practicable, but in females it may be covered by a single layer of clothing. Each part of the chest submitted to examination should be rendered as tense as possible; the anterior part of the chest by stretching the neck and throwing back the shoulders; the axillæ by raising the arms above the head; and the posterior part of the chest by causing the patient to fold his arms and stoop down. Opposite and corresponding points of the chest should be accurately compared. For this purpose, the position of both sides must be the same. If we are examining the anterior part of the chest, the hands must fall loosely at the sides; if the lateral regions, they must be raised equally above the head; if the posterior, they must be equally folded.

There are different ways of eliciting the sounds of the chest by percussion. We may strike with the points of the fingers, or with the flat of the hand; or we may interpose the fingers of the opposite hand, or a thick piece of Indian rubber, or a plate of wood or ivory. Such things are called pleximeters, and percussion, by means of them, is named "mediate percussion." Direct percussion with the points of the fingers ought never to be employed except for the purpose of throwing the muscles of the chest into action, with a view of ascertaining either the irritability of the muscles or the seat of pain. In many cases, especially in phthisis pulmonalis, the skin and muscles are acutely sensitive, and the slightest touch occasions pain. This is a sufficient objection to direct percussion with the fingers. Percussion with the open hand is little used except as a means of contrasting the two sides of the chest over their whole extent at once. Mediate auscultation ought always to be preferred, and the best pleximeter is formed by one or two fingers of the left hand applied closely to the surface. The finger should always be applied with a tolerably firm pressure, especially in stout, flabby, dropsical, or emphysematous subjects. By such pressure the skin and flesh are condensed, and made better conductors of sound. The finger thus applied should be sharply struck by the three middle fingers of the right hand, taking care to strike perpendicularly to the surface, and not obliquely. In comparing the two sides of the chest, care should be taken to strike the same point, with the same force, and in the same condition of the chest, whether filled with air in inspiration, or partly emptied by expiration. The comparison can be most accurately made when the breath is held. When it is desired to ascertain the condi-

tion of a small spot, one finger only of the right hand should be used.

The chief indications given by percussion in disease have been already hinted at. When practised on a part of the chest where a mass of lung is situated, it will yield either a clear or a dull sound. The indications afforded by such sounds are shown in the following table.

	<i>In the Lungs.</i>	<i>External to the Lungs.</i>
Clear Sound on Percussion.	{ Healthy condition. Emphysema. Tubercular excavation.	Pneumothorax.
Dull Sound on Percussion.	{ Congestion and hepatiza- tion. Pulmonary apoplexy. Œdema. Tubercular deposit. Other morbid degenera- tions.	Pleuritic effusion. Hydrothorax Hæmatorax. Tumors in pleura or medias- tinum. Diseases of heart or arteries, with enlargement.

The position in which the clear or dull sound occurs, will often enable us to judge of the cause by which it is produced. Thus emphysema, though it may be confined to one side, and to a small portion of lung, commonly occurs on both sides of the chest at once, and over a large portion of the lungs; pneumothorax, on the contrary, is usually confined to one side, and tubercular excavations occupy, for the most part, the upper lobes of the lungs. A dull sound may arise from a greater variety of causes, which, however, admit of the same distinction. Thus congestion, and the various degrees of hepatisation, the consequence of pneumonia, occupy chiefly the lower lobes, on one or both sides; œdema commonly exists in both lungs at the same time; tubercular deposit is found chiefly in the upper lobes, whilst other morbid degenerations occupy all parts of the lungs indifferently. Of the causes situate external to the lungs, pleuritic effusion and effusion of blood are commonly confined to one side; hydrothorax extends to both; the tumors in the pleura and mediastina may occupy any position; diseases of the heart itself will affect the parts in the neighbourhood of that organ; and aneurismal tumors chiefly the upper and anterior part of the chest.

Auscultation.—The passage of the air through the various structures of the lungs in inspiration and expiration, is accompanied by certain sounds which are easily recognized on applying the ear or the stethoscope to the chest. They vary in different parts of the chest. When the ear is applied to the neck or upper part of the sternum during inspiration, a hollow, blowing sound is heard—this is tracheal respiration; on each side of the upper part of the sternum, between the scapulæ, and sometimes in the axillæ, a whiffing tubular sound is heard—this is bronchial respiration; on most

other parts of the chest a sound is heard which has been compared to that of a sleeper breathing gently through the nostrils, or to the sighing of a gentle breeze—this is called vesicular, from its presumed seat, the air-cells. The student should familiarize himself with these sounds, especially the latter, by applying the ear to the healthy chest; and, as this sound is most distinct in children, he should examine it in them. This same sound is heard in expiration; but it is less distinct, and of shorter continuance.* The intensity of the sound varies in different healthy persons, and in the same person at different times. It is more intense, as has been stated, in young children; also in females, a fact which may perhaps be accounted for by the increased respiratory effort necessitated by the confinement of the chest by stays. It is also augmented by deep inspiration; hence, when the sound is naturally dull, it may be produced by causing the patient to breathe quick, or to draw a deep breath, or to cough, whereby the lungs are emptied, and a full inspiration secured. The respiratory murmur is also rendered more intense in one part of the chest by any impediment to the respiration in the rest of the lung: in this case it is called puerile, from its resemblance to the respiratory murmur of the child. Such partial increase of intensity is a pretty certain sign of consolidation of the remaining portion of the lungs. This sound is sometimes scarcely perceptible, and the absence of it is not always a sign of disease. As a general rule, it may be stated, that where the absence of this sound does not co-exist with any other morbid sounds, or with dulness on percussion, it should not be regarded as an indication of disease. The respiratory murmur may be absent in limited portions of the chest, in consequence of the bronchial tubes being obstructed by tenacious mucus; but here percussion will give a clear sound; or it may be absent, because the air-cells are filled with fluid from within, or compressed from without. In this case, the chest will sound dull on percussion, except where the pressure is occasioned by air in the pleura (pneumothorax).

The *bronchial* respiration in the healthy state is only heard in parts of the chest corresponding with the track of the large bronchial tubes; but if the lung is condensed, from whatever cause, it not only loses its proper respiratory murmur, but, becoming a better conductor of sound, conveys to the ear the sound produced in the bronchial tubes. Hence, bronchial respiration heard with unusual distinctness near the site of the bronchial tubes, or heard on one side, when not audible on the other, or with widely-differing intensity, or in parts where it is not heard in health, is an indication of consolidation of the lung by inward disease or outward

* It is generally stated, that in expiration, the bronchial and tracheal sounds alone are heard; (see Lib. of Med., vol. iii. p. 11; Art. Diagnosis of Diseases of the Lungs, by Dr. Williams;) but this statement is controverted in an able review of Fournet's work, in the Brit. and For. Rev. for April 1840.

pressure. The bronchial respiration, as thus heard, assumes different characters; sometimes resembling puerile respiration in an intense degree; at other times, the noise made by drawing the breath through the closed hand; at others, that occasioned by blowing into a quill; at others, the short puff used in blowing out a candle. To the same class of sounds belongs the so-called *cavernous* respiration, which, in its more marked form, produces a perfect illusion of air drawn in through the stethoscope during inspiration, and puffed into the ear during expiration. This arises either from dilated bronchi, or, more generally, from an excavation in the substance of the lung. The *amphoric* respiration closely resembles the sound produced by blowing into a bottle, and is caused by the passage of air into a cavity lined with a dense membrane.

Besides the respiratory sounds produced in the tubes and air-cells of the lungs, and occurring when those parts are moistened by their natural secretions, and in their natural quantity, there are other sounds due to the increased resistance offered to the passage of air through those parts, by constriction of the parts themselves, or by fluids of various degrees of consistence. These sounds are called *rattles* in English, *râle* in French, and *rhonchus* in Latin. The term *rhonchus* is in most common use in this country. These sounds are further distinguished as *dry* and *moist*—the dry being due to swelling of the mucous membrane, constriction of the tubes, obstructions from viscid phlegm, &c.; the moist to fluids of less consistence accumulated in the several parts of the lungs.

Rhonchi occur in three situations,—in the air-cells, (*vesicular*,) in the bronchial tubes, (*bronchial*,) and in cavities formed in the structure of the lung (*cavernous*).

Vesicular rhonchi are of two kinds, (*a*)—*dry crepitous* or *dry vesicular rhonchus*. (*Râle crepitant sec à grosses bulles, ou craquement of Laennec.*) This sound resembles that produced by blowing into a dried bladder. It occurs only in emphysema of the lungs, and is most distinctly heard in interlobular emphysema. It is only heard during inspiration. (*b*) *Moist crepitant and sub-crepitant rhonchus*. (*Râle crepitant of Laennec.*) This resembles the crepitation of salt thrown on hot iron, or the sound produced by rubbing a lock of hair between the finger and thumb, or the crepitation of a healthy lung distended with air, when pressed by the hand. It exists in all cases where the smallest bronchi and air-cells are partially filled with viscid fluid, provided that they still admit the passage of air. Thus it is present in œdema and apoplexy of the lungs, occasionally in pulmonary catarrh and bronchitis, and in the first stage of phthisis. It is also present in the first stage of pneumonia, constituting its most constant and characteristic sign; it disappears when hepatization comes on, and re-appears again when the inflammation is subsiding, and the lung begins to resume its healthy

condition. In the first and last of these stages the moist crepitant rhonchus alters, and obscures the respiratory sound, but does not completely mask it; in the stage of hepatization, both sounds are absent.

Bronchial Rhonchi.—These, too, are *dry* or *moist*. The *dry* bronchial rhonchi are the *sibilant* and *sonorous*. The *sibilant* resembles a prolonged whistle, or the momentary and interrupted chirping of birds, or the sound emitted by the sudden separation of two portions of smooth oiled stone. The *sonorous* rhonchus resembles the snoring of a person asleep, or the bass note of a violoncello or bassoon, or the cooing of a pigeon. All these varieties of sound arise from contraction of a portion of a bronchial tube, by thickening of a mucous membrane, or by pressure of a limited portion of consolidated lung, &c.; or by a portion of tenacious mucus, the sibilant rhonchus existing probably in the smaller, and the sonorous in the larger bronchial tubes. Allied to these sounds, a sort of *click* is sometimes heard, either during inspiration or expiration, arising probably from the sudden displacement of a portion of viscid mucus adhering to the interior of a bronchial tube. The *moist* bronchial rhonchus is called the *mucous rhonchus* (*râle muqueux* of Laennec). It is due to the passage of air through tubes containing a fluid, and closely resembles the sound produced by blowing through a pipe into soap and water. It is present in pulmonary catarrh, bronchitis, and hæmoptysis; and in all diseases accompanied with much expectoration, as in the third stage of pneumonia and in phthisis. *Tracheal* rhonchus is a mere modification of this sound, existing in the trachea when filled with fluid. It has been compared by Laennec to the rolling of a drum at a distance, or the noise of a carriage in a paved street.

Cavernous rhonchi.—These, also, are *dry* and *moist*. The *dry* cavernous rhonchus is extremely rare, as the cavities in which it exists are rarely found empty. The *moist* cavernous rhonchus has its seat in a cavity in the lungs, which, in ninety-nine cases out of a hundred, is of a tuberculous origin. It consists of the bubbling or gurgling of a fluid in a *circumscribed* cavity, and forms, when well marked, the surest sign of a tuberculous excavation.

In addition to the sounds just described, there are others which are produced by the *voice*. If we put the ear or the stethoscope to a healthy chest, we commonly perceive a diffused resonance: this is most distinctly heard in the situation of the bronchial tubes,—as, for instance, between the scapulæ. If we lay the hand on the chest whilst a person is speaking, especially if the voice be a bass, we perceive a vibration. This has been called *fremitus*. If, instead of applying the stethoscope to the chest, we place it over the larynx or trachea, the voice does not merely vibrate, but seems to pass through the tube to the ear, being much more clearly perceived by the ear applied to the stethoscope than by the other. This sound is called *laryngophony*. The same sound is heard

when the lungs between the bronchial tubes and the parietes of the chest are condensed, and especially if the bronchi are at the same time enlarged—this is *bronchophony*. If in the cavity of the pleura, external to a condensed lung, a thin layer of fluid is deposited, as happens in recent cases of pleuritis, a sound is heard like the bleating of a goat, or the squeaking of Punch—this is *ægophony*. Again, in cases of pulmonary excavation, the sound of the voice passes through the tube to the ear, as in laryngophony, and receives the name of *pectoriloquy*. Lastly, in cases where a large cavity, filled with air and communicating with the bronchi, exists in the chest, a sound is produced during respiration, by speaking, or in coughing, which resembles either the falling of a pin into a cup or glass, or that caused by blowing quickly and forcibly into a bottle with a narrow neck. The first is called *metallic tinkling*, the second *amphoric resonance or buzzing*. These sounds are heard most distinctly in pneumothorax; but they also occur in large abscesses of the lungs.

There is one sound, which, though due to an external cause, may be confounded by the beginner with sounds produced within the chest—the muscular sound: (*bruit musculaire*). It is always heard during muscular contraction, and is peculiarly distinct during the tremulous actions of the muscles from cold, and when the muscles are put upon the stretch. When the neck and shoulders are forcibly thrown back in examining the anterior part of the chest, when the hand is forcibly raised above the head, or the arms strongly folded across the chest, the patient stooping at the same time, this sound is very distinctly heard. It is an extremely rapid vibrating sound, bearing a close resemblance, when strongly marked, to the distant rumbling of carriages over a paved street. The pupil should make himself familiar with this sound, by placing his ear on the pillow, and contracting the masseter muscles with different degrees of force and quickness, taking care, at the same time, to avoid grating the teeth. When he closes the jaw gently, he will hear the rapid vibration just mentioned; a stronger contraction will render the vibration still more rapid; a strong and abrupt contraction closely imitates the first sound of the heart; a still stronger and quicker one produces a sound which might be confounded with the “*bruit de soufflet*,” and the strongest and most abrupt a species of cooing sound. The ear or stethoscope applied to the biceps muscle during a strong contraction, or to the abdominal muscles during a violent and abrupt expiratory effort, perceives a sound not easily distinguished from the first sound of the heart. The continued nature of the “*bruit musculaire*” distinguishes it at once from all the respiratory sounds. There only remains to mention a sound produced external to the lungs, and in the sac of the pleura. It is a *friction*-sound, occurring both in inspiration and expiration when the pleuræ are dry and rough with deposits.

The following table, which presents at one view some of the

chief points just stated, may be referred to with advantage, especially by the young auscultator. It is taken, with some modifications, from Dr. Williams's article on the Diagnosis of the Diseases of the Chest, in the Library of Practical Medicine, vol. iii. p. 18.

SOUNDS PRODUCED BY THE PASSAGE OF THE AIR IN RESPIRATION.

NATURAL.

Tracheal; heard in the neck and at the top of the sternum.

Bronchial; near the upper part of the sternum, between the scapulæ, &c.

Vesicular; on most other parts of the chest.

MORBID.

Bronchial Respiration; from condensed lung.

Cavernous, } in morbid cavities, communicating with the
Amphoric; } bronchi.

RHONCHI. *Moist. Mucous*; liquid in bronchi.

Crepitant; viscid liquid in small tubes and air-cells.

Dry. Sibilant,
Sonorous,
Dry mucous.

} Produced by contraction
of bronchi, by swelling of
mucous membrane, by pres-
sure, and by tenacious mu-
cus.

Dry crepitant; in emphysema, especially in-
terlobular emphysema.

Cavernous; liquid in a morbid cavity.

SOUNDS OF THE VOICE TRANSMITTED THROUGH THE CHEST.

NATURAL.

Laryngophony; over larynx.

Tracheophony; neck and upper part of sternum.

Bronchophony; near top of sternum, between the scapulæ, &c.

Pectoral fremitus; in many parts of chest.

MORBID.

Bronchophony; condensed lung.

Ægophony; the same vibrating through a thin layer of fluid.

Pectoriloquy; in a cavity of the lungs.

Tinkling, &c.; a changed echo of voice or cough in a large cavity.

SOUNDS PRODUCED BY THE MOTIONS OF THE LUNGS.

Friction Sounds, when pleuræ are dry or rough from deposit.

SOUNDS PRODUCED BY THE CONTRACTION OF THE MUSCLES.

Vibratory sound of varying intensity.

Examination of the Heart.—The heart is situated in the anterior mediastinum, within the pericardium, attached to surrounding

parts by the large vessels arising from its base, and with its apex free. Its direction is oblique, the base directed upwards, backwards, and to the right side; the apex downwards, forwards, and to the left; the base looking towards the fifth, sixth, and seventh dorsal vertebræ, from which it is separated by the descending aorta and the œsophagus; the apex, when the body is erect, the ventricles in a state of contraction, and the chest in a medium state of distension, corresponding to the fifth intercostal space—a point about two inches below and one to the inside of the nipple, or two and a half from the outside of the base of the ensiform cartilage. The heart itself lies behind the lower half of the sternum, the third intercostal space, and the cartilages of the fourth, fifth, and sixth ribs; about one-third of the heart, consisting of the right auricle, and the upper and right side of the base of the corresponding ventricle, lying behind the sternum, the remainder of the organ to the left of that bone. The pericardium and heart are covered on each side by the lungs, and also in front, with the exception of a lozenge-shaped space of somewhat less than two inches across. The part thus uncovered by the lungs consists of the whole front of the right ventricle, the most anterior portion of the appendix of the right auricle, with the apex and external edge of the left ventricle. These exposed portions, as well as the root of the pulmonary artery and the ascending aorta, after it has emerged from behind it, are separated from the walls of the chest only by the pericardium and loose cellular tissue. The orifice of the pulmonary artery and its valves, and those of the aorta, which lie nearly directly behind them, correspond to the upper edge of the fourth sterno-costal articulation of the left side, and to a point just above the left side of the fifth dorsal vertebra. The auriculo-ventricular orifices of the two sides of the heart lie to the right and left respectively of these points, that of the right side being at a lower level by several lines. They are only a third of an inch apart, and lie just below the root of the pulmonary artery. The bulging portion of the pulmonary artery, just below its division, is situated, according to Dr. Hope, between the second and third ribs of the left side, close to the sternum. The aorta, as it emerges from behind the pulmonary artery, comes in contact with the sternum, lying behind the mesian line of this bone till it forms its arch; the pulmonary artery, which is also in contact with the sternum, inclining more to the left till it reaches the space between the second and third rib. The arch of the aorta corresponds to the middle of the upper bone of the sternum; so that a sharp instrument, passed through the upper part of the sternum in the median line and on a level with the first intercostal space, would touch the upper part of the arch of the aorta, as it is passing from the right side of the sternum to the left side of the third dorsal vertebra.*

Though the body and apex of the heart are unattached, and

* In this description, I have followed very closely, and in many parts verbatim, Dr. Joy's article in the 3rd Vol. of the Lib. of Pract. Med.

merely embraced by the pericardium, the movements of the heart are greatly restrained by the attachment of its large vessels to surrounding parts, and by the strong connexion of the pericardium with the diaphragm below. In consequence of the connexion with the diaphragm, the unattached portions of the heart (the body and apex) are forced up in expiration and drawn down in inspiration; and this change of position is exaggerated by the ribs moving in opposite directions. During a deep inspiration the apex of the heart, instead of beating on the fifth intercostal space, is felt in the sixth, but indistinctly, in consequence of the elevation of the ribs drawing the lung in front of it. In a forced expiration, on the other hand, the ribs are drawn down and brought more completely into contact with the heart, so that the beat of the heart is felt in the fifth intercostal space, and even as high as the third rib and as low as the lower half of the sternum.* A distended stomach, or an enlarged abdomen, from whatever cause, will have the same effect as the act of expiration. As those portions of the heart which are free to move are of course affected by gravity, the position and direction of the apex will vary with the posture of the body. In examining the heart, three points demand attention,—its *position and size*, its *motions*, and its *sounds*.

Position and size of the heart—These are determined chiefly by percussion, and in certain cases, though with less accuracy, by the touch. In healthy and well-formed persons a dull sound is elicited by percussion over an area of about two inches in diameter, extending from the point where the beat of the heart is felt to the left side of the lower half of the sternum. This space, which corresponds to the part of the heart uncovered by the lungs, yields a dull sound, both on strong and slight percussion. Beyond this space the sound, on percussion, is gradually softened off, in proportion as the thickness of the overlapping lung increases; but on strong and sharp percussion the dull sound of the heart is heard through the intervening portion of lung. When the heart is enlarged, or when the pericardium is filled with fluid, the region of dulness is increased; the same effect is also produced by the consolidation of the surrounding portions of lung, or by tumors intervening between the pericardium and the walls of the chest, or by partial pleuritic effusions confined by false membranes, or even by enlargement of the left lobe of the liver. It is only in the ascertained absence of such diseased conditions that dulness on percussion may be taken as the measure of the heart's size. On the other hand, the absence of this dulness on percussion does not afford certain evidence of the non-enlargement of the heart, as surrounding parts may give an unusually clear sound on percussion, and thus mask the heart-affection. Emphysema of the lung, pneumothorax, or even an unusual distension of the stomach with gas, may give rise to such a clear sound on percussion: the dulness also ceases, even in healthy

* Dr. Williams.

persons, on assuming the recumbent posture, or on taking a deep inspiration. The persistence of a dull sound under these circumstances affords evidence either of adhesions of the heart or lungs, or of such a degree of enlargement of the heart or distension of the pericardium as prevents the heart from receding.

Motions of the heart.—The auricles and ventricles contract alternately, the systole of the one being synchronous with the diastole of the other. The auricles first contract, then the ventricles. The contraction of the ventricles is followed by their diastole, and this by a short pause. During the diastole of the ventricles and the short pause which succeeds, the blood flows from the auricles into the ventricles, and the contraction of the auricular appendices which immediately succeeds the pause excites the ventricles to new contraction. The order, therefore, of the heart's movements is as follows—systole of auricles, systole of ventricles, diastole of ventricles, pause. This order of succession is called the *rhythm* of the heart's motions. Of the *whole* time consumed by these several movements, the contraction of the ventricles occupies a half, the diastole a fourth, and the pause a fourth.

The *impulse* of the heart is synchronous with the contraction of the ventricles and the pulse in the larger arteries. It was formerly attributed to the tilting of the apex of the heart against the ribs, but it is now understood to depend on the sudden change of shape accompanied by rigidity which the heart undergoes—this change consisting of a bulging of its anterior surface through its entire length. The effect of this sudden bulging of the rigid parietes of the ventricles is felt chiefly at the apex, because a thick mass of spongy lung which absorbs and neutralizes the force of the impulse intervenes over the rest of the heart's surface. A full expiration, by diminishing the size of the intervening portion of lung, extends the limits of the impulse, and the same result follows when the body is placed in a prone position.

The strength of the impulse, and the extent of surface over which it is felt, vary greatly in disease. When the parietes of the heart are thickened at the expense of the cavities, (concentric hypertrophy,) the extent of impulse being scarcely greater than natural, its force is much augmented. When, on the other hand, the ventricles are diminished in thickness the impulse is less forcible. If thickening of the walls is accompanied by increase of the size of the cavities, in which case the heart will be greatly enlarged, the impulse is both stronger and more extensive, and may become perceptible over a space of five or six square inches. When the walls are thin and the cavities enlarged, the impulse will be of less force but of greater extent. Fluid in the pericardium renders the impulse indistinct and the place in which it is felt variable. Adhesions between the heart and pericardium, on the contrary, confine the impulse to the same spot, so that change of posture, and the different states of the parietes of the chest in inspiration and expiration have little or

no effect upon it. Tumors formed within the chest and various diseases of the lungs may displace the heart, and cause the spot in which its impulse is felt to vary. Congenital transposition of the heart will have the same effect. The impulse will be more distinctly felt, *cæteris paribus*, where the contraction of the ventricles is abrupt. When the heart acts strongly, and especially in emaciated subjects, its movements may be seen as well as felt, and their force, extent, and nature will often furnish useful indications. When the heart is enlarged, these movements may be distinctly perceived in the epigastric region.

The heart is also subject to various irregularities in its action ; as double and triple impulse, depending generally on spasmodic and partial contraction of the ventricles, and on irregular transmission of blood from the auricles ; to intermittence, inequality, increased or diminished force, &c. As most of these irregular actions of the heart affect the pulse, and produce appreciable changes in it, they will be best considered under that head.

Sounds of the heart.—The natural sounds of the heart are two in number—a dull prolonged sound, synchronous with the impulse of the heart, and consequently with the contraction of the ventricles and the pulse in the larger arteries, and an abrupt clear sound. The second sound immediately succeeds the first, and is followed by an interval of silence. The first sound is loudest over the middle of the ventricles, the last over the site of the semilunar valves, and for a short distance upwards along the sternum. They are best distinguished when the pulse is slow, and they are more clear in emaciated than in stout persons. We may hear them in our own persons when lying down, especially on the left side; and in rare instances of disease they have been heard even at a short distance from the patient. The intensity of the sound diminishes as the distance from the præcordia increases. In stout persons the sounds are limited to the region of the heart itself; in narrow-chested persons, and in children, they may be heard all over the chest before as well as behind. Any cause which increases the conducting power of the contents of the chest extends the limits within which the sounds are heard. Thus, when the lungs are consolidated, as in pneumonia, phthisis, &c., the sounds of the heart are heard much beyond their usual limit. Should consolidation be confined to the right side, the sounds of the heart would be heard more distinctly on the right side, both before and behind, than on the left, and this fact may become a means of diagnosis.

Cause of the sounds.—Much difference of opinion has existed on this subject, and many careful experiments have been made. The majority of medical men now agree in attributing the first sound to the contraction of the ventricles, and the second sound to the reaction of the column of blood in the aorta and pulmonary artery on the semilunar valves, by which those valves are suddenly closed with a sort of click. Some high authorities, of whom the most re-

cent is M. Cruvelhier, attribute both sounds to the closing of the valves, the first sound being due to the closing of the tricuspid and mitral valves, the second to the closing of the semilunar. In support of the opinion which attributes the first sound to the contraction of the ventricles, it may be stated, that the "bruit musculaire" is quite sufficient explanation, if it be true; for no one who has placed his head upon the pillow, and contracted his masseter muscles with varying degrees of force and rapidity, can have failed to recognize the first sound of the heart in every degree of distinctness which it exhibits in healthy persons, from the dull prolonged sound which it has when the circulation is tranquil, up to the cooing sound which accompanies the more powerful and rapid contraction of the heart. It is a strong confirmation of this view that a strong contraction of the abdominal muscles produces a sound not to be distinguished from it.*

The sounds of the heart may be changed in intensity or in kind. An increase or diminution of *intensity* is of very common occurrence. An increased loudness of sound is often heard during nervous palpitations, both by the patient himself and by his attendants; it may also be produced by dilatation of the ventricles accompanied with thinness of their parietes. In the former case the impulse is at the same time increased, in the latter diminished. On the other hand, the sounds may become so feeble as to be heard with difficulty; as is the case in general debility or in debility of the heart itself, in obstructed pulmonary circulation, in cases where the heart is overloaded with blood, in softening of its fibres, and in excessive hypertrophy of the heart. In the latter case there will be strong impulse with weak sounds.

In cases of nervous palpitation, and after violent exercise, both sounds of the heart are unusually distinct, the action of the muscular fibres being strong and abrupt, and the elastic reaction of the aorta closing the valves with a sudden jerk: hence the loudness of the first sound and the peculiar abruptness of the second.

But besides these differences in degree, there are other sounds present in certain unusual or diseased conditions of the circulation. Some of these belong to the heart and others to the blood-vessels. They are the following: the *bellows sound* (bruit de soufflet), the *simple blowing sound*, the *hissing sound*, the *sawing sound* (bruit de scie), the *rasping sound* (bruit de râpe), a *humming sound* (bruit de diable), a *buzzing sound* (bruit de mouche), a *whizzing sound*, and peculiar musical sounds, such as cooing, whistling, &c.

The sounds heard over the region of the heart itself, or in the large vessels which spring from it, are chiefly the bellows sound and its modifications, viz. the sawing or rasping sound, and the several musical sounds. The *bellows sound* is always produced when there is a marked disproportion between the force of the heart's contractions and the size of the tubes or orifices through which the

* Report on the Motions and Sounds of the Heart, 1841.

blood has to pass. It may arise—1, in persons in perfect health during very violent contraction of the heart, the arteries retaining their normal size, as in nervous persons during violent palpitations, the heart contracting both quickly and forcibly; in chlorotic females, arising, as it is thought, from a thin condition of the blood; and in cases of great debility from sudden hæmorrhage. In all these cases the sound is not constant. 2. From narrowing of the orifices, the heart contracting with its usual force, or with increased violence; as where the orifice of the aorta or pulmonary artery is contracted, with or without enlargement and hypertrophy of the corresponding ventricle. 3. From narrowing of the orifices in consequence of diseased formations, as vegetations and diseased incrustations on the valves, the consequence of inflammation, or polypous concretions formed during life. 4. Dilatation of one or more of the orifices of the heart with inefficiency of the valves, as in cases of adhesion of the aortic or auriculo-ventricular valves to the adjacent parietes.

Most of these cases resolve themselves into a disproportion between the force of the heart's beat and the size of the orifices, or some obstacle to the flow of blood. The position in which they are heard, and the sound of the heart which they accompany, will often enable us to fix upon the precise seat and cause. Thus, sounds heard only in the region of the heart or over the position of its valves, but becoming indistinct when the ear is made to follow the course of the arch of the aorta, may be ascribed to disease of the auriculo-ventricular valves, or of the pulmonary artery; or to causes external to the heart itself, and having the pericardium for their seat. On the other hand, sounds heard over the position of the valves and remaining equally distinct or increasing in distinctness, as the ear follows the course of the aorta, may be referred to diseases of the aorta or its valves—to enlargement with or without roughness of the aorta, or to induration or patency of the semilunar valves. When the sounds are limited to the heart, and are due to internal causes, the mitral valve is the most likely seat of the disease. Of the two large arteries, the aorta and the pulmonary artery, the aorta is much the most liable to alterations of structure. If the abnormal sounds accompany the first beat of the heart, they are most probably due either to disease of the auriculo-ventricular orifices, of the valves of the arteries, or of the coats of the arteries themselves. Where they accompany the second sound they are most likely to arise from disease of the aortal valves. If they are heard with both sounds, they may be complications of auriculo-ventricular with aortal or pulmonary disease, or of disease of the aorta as well as of its valves. The position in which they are heard must be taken into account in all these cases.

The sounds heard in the position of the heart, and which arise from causes external to it, are friction sounds, generally double, and in rare cases triple or fourfold. They arise from depositions

of coagulable lymph on the surface of the pericardium, or from other morbid formations in the same situation. These sounds, too, are of limited extent, and are not heard in the course of the large vessels. They resemble those produced by deposition of lymph on the surface of the pleura, and vary in intensity from a sound closely allied to the *bruit de soufflet*, to the harsh creaking sound produced by the folding of new leather.

In cases of abnormal sound, the hand applied over the spot where the sound is heard, perceives a peculiar *thrilling vibratory motion*, resembling that felt on touching the back of a cat in the act of purring. This has been named the purring tremor (*fremissement cataire*); a similar thrill is sometimes felt over an aneurism, or in the healthy arteries themselves.

The sounds heard in the blood-vessels remote from the heart consist chiefly of the bellows-murmur in different degrees of intensity, which may always be produced both in the arteries and veins by the pressure of the stethoscope, but is most distinctly heard in chlorotic females, and after hæmorrhages. It is heard in the veins of the uterus during pregnancy, but may be readily produced by pressure of the stethoscope on the iliac veins; hence the necessity of using caution in these examinations.

The humming sound (*bruit de diable*) and the buzzing sound (*bruit de mouche*) are also heard in different states of the vessels, and may be produced in the large veins by the pressure of the stethoscope.

Other sounds heard in the blood-vessels are the peculiar whizzing or grating sound of aneurism, and a similar sound from the passage of blood through an accidental opening in an artery into a vein (aneurismal varix).

Much information may be obtained by placing the hand upon the pulse in the wrist, at the same time that the ear is applied to the seat of the abnormal sounds. In the case of sounds heard in the region of the heart, and attributed to disease of the auriculo-ventricular valves, if the sound precede the pulse we may attribute it to the entry of the blood into the ventricle, —if it is synchronous with it, to reflux. In this latter case, the presence or absence of the venous pulse, that is to say, the pulsation of the large veins caused by regurgitation of the blood into them, will enable us to decide as to which side of the heart is the site of the disease.

THE ARTERIAL PULSE.

By the ear or by the hand applied to the region of the heart, we may count the number, the force, the quickness, the regularity, and the degree of equality of its beats; but the pulse teaches us this and something more. It is a measure not only of the number, force, quickness, regularity, and degree of equality of the heart's

contractions, but also of the quantity of blood sent forth at each beat. Hence it is a better measure of the circulation. It would be a perfect one were it not that the coats of the arteries vary in their degree of elasticity. But this variation, whilst it impairs the value of the pulse as a measure of the circulation, gives it an additional claim to attention as a criterion of the state of the nervous system; for this it is which modifies the elasticity of the arteries.

The fallaciousness of the pulse has passed into a proverb, and the proverb has furnished a good excuse for the neglect with which it has been treated. Substitute the word "difficult" for the word "fallacious," and we have a motive for industry instead of an apology for idleness. The pulse can only be fallacious to the extent to which we are ignorant of it; it will always remain difficult even to those who understand it best. The difficulties which attach to the subject are the same which beset every part of the study and practice of medicine, and they spring from the same causes—of which the chief are the original difference in degree existing between all the functions of the human body in health, the variable intensity of the causes of disease, and the numerous combinations of which those causes are susceptible.

Some precautions are necessary in examining the pulse, and some directions are required. The first precaution to be observed is, to wait a certain time till the emotion commonly occasioned by the presence of the medical attendant has subsided, for such emotions have a marked effect upon the circulation. The mode in which the pulse is felt is also of some consequence. For the purpose of counting the number of beats a single finger may be used; but in order to observe the more minute changes which it undergoes, the four fingers of the opposite hand should be applied in the course of the radial artery, with a moderately firm and equal pressure. By compressing the artery with the ring or little finger, we can ascertain by the forefinger the degree of its compressibility.

Of all the characters of the pulse, its frequency is that which is most easily ascertained. This usually corresponds with the number of the heart's contractions: it can never exceed that number, though it may fall short of it. In certain forms of disease of the heart, the quantity of blood which the ventricles receive is so small, that it makes no impression on the mass of the circulating fluid, and the impulse does not reach the radial artery; or the heart contracts without having any blood in it; or some pressure, temporary or permanent, may exist in the course of the artery: in all these cases the pulse is imperceptible, and we miss some of its beats. In syncope, too, all the beats of the heart are so feeble that no pulse can be felt at the wrist. These are some of the few exceptions to the rule that the pulse is an accurate measure of the frequency of the heart's contractions. The following are some of the causes which influence the number of the pulse in health:—

Age.—The frequency of the pulse is very variable in young infants. According to Quetelet, the numbers immediately after birth, both for males and females, are as follow :

Maximum 165; Minimum 104; Mean 135.5; Range 61.

The following numbers are taken from Billard; the averages are approximations :—

	Max.	Min.	Mean.	Range.	
1 to 10 days	180;	less than 80 (in 18)	106;	more than	100
1 to 2 months	150;	..... 70	..... 103;	.....	80
2 to 3 months	100;	..... 70	..... 87;	.....	30

Hence it appears, that the pulse of the infant at birth and for some time after, has a very variable frequency, and is little to be depended upon as a test of the state of the health. It is difficult to count the pulse at the wrist at these early ages, hence the beat of the heart should be preferred. The following table presents the number of the pulse at different ages deduced from an average of twenty-five observations at each age specified. All the observations were made in apparently healthy persons, fasting, in a state of rest, in the middle of the day, and in a sitting posture.

MALES.					FEMALES.			
Age.	Max	Min.	Mean.	Range.	Max.	Min.	Mean.	Range.
1 week,	160	104	128	56	160	104	128	56
2 to 7 years	128	72	97	56	128	70	98	58
8—14	108	70	84	38	120	70	94	50
15—21	108	60	76	48	124	56	82	68
22—28	100	53	73	47	114	54	80	60
29—35	92	56	70	36	94	62	78	32
36—42	90	48	68	42	100	56	78	44
43—49	96	50	70	46	106	64	77	42
50—56	92	46	67	46	96	64	76	32
57—63	84	56	68	28	108	60	77	48
64—70	96	54	70	42	100	52	78	48
71—77	94	54	67	40	104	54	81	50
78—84	97	50	71	47	105	64	82	41

The pulse of the adult male, then, may be stated at 70, that of the adult female at 80; the highest number is somewhat less than 100 in the adult male, and somewhat more than 110 in the adult female, the least number in each is about 50. The range (the difference between the highest and lowest numbers) extends from 28 to 56 in the male, average 43; and from 32 to 68 in the female, average 48. The lowest number recorded in the table is 46; and the lowest observed by Floyer was 55. Much lower frequencies have, however, been met with in healthy persons. Heberden records 42, 30, and even 26 beats in a man of 80; Fordyce, 26, in

an old man in the Charterhouse; in a young man whose pulse is not included in the table, as he laboured under slight dyspepsia, I have repeatedly counted as low as 38 beats; and this is the lowest I have met with in many hundreds. Pulses as low as 16 or even 14 beats are on record, but it is doubtful whether the persons in whom they occurred were healthy. Falconer has observed pulses of very low frequency in women, viz. one of 36 and another of 24, and Dr. Graves mentions one of 38.

In disease, extraordinarily low frequencies of the pulse have been observed: one case is reported by M. Piorry, in which it beat 17 times in a minute; a case of epilepsy by Sir W. Burnett, in which the number was 14; and a remarkable case of injury to the upper part of the spine, followed after an interval by fits of syncope with convulsions, in which the pulse was usually about 33, but fell during the fits to 12, 10, 8, "and at three or four different times, when the patient was quite sensible and not in a fit," seven and a-half in a minute.* These low frequencies of the pulse are generally little affected by stimuli, and, as in the case reported by Dr. Graves, remain unaltered by febrile attacks.

It is extremely probable, on the other hand, that exceptions may exist to the frequency of the healthy pulse, or an opposite kind—that is, cases of great frequency; but I have not met with any well-authenticated instances. In disease, extraordinary frequencies of pulse have been counted. Dr. Joy has counted 200 in a case of acute hydrocephalus, and I am credibly informed by a medical man, a near neighbour of my own, that during occasional violent fits of palpitation, he has counted in his own person 250 beats in the minute, and that a medical friend who called to see him in the fits corroborated his statement as to the number. Heberden counted a pulse of 180, though Floyer thinks that the greatest number which can be distinctly counted is 140. I have myself counted upwards of 170 in a case of phthisis.

Sex.—It will be seen, by comparing the foregoing table, that the pulse of the female has nearly the same frequency as that of the male up to 7 years, but that at more advanced periods of life the female pulse exceeds the male by from 6 to 14 beats, the average excess being 9 beats. The pulse, too, has a greater range in the female than in the male; that is to say, there is a greater difference between its highest and lowest numbers. This happens in consequence of the female pulse being much more frequent in many instances than the male, whilst in others it falls nearly as low.

Temperament.—Nothing is known with certainty of the influence of temperament on the pulse. It is probable that the pulse is more frequent in the sanguine and nervous than in the lymphatic and bilious.

Posture.—In the healthy adult male the mean frequency of the pulse in the different postures is as follows:

* Medico-Chir. Trans. 1841; Reporter, Mr. Holberton of Hampton.

Standing 79—sitting 70—lying 67, including all exceptions to the rule.

Standing 81—sitting 71—lying 66, excluding all exceptions to the rule.

In the adult female of the same mean age, the numbers are :

Standing 89—sitting 82—lying 80, including all exceptions to the rule.

Standing 91—sitting 84—lying 80, excluding all exceptions to the rule.

The extremes, however, are very remote from these mean numbers. Thus, in the male, the difference between standing and sitting has been observed as high as 26, and as low as 0; that between sitting and lying as high as 18, and as low as 0; and that between standing and lying as high as 44, and as low as 0. In the female, in like manner, differences scarcely less marked have been observed. Numerous exceptions also exist to the rule that the pulse is more frequent sitting than lying, and standing than sitting. All these facts should be borne in mind at the bedside. The effect of change of posture on the same frequency of the pulse is nearly twice as great in the male as in the female, and nearly three times as great in adults as in early youth.

The effect of change of posture increases with the frequency of the pulse, as is seen in the following tables :

MALES.

	51—70	71—90	91—110	111—130
Standing . . .	61	81	101	120
Sitting . . .	55	68	82	93
Lying . . .	52	66	74	81
Difference between standing and lying }	9	15	27	39

FEMALES.

	61—80	81—100	101—120
Standing . . .	71	92	108
Sitting . . .	67	85	97
Lying . . .	63	83	90
Difference between standing and lying }	8	12	18

The exceptions to the general rule also decrease as the frequency of the pulse increases, and for the higher frequencies of the pulse

entirely disappear. Hence, change of posture admits of practical application in cases where the pulse is much increased in frequency. The effect of change of posture on the same frequency of the pulse is greater in the morning than in the evening. When the head is placed lower than the body, the pulse falls. The cause of the different frequency of the pulse in different postures is the different amount of muscular contraction required to support the body in those postures.

The effect of change of position is much increased by debility; it is greatly diminished in phthisis pulmonalis. The pulse is said by Dr. Graves to be unaffected by posture in hypertrophy of the heart, but this statement requires confirmation.

Period of the day.—The pulse of the healthy male, as a general rule, is more frequent in the morning than in the evening, and diminishes progressively as the day advances. To this rule there are probably some exceptions. There is some reason also to believe that this rule may be inverted in the female. The pulse also falls more rapidly and uniformly in the evening than in the morning. It is also a general rule, that exciting causes of all kinds act more powerfully in the morning than in the evening. In experiments made upon my own person, I found that the effect of the same food on the same frequency of the pulse was, taking one experiment with another, nearly twice as great, and lasted more than three times as long, in the morning; whilst in more than one instance the same food which in the morning raised the pulse from 5 to 12 beats, and kept it above its natural number for one or two hours, produced no effect whatever in the evening. This fact has an important bearing on the administration of food and remedies in disease.

Sleep.—The pulse falls considerably in sleep. In Quetelet's observations, there was a difference of 10 beats in an adult female, the same difference in a girl from three to four years old, and in a boy from four to five years a difference of 16 beats. Sleeplessness excites the circulation.

Exercise.—Muscular exertion increases the frequency of the pulse more than any other cause. It may raise it to upwards of three times its natural frequency. Change of posture is but a particular case of this. After severe and long-continued exertion, as I have ascertained experimentally, the pulse suffers the same collapse as the other functions, and falls much below its natural number. Passive exercise also excites the pulse.

Food.—The pulse is but little affected by vegetable food, more by animal substances, and most of all by warm drinks. Spirituous liquors and tobacco, even though used habitually, increase the frequency of the pulse. Cold liquids lower it.

Mental Emotions.—These have a marked effect on the pulse, the exciting passions increasing its frequency, the depressing passions lowering it. The apprehension which patients feel in the presence

of their physician is well known to excite the pulse, and the caution to wait till the excitement has ceased before the pulse is counted is as old as Celsus.

Temperature of the air.—Cold air lowers the pulse, warm air excites it. In Sir C. Blagden's experiments, in which he exposed himself during eight minutes in air heated to 260° , the pulse was 144, or double its natural frequency.

Density of the air.—On the summit of Mont Blanc, De Saussure found the pulses that beat 49, 66, and 72 times respectively at Chamounix, raised to 98, 112, and 100.

Quantity of blood contained in the system.—The pulse is more frequent in that degree of plethora which falls short of overloading the heart with blood; its frequency is but little increased where the heart is oppressed. Compression of the arteries raises the pulse by producing the first degree of plethora. A slight diminution of the quantity of blood lowers the pulse, a considerable diminution raises it.

Debility.—In debility without disease, the pulse falls, but its frequency is increased in extreme debility, or where debility is complicated with irritation.

The more common causes of increased frequency of pulse in healthy persons, are the following:—Muscular exertion, active and passive exercise, a change from a posture requiring little muscular effort to one requiring more exertion, food, (especially warm drinks,) a high temperature, diminished pressure of the air, extreme debility, sleeplessness, the first degree of plethora, and exciting passions and emotions.

The principal causes of diminished frequency, on the other hand, are:—Sleep, fatigue, provided it be not carried to excess, continued rest, debility without disease, (provided it be not in an extreme degree,) depressing passions, cold applied externally or taken internally, increased atmospheric pressure, a change from the standing to the sitting, or from the sitting to the recumbent posture, and the inverted position of the body.

Other characters of the pulse, besides its frequency, deserve notice. The pulse of the healthy male may be described as regular, moderately full, compressible, and rising rather slowly under the finger; that of the female is smaller and quicker in the beat, as is also the pulse of the child. The pulse of persons of a sanguine temperament is full, hard, and quick; that of the lymphatic temperament, slower in the beat. In old age the pulse is often rendered hard by the increased firmness of the arteries. Exceptions also occur in healthy persons to the regularity of the pulse, instances having been observed in which the pulse was irregular or even intermittent in health, and regular in disease, resuming its intermittent character on recovery. In some persons this irregularity occurs on every slight attack of indigestion, especially where much flatulence is present.

The frequency of the pulse, though a point of much importance, is by no means the only one which demands the attention of the practitioner; there are other characters of at least equal value. The following description and explanation of them will be found useful:—

The impression communicated to the finger by the pulse is compounded of the beat of the heart, the reaction of the aorta and large vessels, the condition of the coats of the artery itself, and the consistence of the blood.

The characters of the pulse which depend upon the degree and mode of the heart's contraction, are the following:—

Number of the heart's contractions.—Pulse *frequent, infrequent.*

Regularity of the heart's contractions.—Pulse *regular, irregular, intermittent.* (This last term should be applied to an arrest of the heart's action occurring at regular intervals.)

Quantity of blood expelled at each contraction of the heart. Pulse *large* (full), *small.* If the quantity sent out at each beat is the same, the pulse is *equal*, if different, *unequal.*

Time occupied by each beat of the heart.—Pulse, *slow* (labouring), *quick.*

The influence of the elastic reaction of the large arterial trunks on the pulse, is shown in cases of dilatation of the aorta with loss of elasticity, and in aneurism. The firm and strong reaction of the healthy elastic coat produces a steady pulse, the absence of this reaction occasions the peculiar *thrilling* pulse of aneurism. The degree of elasticity of the arteries themselves produces the following modifications:—

Elasticity of the arteries increased.—Pulse *hard* (strong, sharp, wiry, incompressible.)

Elasticity of the arteries diminished.—Pulse *soft* (weak, yielding, compressible.)

Elasticity lost in the large arterial trunks.—Pulse *thrilling, vibrating.*

The foregoing characters of the pulse are rarely, if ever, met with separate, but admit of various combinations, of which the following are the most important:—

Pulse *frequent, large, soft.*—(Compounded of a frequent beat of the heart, a large quantity of blood sent out by each contraction, and an inelastic artery.) This pulse accompanies the premonitory stage of many febrile and exanthematous diseases; such as scarlatina, cynanche tonsillaris, erysipelas, &c. A similar pulse exists in the first stage of pneumonia.

Pulse *frequent, quick, small.*—(Compounded of a frequent beat of the heart, a quick contraction, and a small quantity of blood sent out at each beat.) This is the characteristic pulse of phthisis in males, and of anæmia in females.

Pulse *frequent, large, hard.*—(Compounded of a frequent beat

of the heart, a large quantity of blood sent out at each beat, and an elastic artery.) The pulse of the first degree of plethora.

Pulse *rather frequent, full, slow* (labouring).—(Compounded of a rather frequent and a slow beat of the heart, and a large quantity of blood sent out at each contraction.) The pulse of a greater degree of plethora, the heart overloaded with blood.

Pulse *frequent, large, hard, quick*.—(Compounded of a frequent and quick beat, a large circulation of blood, and an elastic artery.) The pulse of inflammatory fever.

Pulse *frequent, large, hard, thrilling*.—(Compounded of a frequent beat of the heart, a large quantity of blood sent out at each beat, an elastic artery at the wrist, with a loss of elasticity in the large arterial trunk.) The characteristic pulse of aneurism and of dilatation of the aorta without obstruction to the flow of blood.

Pulse *unequal and irregular, frequent or infrequent*.—(Compounded of a variable quantity of blood sent out at each contraction, and of contractions performed in unequal times.) As the quantity of blood sent forth by the heart may depend upon one of two causes—a diminished supply from the auricle, or a want of power in the heart to send forth all the blood which it receives,—this pulse may indicate mitral valve disease, or atrophy of the heart. It may depend, also, on causes which render the supply of blood to the left auricle variable. Hence it occurs in some diseases of the lungs.

Pulse *infrequent, large, hard*.—(Compounded of an infrequent beat of the heart, a full supply of blood, and an elastic artery.) A pulse often met with in apoplexy before depletion has been practised, in hydrocephalus, compression of the brain, narcotism, &c.

Pulse *infrequent, quick*.—(Compounded of an infrequent and a quick beat of the heart.) A pulse sometimes met with in the hysteric female.

These are some of the many combinations of the chief elements, so to speak, of the pulse. They are given partly as examples of the employment of terms, and partly as hints to those who may wish to follow out the study of the pulse. Taken in combination with other symptoms, the pulse furnishes important indications in all diseases; whilst in some diseases of frequent occurrence, as in phthisis pulmonalis, and affections of the heart, it often forms the earliest clue to the existence of an obscure and lurking malady. Practice alone can make the physician acquainted with the principal characters of the pulse; but the knowledge acquired will amply repay the labour bestowed.

Besides the simple characters of the pulse already mentioned, others of less frequent occurrence and more obscure nature have been mentioned by authors, of which the following are examples. The redoubled pulses, (*dicrotus, bisferiens, bisiliens*), when two strokes follow each other rapidly, and are separated from the two

succeeding by an interval of repose ; a pulse which is said to indicate approaching hæmorrhage ; the *incident* pulse, (incidens, inciduus,) when the second pulsation is weaker than the first, the third than the fourth, after which there is a stroke as strong as the first, and so on ; this is the critical pulse of the old writers ; the *pulsus caprisans*, admirably named, but rarely felt ; it consists in a small pulse followed after a short interval by a large one, conveying the impression of an unsuccessful effort, followed by the overcoming of an obstacle.

THE RESPIRATION.

The products of respiration have already been mentioned. It only remains to speak of the mechanism by which these important changes take place. The bronchial tubes divide into extremely minute branches, each of which terminates in a distinct cell. Around the cell a small artery with its accompanying vein forms a capillary net-work, and the blood which circulates through these vessels is exposed to the air which the cell contains. The lungs, then, closely resemble a large gland, the minute terminations of which, like the acini of the liver and kidneys, are surrounded by a delicate tissue of blood-vessels ; but they differ from other glands inasmuch as their efferent ducts, viz. the air-passages, supply them with a material in some way or other essential to their proper secretion. In all other glands the secretion is formed from the blood alone ; in this the blood is exposed to the air, the contact of which is essential to the performance of the functions of the organ. A provision is made for a constant renewal of the air in the movements of inspiration and expiration. Inspiration consists in the descent of the diaphragm, and the raising and tilting outwards of the ribs. The descent of the diaphragm is accompanied by the protrusion of the abdomen. Expiration, when perfectly tranquil, is performed merely by the elastic reaction of the ribs and the resiliency of the lungs themselves, which have been shown to possess a very considerable degree of elasticity. In violent inspiration other muscles besides the diaphragm and intercostals are called into play, especially those by which the scapulæ are raised and fixed. In violent expiration, as in coughing, &c., the abdominal muscles are brought into action, by which the viscera of the abdomen are compressed and the diaphragm forced upwards into the chest. Yawning, sighing, &c. are forms of deep inspiration ; coughing, sneezing, &c. of violent expiration. The deep inspirations relieve the circulation by leaving greater space for the admission of blood into the heart, whilst violent expirations are chiefly of use by freeing the lungs or air-passages of noxious and irritating substances. The lungs are not only elastic, but the air-tubes, like the efferent ducts of glands, possess muscular fibres.

The peculiarity of the muscles of respiration is, that they are endowed both with a voluntary and an involuntary action. Their

involuntary character subjects them to the same influences as the other involuntary muscles, whilst their subordination to the will renders them liable to all those affections of the voluntary muscles in which volition is suspended or impeded. Hence they are affected in hysteria, in chorea, and in tetanus. For the reasons now stated, the movements of respiration are deserving of very careful study and of much more attention than they have yet received.

As the muscles of respiration are subject to the influence of the will, it is necessary, in experiments or observations upon the number and character of the respirations, to avoid this source of fallacy. I have succeeded in accomplishing this purpose by the invention of an instrument which registers the number of respirations during a considerable interval, without requiring any attention on the part of the experimenter. At the bedside, the same object may be secured when the patient is lying down, by resting his hand on the abdomen as if with a view of counting the pulse. By relaxing the grasp upon the wrist, and allowing the hand to rise and fall with the movements of respiration, the number of respirations may be counted. In this manner the interference of the will, which is always called into play when the attention of the patient is attracted to his breathing, is avoided. By this means, too, the pulse and respiration may be counted in succession, and compared with each other.

Number of the respirations.—The number of the respirations is subject to still greater variety than that of the pulse, and has been still less inquired into. Little is hitherto known on the subject beyond a few rude estimates. The number of inspirations in a minute is usually stated at 18, or about 1 to every 4 beats of the pulse. It is variously stated by authors for the adult male at from 14 to 26 respirations in the minute. By experiments, as yet unpublished, on my own person, I have arrived at the following results:—

The number of respirations varies at different times and under different circumstances, but in a state of comparative rest, from 22 to 12 per minute. The principal cause of this difference is, the posture of the body. Thus for the same frequency of pulse (64 beats), the number of respirations was, standing 22, sitting 19, and lying 13.

Hence the rule which the pulse follows, viz. that the difference between standing and sitting is greater than that between sitting and lying, is inverted in the case of the respiration. The respiration in the sitting posture ranges from 15 to 21. The rule of the pulse is also inverted in respect of the influence of the time of the day, for whereas the pulse becomes less frequent as the day advances, the respiration increases in frequency. On comparing the same frequency of pulse morning and evening, I find that there are about 18 respirations in the evening for 17 in the morning. The same rule obtains in disease in both sexes, even in those

cases where the pulse becomes more frequent in the evening. That degree of debility, therefore, which fatigue occasions both in health and disease, is accompanied by increased frequency of respiration. The number of respirations increases with that of the pulse, but in a less rapid ratio, the proportion which the respiration bears to the pulse decreasing as the pulse increases. Further observations may slightly modify these statements, but they will be found in the main correct.

Quetelet has made some interesting observations on the respiration at different ages, in males and females. The following table presents the results which he obtained from about three hundred observations on the male, and a smaller number on the female :—

Number of the respirations.

AGE		
	MALE.	FEMALE.
At birth	23 to 70	27 to 68
5 years	32	.....
15—20	16 to 24	19
20—25	14 to 24	17
25—30	15 to 21	.....
30—50	11 to 23	19

Quetelet has also examined the effect of sleep on the respiration. In a woman in her twenty-seventh year he found the respiration to be, awake 27, asleep 21. In two young children, the differences were 5 and 8 respectively. It appears from his experiments, that the respiration is more affected by sleep than the pulse.

Proportion which the respiration bears to the pulse.—This has been variously estimated by authors. Quetelet, Burdach, and the majority of physiologists, estimate the number at 1 to 4; Joy (Lib. Pr. Med.) at 1 to $4\frac{1}{2}$; Floyer at 1 to 5. No dependence can be placed on any of these estimates, as they were formed in ignorance of the effect of posture on the breathing. In my own experiments the proportion has varied from 1 : 2.60 to 1 : 5.23. The chief cause of this difference is the posture of the body. Thus, for a pulse of 64, the proportion standing was 1 : 2.95, sitting 1 : 3.35, and lying 1 : 4.97. In the sitting posture, but for different frequencies of the pulse, it has varied from 1 : 2.61 to 1 : 5.00. The proportions morning and evening for the same frequency of the pulse are about 1 : 3.60 and 1 : 3.40. The proportion which the respiration bears to the pulse decreases as the pulse increases. Thus, for a pulse of 54, the proportion was 1 to 3; for a pulse of 72, it was 1 to 4.

The causes which affect the respiration in health are probably the same as those which affect the pulse. Thus, all causes which increase the frequency of the pulse and the force of the circulation, augment the number of the respirations. On the other hand, all causes of diminished frequency of pulse, also lower the respiration. Thus, exercise increases the number of respirations, rest

diminishes them: high temperatures increase the frequency both of the pulse and breathing, cold diminishes the frequency of both. Sleep, which lowers the pulse, has a still more marked effect upon the respiration. The only exception to the rule, with which I am acquainted, is that of debility. It has been already stated, that debility without disease, provided it be not extreme, is accompanied by an infrequent pulse; the number of respirations, on the contrary, is increased in every degree of debility.

In disease the number of the respirations varies within much wider limits than that of the pulse. The smallest number which I have counted is 6 in a female sleeping, but not comatose, after attempting suicide by taking laudanum; the highest number is 73 in a case of paralysis agitans. I have met with a still higher frequency in a case of hysteric asthma, but the exact number was not noted down. I have counted as few as 10 respirations in a case of paralysis, and as many as 44 in a case of phthisis. Floyer met with 60 respirations in a case of suffocative catarrh, and in a case of inflammation of the lungs in a child; on the other hand, he counted as few as 7 in more than one attack of asthma. Dr. Graves has recorded as small a number as 12, and as many as 50 in cases of fever.

With regard to the proportion which the respiration bears to the pulse in disease;—Floyer has found it as large as 1 to 2 in a case of suffocative catarrh, and as small as 1 to 14 in a case of asthma; Dr. Graves has observed as high a proportion as 1 to 2 in one case of fever, and as low a proportion as 1 to 20 in another. In the case of paralysis agitans already referred to, I counted a pulse of 72 and 73 respirations; in a case of transposition of the heart, 32 respirations to 46 pulses; and in a case of paralysis, 1 respiration to $6\frac{1}{2}$ pulses.

These remarkable variations in the number of the respirations as compared with that of the pulse are readily explained, if we reflect that the respiration is influenced by many other causes besides the quantity of blood sent to the lungs by the heart. Some of these causes are internal and some external. The principal internal causes are the state of the lungs themselves, and of the pleuræ by which they are invested. Among external causes are mechanical obstructions to the entrance of air, as by the pressure of tumors, &c., upon the air-passages, constriction of the chest, increased or diminished action of the muscles of respiration, &c. All these obstructions to the free play of the lungs, and the due performance of respiration, accelerate the breathing; and this acceleration, whether accompanied by a feeling of uneasiness or not, has been called dyspnœa. As this is the principal symptom of all diseases of the lungs, and a concomitant of a great majority of the diseases of the heart, it will be useful to present the chief causes of it in a tabular form.*

* A similar table is given by Dr. Williams in Lib. Pr., Med. vol. iii. p. 25. Some use has been made of it in forming the scheme on the opposite page.

CAUSES OF INCREASED FREQUENCY OF RESPIRATION.—DYSPNŒA.

I. *Quantity of blood in the lungs increased.*

a. With quickened circulation.

{ Exercise, repletion, plethora (1st degree), inflammatory fevers, hypertrophy of the right side of the heart, &c.

b. With obstacle to return of blood to the heart.

{ Diseases of the mitral valve, pressure on the pulmonary veins, &c.

II. *Quality of the blood altered.*

a. More venous than usual.

Morbus cæruleus, &c.

b. Red particles deficient?

Anæmia, chlorosis.

III. *Deficiency of oxygen in inspired air.*

a. Air pure but small in quantity.

{ Air rarefied by high temperature, or diminished atmospheric pressure.

b. Air defective in quality.

{ Non-poisonous gases, as nitrogen and hydrogen, &c.

IV. *Mechanical obstructions.*

Internal {

a. Of the air tubes.

b. In lungs themselves.

c. In pleural sac.

d. Caused by other internal organs.

{ Diminished size of air-tubes, from thickening of their parietes, or from pressure.

{ Congestion, hepatization, œdema, tubercle, &c.; emphysema, dilated bronchi, vomica, &c.

{ Hydrothorax, pneumothorax, pleuritic effusions and adhesions.

{ Enlargement of the heart or large vessels, aneurismal tumors.

External {

a. In parietes of the chest.

b. In abdomen.

{ Malformations and distortions, ossification of cartilages, &c.

{ Enlarged viscera, tumors or dropsical effusions in abdomen.

V. *State of the muscles of respiration.*

a. Paralysis, (partial).

{ Injuries of the spinal marrow, in the neck, &c.

b. Debility.

{ From fatigue, exhaustion, after severe febrile affections, &c.

c. Pain, {

1. In muscles.

2. In surrounding parts.

{ In intercostals, diaphragm, or abdominal muscles, the sound muscles performing the respiratory movements.

{ Pain in abdomen in peritonitis, and in the chest in pleuritis, the muscles which cause least pain acting alone.

d. Spasm.

Tetanus, hydrophobia, &c.

e. Other forms of augmented innervation.

{ Strong mental emotions, hysteria, asthma.

The chief causes of diminished frequency of the respiration are sleep and coma, however produced, whether by narcotics or by pressure on the brain. The respiration, therefore, is infrequent in apoplexy, in poisoning by opium and carbonic acid, &c.

Many other characters of the respiration, besides increased frequency, merit attention; as the full or deep, the small or feeble, the regular or irregular; the short, quick, catching; the long, the labouring; the thoracic, the abdominal, the diaphragmatic, &c.

Increased or diminished frequency of the respiration taken alone are of comparatively little value; it is only when combined with observations on the pulse, or examinations of the chest by percussion and auscultation, that we learn its real signification. Thus, a frequent respiration, taken alone, may arise from any one of the many causes specified in the table; but a frequent respiration with an infrequent pulse, in the ascertained absence of any disease of the internal organs of the chest, would strongly indicate great debility, or, in the absence of this, hysteria. On the other hand, an infrequent pulse and respiration combined would as probably arise from some disease or injury of the brain or of the upper portion of the spinal marrow. Again, a frequent and quick respiration, in the absence of disease of the internal organs of the chest, and accompanied by acute pain of the parietes of the chest or abdomen, is at once explained by the existence of that pain, whether its seat be in the muscles or in the peritoneum.

Important indications may also be obtained by noting the number of the respirations day by day in acute diseases. In pneumonia, for instance, a daily diminution in the number of the respirations, with or without a similar change of the pulse, gives the best hope of recovery; in apoplexy or in narcotic poisoning, on the contrary, an increase of the number of respirations, especially if accompanied by an increased frequency of pulse, may be considered as a good symptom. So in convalescence from fever, where there is great debility, a diminished frequency of respiration, with a gradual increase in the number of the pulse, is a sign of returning strength.

In making use of these, as well as of the less important symptoms and signs of disease, the observer should always be on his guard against the common error of trusting too implicitly to any one sign, however valuable in itself, to the neglect of others which are capable of affording him useful information. In the case of the diseases of the chest, for instance, neither the stethoscopic signs, nor the respiration, nor the pulse alone, can furnish the practitioner with all the information which he is in want of; but if, knowing the exact value of each of these signs and the fallacies which attach to each, he makes use of all of them at the same time, there are few difficulties in diagnosis which he will not be able to overcome.

CHAPTER VI.

OUTLINE OF GENERAL THERAPEUTICS.

THE science of therapeutics, as the name implies, treats of the cure and palliation of diseases. In its widest sense, it comprises all knowledge which has an immediate bearing upon this important object—the knowledge of disease on the one hand, and of the virtues of remedies on the other. The application of this knowledge in individual cases constitutes the *art* of healing. As there is a general and special pathology, so is there a general and special therapeutics. General pathology has been treated in a former chapter; general therapeutics remains to be considered in the present.

This subject is beset by the same difficulties which attach to the study of disease, and by others which are peculiar to itself. It has been already stated, that our knowledge of disease is rendered imperfect by our ignorance of the phenomena of health: just in the same manner our knowledge of the action of remedies in disease is impeded by the slender information which we possess on the effects of those remedies on the healthy frame. But the great obstacle to the improvement of the science and the art of healing is the difficulty of instituting comparative trials of the efficacy of different modes of treatment in the same disease, and our necessary ignorance of the extent to which the body, if left to itself, would repair the injuries which it sustains. The medical man does not feel justified in leaving disease to itself; hence he is ignorant of the nature and power of the “*vis medicatrix* :” on the other hand, he is unwilling to risk the employment of a new remedy in a disease in which an old one has been used by general consent, lest an unsuccessful or fatal result should be laid to his charge.

When these facts are taken into consideration, it will be easy to estimate the difficulty of forming any exact classification of remedies, or establishing any broad principles of treatment. Nevertheless, it is important that the attempt should be made, as general principles are the foundation of all sound practice. The difficulties which lie in the way of such an attempt will be best removed by following step by step the principal functions of the body, as already described in a former chapter, and endeavouring to show the effect which remedies produce upon each of them in turn. In pursuance of this plan the following arrangement will be adopted.

1. Remedies applicable to disorders of the *primæ viæ*, including the treatment of disorders of the stomach, liver, and intestines. This part corresponds with the first division of Chapter IV. (p. 19 to 22).

2. Remedies which affect the circulation and the functions performed by the several orders of vessels. This division corresponds with the second part of Chapter IV. (p. 32 to 46).

3. Remedies which act upon the structures of the body. This division corresponds with the third part of Chapter IV. (p. 46 to 49.)

4. Remedies which act upon the nervous system. This division corresponds with the fourth part of Chapter IV. (p. 49 to 67.)

5. A fifth division will comprise an attempt at a classification of the more important remedies, with some useful tables.

1. REMEDIES APPLICABLE TO DISEASES OF THE PRIMÆ VIÆ.

Diet.—Most disorders of the stomach require some regulation of the diet, or some directions as to the time and mode of taking food. The functional disorder of most frequent occurrence is anorexia, or loss of appetite, attendant upon almost all severe diseases, especially those of an inflammatory or febrile character. This loss of appetite, which is always accompanied by a loss of power to digest food, indicates either entire abstinence or the use of such articles of diet as are least irritating to the stomach. These are the farinaceous liquids, such as barley-water and gruel; acidulated drinks, such as lemonade, imperial, &c., toast-water, and the ripe juicy fruits, especially the orange. Some small portion of nutritious matter is furnished by these articles of diet, though the stomach has lost the power of digestion.

Those functional disorders of the stomach which are independent of the general system, and originate within the organ itself, are termed dyspepsia, of which there are two kinds—the acute and the chronic. The acute form requires a similar diet to that which is indicated in the anorexia attendant upon constitutional diseases; a diet free from all matter which can irritate the tender membrane of the stomach. For this purpose a farinaceous diet, such as gruel, arrow-root, or sago, to the entire exclusion of all solid matter, whether animal or vegetable, should be prescribed. The chronic form of dyspepsia requires a close attention to the time and mode of taking food, the quantity and quality of the food itself, and the condition of the other functions of the body, especially those of the intestines. The treatment of this form of disease involves too much detail to allow of its being discussed in this place. The necessity of complete mastication, and of the use of a moderate quantity of liquid, and the mischief of over-repletion, of prolonged abstinence, and of the excessive use of condiments, are too obvious to require much comment. Organic diseases of the stomach require the same abstinence from solid and irritating matters which has been insisted upon in the treatment of acute dyspepsia. But here it is important to administer such substances as nourish, at the same

time that they are free from irritating qualities; such as strong broths, soups, and jellies.

Another point to be attended to in regulating the diet of patients is, to give them such food as is suitable to their age. This caution requires to be observed more especially in the diseases of children. The stomachs of children are easily disordered by food ill-adapted to their years and strength: hence solid food of all kinds is apt to disagree with very young children; and the disorder of the stomach which it occasions lays the foundation for severe constitutional maladies. Here we must recur to the diet of the infant at the breast, substituting for the milk of the mother new milk from the cow, and administering it, if necessary, in small quantities, and at long intervals. This simple treatment is often attended with the best effects.

The disorders of the stomach which have been just described affect chiefly, if not entirely, the *reducing* function of the organ. When the *converting* function is disordered, the diet must be regulated according to the nature of the existing disorder. In cases of diabetes, for instance, where an unusual quantity of sugar is generated in the stomach and excreted by the kidney, such a diet must be prescribed as contains the smallest quantity of substances capable of being converted into saccharine matter. The saccharine staminal principles, therefore, must be given in small quantity and in an organized form, and the diet must consist chiefly of albuminous and oleaginous elements. A similar, but a less strict, attention to diet is necessary in persons subject to the oxalate of lime calculus, in whom it may be sufficient to prevent the use of sugar in its crystallized form.

A strict attention to diet is necessary not merely in disorders of the stomach, but as a means of inducing certain states of the general system. The influence which a particular diet exercises upon the health is well exemplified in the opposite systems of training practised in preparing men for the exercises of the ring and of the turf. The physician, likewise, resorts to a certain kind of diet, with a view of imparting or reducing strength: allowing a nourishing diet to the convalescent, and restricting the patient labouring under a severe inflammatory or febrile attack to substances containing little or no nutriment. This, which is called the *antiphlogistic* diet or regimen, must be more or less strict, according to the severity of the disease in which it is prescribed. In cases of the more severe kind, total abstinence from food may be necessary, fluids being allowed according to the existing degree of thirst: in less severe and urgent cases, the patient may be restricted to vegetables, which have little effect on the circulation. During the stage of convalescence from acute diseases it is necessary to pass with caution from the abstinence of the strict antiphlogistic regimen to vegetable diet, from that to fish or light broths, and then to meat in moderate quantity, beginning with that most easy of diges-

tion, viz. mutton. The regulation of the diet in cases of convalescence is of much importance, and requires a strict attention on the one hand to the powers of the stomach, as tested by the degree of appetite, and the effect of the food already prescribed; and on the other, to the state of the circulation, as evidenced by the pulse. The physician should bear in mind that vegetable food has little or no effect on the circulation, but that animal food stimulates, that warm liquids excite, whilst cold liquids act as sedatives, and that food produces its greatest effect on the circulation in the early part of the day. These facts should be borne in mind, especially in cases of slow and unsteady convalescence; that is to say, in those cases where debility is accompanied by some remains of local affection, where the appetite is variable, and that condition of the general system exists to which the name irritation has been given. On the other hand, when disease has entirely left the patient, and nothing but debility remains, when the appetite is strong and the circulation tranquil, food may be administered with less caution. But there are cases in which a nourishing and even stimulating diet is necessary, though local inflammation and constitutional irritation be present. These are cases in which debilitating discharges exist, or extensive injuries are in course of reparation, which require a more abundant supply of nourishment than that which the stomach, if left to itself and guided by the existing appetite for food, would be able to supply. Here we must combine the stronger and more stimulating kinds of solid food with liquids containing nourishment and stimulus, as wine, ale, porter, &c. In such cases, too, the previous habits of the patient must be attended to, and the drunkard must be supplied with his accustomed stimulus. These cases fall, for the most part, under the care of the surgeon, and it is in the treatment of them that the accomplished surgeon best displays his skill.

One general rule applies to diet as to the employment of every remedy of the more simple kind, viz. that where diet is equally efficacious with medicine, it should always have the preference. The duty of the physician is not to cure disease by physic, but to cure it by all the means which are within his reach, and the more simple the means the stronger their claim upon his notice.

Diet forms but a part of the remedial means which we have at command in treating diseases of the stomach. For the acute affections of the mucous membrane of the stomach, indeed, diet alone will often prove a sufficient remedy; but for those chronic affections which have received the name of chronic dyspepsia something more is required. In addition to the regulation of the diet, medicines are often required for the relief or cure of these cases. Much may be done by taking off the load from a weak stomach; but it is necessary at the same time to impart strength. Many substances which have the effect of increasing the appetite and the powers of the stomach are in common use, as condiments. Of these,

common salt is the only one absolutely required ; for experiment has shown that animals deprived of this simple condiment soon perish, however nourishing their food may be in other respects ; and one of the severest punishments to which man has ever been subjected, is a diet from which common salt is excluded. With this exception, the healthy stomach does not stand in absolute need of condiments, though, when the diet consists principally of vegetable food, the use of spices seems to contribute to digestion.

Almost every substance which possesses active properties of any kind when taken into the stomach, produces some effect upon the mucous membrane, and by far the majority increase its vascularity and the flow of its secretion, and the contraction of its muscular coat. All the rubefacients, for instance, that is to say, all those substances which inflame the skin, inflame the mucous membrane of the stomach also ; and many substances which have not power enough to act upon the skin through the cuticle affect the more delicate and less protected mucous membrane of the stomach. In small doses these substances increase the appetite and strengthen the digestion ; when long continued, they produce congestion and debility of the capillaries ; and when given in large doses, they act as emetics. Thus common salt, which in moderation is the best and safest condiment we possess, when given in large doses produces sickness, and in still larger ones acts as an irritant poison. The same observation applies to mustard, horse-radish, garlic, &c. There is reason to believe that, as far as the stomach itself is concerned, almost all substances, whether derived from the vegetable or mineral kingdom, act nearly in the same way. For instance, a quarter of a grain of arsenic, or a grain of tartar-emetic, or a scruple of sulphate of zinc, or the same dose of ipecacuanha, will not produce vomiting more effectually than a table-spoonful of mustard, or twice the quantity of common salt, or a large draught of hot water. On the other hand, a thirtieth of a grain of arsenic, or the twelfth of a grain of tartar-emetic, or one or two grains of zinc, or the same dose of ipecacuanha or squill, will as surely increase the appetite as half a tea-spoonful of salt or mustard, or a small draught of warm water. In choosing, then, between the many substances which act as emetics in large doses, and as gentle stimulants in small ones, we prefer those which produce the least injurious effect upon the constitution ; and these are the substances which experience has pointed out as the best and safest condiments. A list of them would comprise all the stimulant and aromatic herbs used in cookery, as well as many substances employed in medicine. All of these, under different names and variously combined, have been given either as independent remedies in dyspepsia, or to qualify remedies directed to other organs. Thus we combine mint, or ginger, or cloves, with saline purgatives, ammoniacum with squills, galbanum with aloes, the essential oils with many different kinds of aperient pills.

The simple bitters, and the warm aromatic bitters, or the as-

tringent bitters, under the name of aromatics, stomachics, carminatives, or cordials, are the remedies most frequently employed with a view of increasing the appetite, or causing the muscular fibres of the stomach to contract.

Emetics.—Any of the remedies just enumerated, when given in large doses, are emetics. Those in most common use are ipecacuanha, tartar-emetic, and zinc; mustard or common salt are often of use on an emergency when other emetics are not at hand. It is usual to promote the action of these substances by copious draughts of warm water, and by tickling the throat with a feather. Emetics are commonly prescribed merely with a view of emptying the stomach; occasionally they are used for this purpose in the beginning of febrile affections, and they are administered frequently and at short intervals in incipient cases of phthisis pulmonalis, with the best effect.

The stomach becomes insensible to the effect of stimulants if they are often repeated; so that what was an emetic at first, becomes a promoter of digestion; what acted as a gentle stimulant when first administered, loses its effect entirely by repetition. Thus, a cigar, to a person unaccustomed to smoke, will cause vomiting; but after many repetitions it becomes an effectual promoter of digestion. The same thing occurs in disease during the administration of tartar-emetic: the first few doses will often cause sickness; but ere long the stomach becomes accustomed to its use, and, if continued, it produces that amount of stimulation which is favourable to digestion.

The remedies which have been mentioned probably differ but little in their mode of action on the stomach; but their remote action on other organs of the body is very various. Some of them belong to the class of stimulants, others to that of tonics, and the most active are strong irritant poisons. It is in their direct action on the stomach itself that they resemble each other, producing, according to the dose, the effect of a stomachic, a nauseant, an emetic, or an irritant poison.

All the medicines which have been enumerated produce, according to their dose, a determination of blood to the mucous membrane; and there are probably but few which produce permanent contraction of the capillaries. Cold liquids and ice are the most effectual remedies of this sort, and are therefore well adapted to combat severe inflammation of the stomach, or active hæmorrhage from the mucous surface. In the more chronic forms of determination of blood and in passive hæmorrhage, nitrate of potash may be administered with advantage.

The muscular coat of the stomach may be stimulated to contraction most effectually by the warm aromatic bitters, as ginger, cardamoms, &c.; the neuralgic pain of the stomach (gastrodynia) is often effectually removed by bismuth, and the troublesome sickness which sometimes attends diseases of remote organs, by the hydrocyanic acid.

The liver.—The functional disorders of the *liver*, which consist in a diminished secretion of bile, are most effectually treated by small doses of mercury, or by the nitro-muriatic acid. Another remedy sometimes given, with the same object of promoting the secretion of the bile, is taraxacum.

Intestinal canal.—The chief functional disorders of the intestinal canal are diarrhœa, hæmorrhage, and constipation. Diarrhœa, like dyspepsia, may be acute or chronic. Acute and recent diarrhœa, like acute gastritis, may always be removed by a farinaceous diet, from which all solid and irritating matters are excluded. Chronic diarrhœa, arising as it does from a congested state of the mucous membrane, may be cured most effectually by removing that congestion. This is effected by small doses of mercurial preparations, which, acting on the liver, increase the secretion of the bile, and unload the branches of the vena portæ. Where this treatment fails, which is almost never, and probably only where the mucous membrane is in an extremely relaxed state, astringents may be resorted to, as catechu, kino, aromatic confection, chalk mixture, tannin, &c. When these fail, the stronger astringent minerals, as sulphate of zinc or sulphate of copper, in combination with opium, will sometimes prove successful. In my own experience, the nitrate of potash has succeeded where these have failed.

Hæmorrhage from the intestines (*malæna*) requires the same treatment as chronic diarrhœa, viz. small doses of mercurial preparations, to increase the secretion of the liver and unload the vena portæ, combined with an unirritating diet. This treatment will be equally effectual, whether the blood come, as some suppose, from the liver itself, or from the surface of the intestines. Another form of hæmorrhage from the bowels occurs in dysentery, and blood is also passed from internal or external piles. Ipecacuanha and opium have been found eminently serviceable in dysentery. Piles are most effectually relieved by unloading the bowels, promoting the secretion of the liver, by the local abstraction of blood, the local application of cold, or the use of stimulant ointments.

Constipation, as it arises from many causes, requires many remedies. The substances which naturally promote the action of the bowels are those which escape the action of the stomach and are not convertible into nourishment; such as the green matter of vegetables, the hard covering of seeds, the tendons and gristle of meat. Where these are carefully removed in the process of cookery, constipation is apt to arise, and may often be removed by introducing some of these indigestible substances into the food. Thus, brown bread will often prove an effectual laxative.

The medicines which act upon the bowels, are all those which cause vomiting when taken into the stomach, as tartar-emetic, tobacco, sulphate of zinc, ipecacuanha, squills, &c., and the whole class of irritant poisons. It is probable that all purgatives given in sufficiently large doses would act as emetics, just as all emetics

given in too small doses to produce vomiting, when they pass into the bowels act more or less energetically as purgatives. Many of those substances, however, which act as violent purgatives, have little or no effect on the stomach; hence their action may be considered as in some degree peculiar.

Purgatives act in two ways—by promoting the secretion of the mucous membrane, and by increasing the peristaltic action of the intestines; but some act slightly in one of these ways and energetically in the other. Those which excite abundant watery discharges are called hydragogue cathartics. Purgatives are of various kinds, and may be divided into groups or classes; as the mild cathartics or *laxatives*, (manna, cassia pulp, tamarinds, prunes, honey, bitartrate of potash, and the fixed oils, as castor, almond, and olive oils); the *saline* or antiphlogistic purgatives (sulphates of soda, potash, and magnesia); the milder acrid purgatives (senna, rhubarb, and aloes); the strong acrid purgatives (as jalap, scammony, black hellebore, gamboge, croton oil, colocynth, and elaterium); and, lastly, the mercurial purgatives (as the hydrargyrum c. cretâ, the pilula hydrargyri, and calomel).^{*} We make choice of one or other of these remedies, according to the object which we have in view. If we wish simply to relieve the bowels, we prefer combinations of aloes with rhubarb, or ipecacuanha; if gently to promote the secretion of the whole course of the intestinal canal, we use the gentle laxative; if to reduce inflammation, the saline; if to overcome obstinate constipation, the stronger purgatives; if to remove dropsical effusions, the drastic or hydragogue cathartics; and if we desire to promote the secretion of the liver at the same time, we combine the mercurial purgatives with those adapted to fulfil other indications.

The choice of purgatives is not more important, however, than the mode of administration. When the bowels have been long overloaded with fæces, and especially where the irritation produced by them has affected the nervous centres, it is important to remove the load from the intestines without increasing the mischief already existing; in other words, hypercatharsis must be carefully avoided. Here we must not only select such remedies as effectually remove the feculent matter, but watch their operation from day to day; and as soon as any signs of intestinal irritation make their appearance, we must withdraw our purgative, and treat the hypercatharsis as if it were diarrhœa produced by any other irritating cause, viz. by a mucilaginous diet.

In cases of extreme irritability of the stomach or bowels, or of both, we may relieve the intestines by enemata, consisting of warm water, or gruel with or without an admixture of common salt; or we may employ any of those remedies which act as purgatives, however introduced into the system. Of these, the most effectual is croton oil combined with castor oil, and rubbed into the skin. The shock

^{*} See Pereira. Introduction.

of cold water on the surface of the abdomen, or the electric spark, will also produce a purgative effect ; the former is often employed with advantage in cases of obstinate constipation.

MEDICINES WHICH ACT ON THE ORGANS OF CIRCULATION.

We recognize three distinct states of circulation in healthy persons, in disease, and under the operation of medicines ; viz. 1, increased frequency of pulse with increased force and fulness ; 2, increased frequency of pulse with diminished force and fulness ; 3, diminished frequency of pulse with increased or diminished force and fulness. In health, the first state of circulation is brought about by violent exercise, by spirituous liquors, &c. ; the second may be produced by those strong mental emotions and impressions which, in excess, give rise to syncope ; the third attends exhaustion and sleep. In disease, the first state of circulation is present in acute inflammation or high inflammatory fever ; the second in all diseases attended with extreme debility ; and the third, in apoplexy. The same conditions follow the operation of remedies ; the frequent, full, and strong pulse is produced by spirituous liquors, ammonia, &c. ; the frequent, small, and weak pulse by tartar-emetic, tobacco, &c. ; and the infrequent pulse, of varying size and force, by opium, conium, stramonium, &c. In the cases specified, that is to say, in health, in disease, and under the operation of remedies, supposing the several states to be produced in the same person, with the same quantity of circulating fluid in his body, it is obvious that in a given time more blood will traverse each organ in the first case, a less quantity in the second case, and a variable quantity, sometimes more, sometimes less, in the third case. According to the first supposition, the quantity of blood traversing each organ is increased in two ways ;—by the increased frequency of the heart's beat, and the increased quantity of blood sent out at each contraction of the ventricle ; according to the second supposition, the quantity of blood passing through each organ is diminished, because the quantity of blood sent out from the heart is lessened more than the number of beats is increased ; and, according to the third supposition, the heart sends out in one case more, in another less, blood than that which will compensate for the diminished number of its beats.

The remedies which augment the frequency as well as the force of the heart's contractions are called *stimulants* ; those which augment their frequency and diminish their force are called *depressants* ; those which produce diminished frequency belong to the class of *sedatives* and *narcotics*.

Stimulants (incitants or excitants).—According to the definition just given, the state of the circulation is made the test and measure of the effect of remedies ; those remedies being stimulants which increase the frequency, as well as the force, of the heart's contrac-

tions. In assuming this as the test, it is not meant to apply without any exception, for it will soon appear that there are cases in which stimulants diminish instead of increasing the number of the heart's contractions. Nevertheless, this is their invariable effect on healthy persons, and their more common effect in disease. This state of circulation is brought about by the agency of the nervous system, whatever may be the part to which the stimulant is applied; and this change thus produced in the condition of the nervous centres is reflected back upon the heart and organs of circulation. If, for instance, a stimulant, such as brandy, be taken into the stomach, the impression produced upon its nerves is conveyed, either directly to the heart through the branches of the solar plexus, or to the brain and spinal cord, whence it is reflected upon the heart, or, being absorbed into the circulation, it may be applied directly to the nervous centres, or to the nerves supplying the lining membrane of the heart itself. Here there are many possible ways in which the circulation may be affected; but a more simple case is that of exercise, the most powerful stimulant of the healthy frame. It may easily be proved that the effect of exercise on the circulation is not merely a mechanical one, but that it arises, at least in part, from the reflection of nervous influence upon the heart in common with the voluntary muscles of the body. The effect of heat applied to the skin is evidently due to the same cause. Hence it may be safely stated that though the state of the circulation is the test of the action of stimulants, it is through the nervous system that that state is brought about.

The effects of stimulants on the healthy body may be partly explained by the increased quantity of blood sent to every organ of the frame. The rapid and abundant circulation through the lungs leads to a more frequent respiration and a more complete decarbonization of the blood; the increased flow of arterial blood to the brain excites all its functions; the impressions on the senses are more acute, the flow of ideas more rapid, volition stronger and more prompt, the passions excited, the feelings joyous; all the capillaries of the body are distended, and the glandular structures pour forth their secretions; the involuntary muscles, too, partake of the general excitement; and the functions dependent upon them, as digestion, defæcation, &c., are performed with increased vigour.

Such are the effects of stimuli given in moderate quantity: in excess they act as depressants or narcotics. Thus spirituous liquors, when taken in moderation, produce all the effects which have been described; but in large doses they may give rise either to sickness, accompanied by depression or collapse, or to narcotism. In the one case, they occasion vomiting, a feeling of extreme debility, a frequent and small pulse, a cold sweat; in the other, they produce symptoms of apoplexy, oppression of all the functions, paralysis of the voluntary muscles, and an infrequent beat of the heart. The first effect is commonly pro-

duced in persons unused to the action of the stimulant, in whom the stomach, retaining its healthy sensibility to poison, rejects it when taken in large quantity; the latter in those whose stomach is naturally insensible, or has become so by long habit. As the narcotic effects thus produced are similar to those brought on by opium or by other substances belonging to the class narcotics, alcohol has been put down in the list of narcotic remedies; but without sufficient reason, for narcotism is the necessary effect of extreme exhaustion of the nervous power, and exhaustion the invariable consequence of over-stimulation. It would be as reasonable to call exercise a narcotic, because the exhaustion which it produces, when carried to excess, occasions deep sleep. Alcohol has all the attributes of a pure stimulant, differing from other stimulants in degree more than in kind, and belonging to the class of volatile or diffusible stimulants. If alcohol is to be placed among the narcotics, because it may produce coma, it must be classed with the emetics and depressants, because it occasions sickness and debility. It may be laid down, then, as a general rule, that all stimuli carried to excess produce exhaustion of the nervous power, and that this exhaustion may display itself in one of two ways—in depression or oppression; in debility or coma.

It has been stated that increased frequency, fulness, and force of pulse is the test of the action of stimulants, but that there is one case in which the test does not apply. This case has already been indicated in an earlier part of this introduction (p. 62). It is the case of debility without local disease, and accompanied with frequent pulse: in this state stimulants diminish the frequency of the pulse. It was also stated, in the same place, that the effect of stimulants on a pulse rendered infrequent by debility without local disease was much less than that produced on the pulse of healthy persons. This fact is easily explained, by the exhaustion of the nervous system which attends debility, and renders it dead to all impressions from within or from without. In administering stimulants in this state of debility, their effect on the circulation should be carefully noted. If they lower the pulse, they act favourably; if they raise it much, they do harm. It is when they lower the pulse that stimulants act as tonics: when they raise it much, they impart merely momentary strength, to be followed by collapse proportioned to the previous excitement.

Tonics.—These remedies, as the name implies, are given in states of debility, with a view of restoring firmness, strength, and *tone* to the entire frame. When the body is extremely weak, stimulants have the effect of imparting real strength; in other words, they become tonics. In less degrees of debility, they produce less obvious effect than on the robust and healthy. Stimulants in large doses become tonics in small ones; is there not, therefore, good reason to suppose, that those remedies which are tonics in the dose in which they are commonly employed would act as stimulants in

larger quantities? Ought not stimulants and tonics to be classed together, as remedies which have the same effect on the system, but vary rather in the state of body in which they are administered, stimulants being tonics for the weak, and tonics becoming stimulants to the strong?

Depressants.—This name is here used to distinguish a class of remedies which has the effect of rendering the pulse frequent, small, and weak—the exact reverse, therefore, of the action of stimulants. This change in the circulation is accompanied by great prostration of strength, nausea, cold sweat, and all those symptoms which characterise approaching syncope. This state is brought about by the abstraction of blood, by the preparations of antimony, and by many remedies which act as stomachics in small doses and as emetics in large ones. The loss of a large quantity of blood, or the rapid removal of a smaller quantity, brings about syncope, or a state approaching to it, and, as during this state the heart sends out a comparatively small quantity of blood, and that which it does send forth is propelled with little force, that part of inflammation which consists of an increased action of the heart is removed by this simple depressant. Tartar-emetic, which, next to bleeding, is the sheet-anchor in all acute inflammation, and one of the most powerful and safe remedies in the materia medica, brings about precisely the same condition as that produced by bleeding, and may be employed either alone or in combination with blood-letting in the treatment of all *acute* inflammations. Tartar-emetic is the only depressant of acknowledged power and efficacy which acts simply as a depressant; for tobacco, which produces a very similar effect, in some respects, combines the properties of a narcotic and a depressant.

As there is an exception to the rule that stimulants increase the frequency, and force of the pulse, so is there an exception to the rule that depressants increase its frequency whilst they diminish its force. Thus blood-letting, which belongs to the order of depressants, will render the pulse full and strong, and even increase its frequency, in certain cases of plethora when the circulation is oppressed with blood, and in pneumonia when the powers of the system are oppressed and the circulation impeded by obstruction to the important function of respiration. Again, in cases of acute inflammation, accompanied with high inflammatory fever, bleeding or tartar-emetic will lessen the frequency and force of the pulse at the same time. In all these cases, however, the *modus operandi* of these remedies is essentially the same; it appears to be different merely because the circumstances in which the remedies are employed vary. Bleeding is not stimulant because it sometimes gives force and frequency to the pulse, any more than alcohol is a depressant because it sometimes renders the pulse small and frequent. The ordinary effect of remedies on persons in health ought to determine the class to which they shall be referred.

Sedatives.—These remedies may be considered in this place, because they are nearly allied in some respects to the last class, and are by many authors confounded with them. Like stimulants and depressants, they act upon the nervous centres originally, though some of their more obvious effects display themselves in the circulation. Sedatives differ from stimulants and depressants, inasmuch as they do not increase the frequency of the pulse, but, on the contrary, diminish it. They resemble narcotics in reducing the frequency of the pulse, but differ from them in not producing stupor. The true sedatives sometimes produce sleep, but they as frequently occasion wakefulness; they differ from the pure narcotic inasmuch as in large doses they cause delirium, or a state nearly resembling delirium tremens, whilst the narcotics in large doses occasion coma and apoplexy.* Hydrocyanic acid and digitalis are the principal remedies of this class, to which may be added the powerful remedy of cold. Hydrocyanic acid and digitalis both lower the pulse, although neither of them bears any resemblance in other respects to narcotics. It is true that there are states of system in which both these remedies will increase the frequency of the pulse, just as there are states of system in which the effect of stimulants and depressants on the circulation is reversed. Digitalis, for example, which, administered in diseases accompanied with a frequent pulse, lowers it in a remarkable degree, and often reduces it much below the healthy standard, in some healthy persons, and perhaps in all, has the reverse effect.† The effects of hydrocyanic acid are more constant; but there is little doubt that exceptions exist to the rule of its operation. In classing cold with sedatives the same difficulty exists, for extreme cold produces effects which give it as good a title to be placed among the narcotics. This remedy is so important, that it deserves a separate consideration.

Cold, according to the degree and manner of its application, acts in very different ways. Its general effects on the circulation depend upon its intensity. A moderate degree of cold applied to the general surface acts as a stimulant; but when the skin is hot and dry, it reduces the temperature, lowers the circulation, soothes the nervous system, and disposes to sleep. Applied to the head in the form of cold lotion or of ice, it is one of the most valuable remedies in inflammatory affections of the brain. Its application to other parts of the body is of the greatest service in local inflammation or hæmorrhage. Cold is applied to the throat internally or externally in scarlatina anginosa, in the first stage of cynanche tonsillaris, and in hydrophobia, with the best effects. The effect of this powerful

* See some of the distinctions insisted upon in this place clearly laid down in Dr. Billing's "First Principles of Medicine," p. 77, et seq. Many of these views are also embodied in Dr. Spillan's "Manual of Therapeutics."

† See the Experiments made by Dr. Saunders on his own person, and detailed in his work on Consumption.

agent on the nervous system will be considered in another place. Applied locally in the form of *douche*, it restores the elasticity of the capillary vessels, and by preventing further effusion, allows the absorbent vessels to remove any fluid which may have been thrown out.

Narcotics.—The action of these remedies belongs so completely to the fourth head, (the action of remedies on the nervous system,) that nothing need be said in this place except that the effect of narcotics on the circulating system is the opposite of that produced by stimulants and depressants, viz. that of diminishing the frequency of the heart's contractions. These remedies also affect the respirations in a striking manner, diminishing their number in a still greater degree than that of the pulse. This combined decrease of the pulse and respiration may serve to distinguish the action of this class of remedies. All those remedies which produce great debility, as the depressants, for instance, increase the number of the respirations, though in certain cases they diminish that of the pulse. The effect of narcotics on the pulse and respiration, therefore, deserves attention.

The remedies which have been examined affect the circulation primarily by the influence which they exert upon the nervous centres; and secondarily, through the reflection of that influence upon the heart. There remains to speak of the means which we have of effecting changes in the capillary vessels.

Remedies which affect the capillaries:—Treatment of inflammation. It has been already stated (p. 38) that in inflammation there is diminished action (that is, diminished elasticity) of the capillaries with increased action of the heart, and that the two together keep up that dilated condition of the capillaries which is the essence of inflammation. It is obvious that there are two ways in which these minute vessels may be restored to their healthy degree of contraction: the first is by lessening the quantity of blood which passes through them; and the second by increasing their elasticity, so as to enable them to contract upon their contents. In most acute inflammations, both these remedies are required. If the inflammation be recent, the capillaries may recover themselves, if once relieved of the undue quantity of blood sent to them by the heart; and in this case the abstraction of blood, or the use of depressing remedies, will suffice; but if the inflammation be chronic, the capillaries may have so lost their elasticity, as not to recover themselves, though the blood circulates through them in diminished quantity; and in this case we must make use of such remedies as restore the lost elasticity of the capillary vessels; and precisely the same treatment is required in that state to which we give the name of congestion.

The treatment of inflammation then is twofold—it consists in diminishing the quantity of blood sent out by the heart on the one hand, and restoring the lost elasticity of the capillaries on the

other. The first indication can be fulfilled only by general remedies, the second by general or by local means.

As the increased action of the heart occurs only in the *acute* form of inflammation, it is in that form only that general remedies are necessary. These remedies are general blood-letting and depressants, of which the best is tartar-emetic. Take, for example, an acute case of pleurisy occurring in a robust man, or in one previously enjoying good health, the treatment is very simple—bleeding to the approach of fainting, or the complete cessation of pain, followed without loss of time by tartar-emetic in such doses and at such intervals as to keep up a constant state of nausea. This is the way to save blood, and to avoid chronic disease. Bleeding alone, even though often repeated, will not suffice to subdue the inflammation, for each bleeding is followed by reaction, and that reaction re-establishes the inflammation. The great principle to be observed in the treatment of all acute inflammation is to subdue it at once, and not to allow reaction. If this principle is not strictly adhered to, chronic disease will be the consequence. M. Louis has taught us a useful lesson as to the inefficacy of mere bleeding in one disease (pneumonia). He found, as every man who knows anything of the treatment of disease would expect, that bleeding—mere bleeding—shortened the duration of the disease only by one day. Of course it did. How was any other result to be expected? The word *reaction* explains it all. Never, then, allow reaction. Subdue inflammation at once, and keep it down till the capillaries have had time to contract to their usual size. If tartar-emetic should fail to subdue the inflammation after one bleeding, which it may possibly do in very plethoric persons, another bleeding must be resorted to, for it is always better to risk temporary debility than chronic disease. In the abstraction of blood one rule should always be borne in mind—to spare the lancet where we can, but to use it boldly where other means fail us.

Such is the treatment of acute inflammation where it is accompanied by strong action of the heart. But this is not present in all cases of inflammation. It is absent in inflammation of the mucous membranes, unless they take on the most acute character, as in croup, or in cases of irritant poisoning; it is absent also in erysipelas, and in many cases of inflammation occurring in persons of a broken constitution. The chief inflammatory diseases which affect the general circulation are those of the serous membranes, acute rheumatism, and extensive inflammation of the cellular membrane, the consequence of injury.

When inflammation of the mucous membranes, however, occurs in its most severe form, general depletion is necessary, especially if the affected membrane line some narrow passage which is apt to be filled with the secretion poured out from its surface. Thus we bleed in croup, partly on account of the existing inflammation, and partly because the narrow passages of the larynx

and bronchia are apt to be filled up by the tenacious secretion poured out from the surface of the membrane. In pneumonia, too, we use the lancet freely for a similar reason; not merely to subdue the inflammation, but to prevent the functions of the lungs being entirely suspended by the arrest of the blood in the small air-cells. There is another case in which we are obliged to employ general remedies, though the existing inflammation does not materially affect the circulation or threaten life; viz., when the part affected by the inflammation is an organ of such extreme delicacy, that the continuance of inflammation in it would destroy its functions. This is the case in inflammation of the internal parts of the eye, when the most active measures are necessary to save the organ from destruction. As a general rule, then, it may be stated, that blood-letting is required when inflammation is accompanied by increased action of the heart, or when some function essential to life is impeded, or some delicate organ threatened with destruction. In most other cases general bleeding will be unnecessary.

The second indication—that of causing the dilated capillaries to contract on their contents—may be accomplished in various ways; locally, by pressure, cold, astringent applications, and the cautious use of substances which themselves cause inflammation, but act as gentle stimulants when applied in small quantity, and for a short period; and generally, by remedies which experience has shown to possess that property. If the vessels are much distended with blood, local depletion is indicated as a preparatory measure. When the capillaries have been by this means partially emptied of their contents, we may apply the remedies just mentioned according to the nature of the inflamed part. Pressure properly applied, gives support to the vessels and gives them time to contract; cold acts on all the textures of the part, on the capillaries as well as on the nerves which supply them; astringent applications cause all the textures to contract, at the same time that they gently irritate the vessels and excite them to the performance of their proper function, viz. elastic reaction; whilst the direct irritants, as nitrate of silver, the sulphate of zinc and copper, &c., prove beneficial simply by their stimulating property. All these applications have been used with advantage—pressure in chronic inflammation and ulceration of the extremities, in swelled testicle, &c.; cold in every form of external and internal inflammation, as in common phlegmonous inflammation of the skin; in the inflammatory sore throat of scarlatina maligna; in the inflammation of the fauces attending hydrophobia; in inflammatory diseases of the rectum and vagina, &c.; astringents in common or specific inflammation of the mucous membranes; stimulants in phlegmonous inflammation of the skin, to the surface of irritable ulcers, to the mucous membranes in the form of injection, &c.

The general remedies which promote the contraction of the

capillaries, (that is to say, remedies which act through the system and not by local application,) are tartar-emetic, mercury, arsenic, and iodine, which act on the capillaries of every part of the body, and certain local remedies which affect particular organs, as uva ursi, copaiba, cubebs, pepper, &c. The first class of remedies, (tartar-emetic, mercury, arsenic, and iodine,) when applied to the skin, excite inflammation; this shows the power which they exercise over the capillaries: they are also capable of being absorbed and taken into the circulation, and consequently they are applied to the capillaries in the most direct manner. Hence, when administered internally, they may be presumed to have the same power of curing inflammation, which nitrate of silver has when locally applied. The cases in which one of these remedies is more applicable than another, are found out empirically. Tartar emetic is to be preferred in common inflammation, mercury and iodine in specific inflammation. Mercury has the preference over all other remedies in cases of great urgency when no time is to be lost, and our object is not merely to subdue existing inflammation, but to suspend specific disease of which it is a part. Hence the use of mercury in iritis, croup, &c. Uva ursi, copaiba, cubebs, and black pepper, are all employed with great advantage in inflammation of the mucous membrane of the urinary passages. They act as direct stimulants through the urine, and when given in sufficient doses, cure gonorrhœa even in its acute stage. Uva ursi is used chiefly in inflammation of the mucous membrane of the bladder; copaiba and cubebs in gonorrhœa, in which disease pepper has been employed by Dr. Billing with equal advantage. Copaiba has also been advantageously employed in cases of bronchitis.

Hæmorrhage differs little from inflammation in the treatment which it requires. Active hæmorrhage demands the same remedies as acute inflammation, and passive hæmorrhage may be cured by the same means which are found useful in some forms of chronic inflammation, viz., astringent remedies, as cold, the preparations of lead, tannin, &c.

The treatment of *febrile affections* is governed by the same general principles which preside over the treatment of inflammation. When they are free from the complication of local disease, and are attended by a frequent, full, and hard pulse, depressing remedies, as bleeding and tartar-emetic, separate or combined, are indicated; but in those cases where there is great prostration of strength, with a small and frequent pulse, tonics or stimulants, according to the degree of the existing debility, will be required. Local disease must be treated by general or local remedies, according to the powers of the system, with the general precaution that the strength of the patient must be husbanded as much as possible in order that he may not be worn out before the disease has run its appointed course. The same remark applies with equal force to those febrile affections of which local inflammations form a

constituent part, as the febrile exanthemata, such as measles, scarlatina, small pox, and erysipelas.

The process of *secretion* is one over which medicines exert much power either directly or indirectly. The most important secretions are those of the lungs, skin, and kidneys. The secretions of the lungs not being subjects of observation or measurement at the bedside, yield in point of importance to the two latter. The nature of the process of secretion, and of the influence which remedies have upon it, will be best understood by selecting the secretion of the skin as an example. When the skin is red, hot, and dry, we can excite perspiration by the cautious application of cold; when it is pale, cold, and dry, by the application of heat. In the one case we diminish the size of the capillaries, and consequently the quantity of blood which they contain; in the latter we increase both. In the same conditions of skin, and in the same states of the system, we can produce the same results by depressants, on the one hand, and by stimulants, on the other. It appears, then, that in the case of this important secretion we can produce the same effect by a local application and by a remedy internally administered. In these cases of local application, the temperature of the skin which is favourable to sweating is intermediate between the two opposite conditions, accompanied by the dry skin. So also, in the case of the general remedies, the temperature of the skin is brought to the same intermediate condition by the depressants on the one hand, and the stimulants on the other. This state of the skin might be termed the "sweating point." It is true that this point is not fixed, for it must vary in different persons, not only with the temperature of the skin and the quantity of blood circulating through the capillaries, but with the condition of the capillaries themselves; so that in strong and robust persons it must be, so to speak, much higher than in those worn out by disease. In extreme debility, it is well known that cold sweats take place from mere relaxation of the capillary vessels, when the temperature of the body is extremely low. It appears, then, that increased secretion from the skin may be brought about by remedies which act upon the general circulation, and this fact may be extended by analogy to other secretions also. Thus, blood-letting practised in a case of inflammatory fever, will promote the flow of all the secretions, by bringing the capillaries of all the organs to what may be termed their secreting point.

In this place it is necessary to enter a protest against the anxiety often entertained by the practitioner to obtain diaphoresis. Sweating is, no doubt, a good sign and a useful thing whenever the skin is hot and dry; but as in the administration of so-called diaphoretics, the sweating is the necessary consequence of the change which has been effected in the general circulation, our anxiety should be not to procure diaphoresis, but to bring the circulation into that state in which sweating is possible. Now this is not

a mere splitting of straws, for by placing ourselves in the proper point of view we are able to make a right selection of our diaphoretic. Thus, when the skin is hot and dry, we select a depressant, when cold, a stimulant, diaphoretic. So also with diuretics, we select a stimulating diuretic in languid states of the circulation, and a depressing one where there is strong febrile action.

It is not meant to assert that all remedies which promote secretion act only through their influence on the general circulation, for the strong analogy which may be drawn from the local action of remedies on the capillaries in inflammation must admit of application to other states of those vessels; and as it is probable that secretion does not depend upon the mere size of the vessels and the quantity of blood circulating through them, but also on the condition of their coats, there is good ground for believing that some remedies act directly upon the capillaries themselves. The virtue of tartar-emetic may, perhaps, depend on the effect which it produces on the capillaries themselves as well as on the general circulation, although in the majority of cases the latter explanation appears sufficient. There is, indeed, one case in which the action of remedies in promoting secretion appears to depend almost exclusively upon the adaptation of the remedy to the quality of the secretion itself. For instance, the urine is a secretion which abounds in salts, and it is well known that saline medicines are of great efficacy in promoting that secretion: the perspiration, too, contains salts though in less quantity; this secretion, therefore, like the urine, may perhaps be increased by the use of remedies of which salines form a part. Thus, Dover's powder may possibly derive part of its efficacy from the sulphate of potash which it contains.

Admitting, then, that the secretions may be promoted both by general remedies and by remedies acting locally on the capillaries of the secreting organ, it is important to distinguish the two cases, and to bear in mind that in disease affecting the general system, it is not so much our object to promote the flow of the secretions as to bring about that state of the circulation in which secretion takes place as a necessary consequence.

The remedies adapted to promote the *absorption* of fluids thrown out into the several cavities of the body, act for the most part through the general system. Of these the most powerful remedy is blood-letting, which acts by diminishing the quantity of the circulating fluid, and, when the cause of dropsy is of an inflammatory nature, by removing the inflammation. The other remedies in common use are employed with the same views. They consist of medicines directed to the several secreting organs, especially the bowels, kidney, and skin. The increased secretion from these parts has the twofold effect of blood-letting—that of diminishing the quantity of the circulating fluid and subduing any inflammation which may exist. Where much general debility is present,

it may be necessary to combine tonics or stimulants (for stimulants are tonics to the debilitated) with depletion. To proportion the one to the other much judgment and care are necessary. The local means best adapted to promote absorption are those which stimulate the capillaries and parts affected, as friction with the hand or with stimulating liniments, a jet of cold water, the electric spark, tincture of iodine, &c. It is of little consequence to inquire whether these agents act by restoring the capillaries to their healthy state, or by stimulating the absorbents. (See p. 46.)

REMEDIES ADAPTED TO THE REMOVAL OF THE SOLID STRUCTURES OF THE BODY.

Morbid growths have been divided (see p. 47) into analogous and heterologous. Experience shows that we have little or no power over the latter class; they form one of the opprobria of medicine, and where they cannot be removed by the knife, we can do nothing more than alleviate the sufferings which they occasion. The same observation extends to such analogous formations as do not consist in a mere hypertrophy of a natural texture. Atrophy and hypertrophy indeed, seem to be the only alterations of the solid structures of the body which are at all under the control of medicine. The remedies applicable to the restoration of a part from the condition of atrophy, are exercise, friction, electricity, and, in short, all those means which increase the flow of blood to the part and promote its natural actions. The remedies, on the other hand, which are of use in hypertrophy, are rest, pressure, cold, local abstraction of blood, preparations of mercury and iodine, &c. The rationale of the action of the first-named remedies is obvious, but there is some difficulty in explaining the efficacy of mercury and iodine in promoting the absorption of solid textures. Are the capillaries contracted by these medicines so as to diminish the quantity of blood circulated through the part, and to a degree which is incompatible with secretion?—or are the absorbents stimulated to increased activity? The former supposition appears the more probable, and is more in conformity with what we know of the functions of the capillary vessels. The question, however, is of no immediate practical importance.

REMEDIES WHICH ACT UPON THE NERVOUS SYSTEM.

As all the functions of the body are more or less dependent upon the nervous influence, it follows that all remedies possessed of active properties must affect the nervous system. All the medicines, therefore, which have already been mentioned under preceding sections, belong with equal right to this. Stimulants, depressants, sedatives, narcotics, and tonics, affect the circulation through the nerves; and even those remedies of which the action is strictly local, act locally on the nerves and through them on the vessels to

which they are distributed. But there are some substances which exert so peculiar an influence on the nervous system, as to demand a separate notice in this place.

The remedies which act upon the *nerves of sensation* are classed by the toxicologist with narcotic or narcotico-acrid substances, but in works on materia medica, they are considered as sedatives. Of these monkshood and black hellebore, and their active principle aconite, are the chief. They produce numbness, accompanied by a tingling sensation in the parts to which they are applied. Hydrocyanic acid also produces numbness of the part to which it is applied. Belladonna, too, acts locally on the nerves of sensation, and hence its efficacy in neuralgia. Its efficacy in dilating the pupil is perhaps due to its effect on the retina. But the best and most powerful remedy for this purpose is cold. It is more sure and manageable than any other, and with proper precautions, may be applied whenever such remedies are indicated.

The *nerves of voluntary motion*, and through them the muscular system, are powerfully affected by remedies in three different ways;—with paralysis, convulsions, and tonic spasms. Extreme debility of the muscles is the familiar effect of all depressing remedies, and especially of tobacco. The same effect is produced by digitalis, and by oxalic acid. Paralysis is produced by various poisons, as the woorara, ticunas, and curare, by large doses of conium and stramonium, and by one metallic poison—lead. Convulsions are produced by almost all the narcotico-acrid and irritant poisons; and they follow poisoning by hydrocyanic acid, digitalis, squills, monkshood, black hellebore, conium, tobacco, stramonium, oxalic acid, &c., and occasionally occur in the course of poisoning with opium; they are also present in poisoning with arsenic, bismuth, copper, mercury, silver, and zinc. Tetanic spasms are produced by nuxvomica, St. Ignatius' bean, by angustura, upas tieuté, and the active principles strychnia and brucia. They are an occasional effect of monkshood, and of the ergot of rye, taken in poisonous doses. The muscular contractions of the uterus produced by the secale cornutum, furnish an example of local action on the muscular fibres of which much advantage is taken in the practice of midwifery.

The treatment of diseases dependent upon, or accompanied by, local affections with reflex action of the muscles is of much importance, and in this respect the theory of the excito-motory system is likely to confer great practical benefits on medical treatment. The importance of attending to the local affections in tetanus and hydrophobia, for instance, can scarcely be overrated. In the latter disease, ice as a local application to the throat, internally and externally, has been recently attended with the best effects.*

* In a case lately admitted into the King's College Hospital, under the care of Dr. Todd.

The medicines which act upon the brain, and affect the peculiar functions of that organ, occasioning sleep, insensibility, coma, delirium, and erroneous perceptions judgments and volitions, are of great importance in the treatment of disease. The mode of action of the most important class, the narcotics, has already been examined (p. 53.) It will be sufficient in this place to mention some of the more striking effects of the principal remedies in common use.

The class of inebriating substances, such as alcohol and spirituous liquors, æther, the nitrous oxide gas, and the resin of the Indian hemp, lately introduced to the notice of the profession by Dr. O'Shaughnessy, produce the effects of stimulants in small doses, the familiar phenomena of inebriation in larger ones, followed by sleep, stupefaction, or apoplexy; when long continued they produce delirium tremens.

The narcotics, of which the principal are opium, (morphia,) henbane, and lactucarium, are employed to relieve pain, when they are called *anodynes*; or to sooth irritation, when they are termed *paregorics*; or to diminish inordinate muscular contraction, in which case they are called *antispasmodics*; or, lastly, to procure sleep, when they receive the name of *hypnotics*. Opium combines a stimulant with a narcotic principle; hence it is admirably adapted to the state of irritation, accompanied with much debility, the narcotic soothing the excitement, whilst the stimulant principle counteracts the existing debility. Sulphuretted hydrogen, carbonic acid, carbonic oxide, and cyanogen gas act also as narcotics. As such carbonic acid has been locally applied.

The class of sedatives comprises many substances allied in some of their properties to the narcotics, and in others to the depressants. They differ from the narcotics in not producing sleep, but, on the contrary, delirium in some of its many forms. Thus belladonna, stramonium, monkshood, black hellebore, veratria, colchicum, and camphor, to which perhaps musk and valerian may be added, give rise to delirium in the first instance, which is sometimes followed after a considerable interval by coma. Tobacco, ipecacuanha, conium, squills, and digitalis, appear to produce coma without previous delirium. Tobacco, ipecacuanha, and squills, have been already described as depressants, and have been shown to have a remarkable effect on the muscular system.

Many of the metallic substances used in medicine appear to exert a peculiar influence on the nervous system. They are remedies which act locally as irritants, and when administered in small doses and during a considerable period, as tonics: as such they have been used with advantage in chorea and epilepsy. Arsenic, copper, iron, silver, and zinc, belong to this class.

Cold has already been mentioned more than once as a remedy of great power. Its effects on the circulation have already been considered (p. 135). These are accompanied by a sedative effect

on the nervous system. But cold produces marked effects on the nervous system without any corresponding effect on the circulating organs. It blunts sensibility, and therefore subdues pain; applied suddenly, it is an effective shock, and rouses both the body and mind. Hence the efficacy of cold water dashed in the face in hysteria, where all that is necessary to remove a paroxysm is strongly to excite attention and an effort at self-control; hence, also, its use in syncope and asphyxia. In the disorder of the nervous system which follows severe inflammatory diseases of the brain, it forms a most effective stimulus, rousing the nervous system, and gradually restoring all the functions of the organ. In cases of violent nervous excitement, on the other hand, it acts as a powerful sedative, allaying the irritation of the nervous system, and reducing the frequency of the pulse, subduing the most violent pain, and infallibly securing sleep. Such are its virtues in the violent paroxysms of mania.

CLASSIFICATION OF REMEDIES.—TABLES OF DOSES, &c.

The principal classes of remedies, with the more important substances contained in each class, have already been pointed out in the previous sections of this chapter. The following summary, which embodies these points of information, will be found of use, and in accordance with the design of a book of reference.

CLASS I. STIMULANTS.—(a) *general* (b) *local*.—*General stimulants* excite all the organs and functions of the body—the circulation, the functions of the brain and nervous system, the secretions, &c. In healthy persons they cause a frequent, full, and quick pulse; in extreme debility they render the pulse less frequent, but more full. The exhaustion which follows the excessive use of them resembles the effects of the depressants or narcotics. *Local stimulants* act on one or more organs of the body, either directly or through the circulation. They excite those organs to the active performance of their appropriate functions, and this excitement is generally accompanied by increased determination of blood. The reaction which follows their abuse shows itself in sluggish function and circulation. In local debility they act as local tonics.

The *general* stimulants in most common use, as medicines, are the various forms and preparations of alcohol, æther, and ammonia, and cold employed as a shock. Amongst the stimulant remedies of less power, are those which are commonly designated antispasmodics, as valerian, assafœtida, musk, &c. To these may be added, serpentary and contrayerva, which appear to combine the virtues of the stimulant and tonic, and are employed with advantage in typhus fever. There are certain remedies also which may be referred to the class of general stimulants, as they are administered by the mouth, enter the circulation, and affect particular systems, and tissues. To this class belong nux vomica and the active prin-

ciples strychnia and brucia, which affect the muscular system by producing tetanic spasms; the metallic preparations, especially mercury, arsenic, and antimony, which appear to act upon the entire capillary system, including the capillaries of the secretory organs; and the balsams, which affect the mucous membranes.

The *local* stimulants comprise those which are applied directly to the body, as heat, the escharotics, and rubefacients, applied to the skin; the stomachics, carminatives, and emetics, taken into the stomach; the several classes of purgatives, applied to the mucous membrane of the bowels: and those which after entering the circulation act only on certain organs, as the sudorifics, the diuretics, the emmenagogues, &c.; and the stimulating remedies so advantageously employed in diseases of the urinary passages, viz. copaiba, and cubebs. Some of these remedies have a specific action upon one part of the frame, as the ergot of rye, which stimulates the muscular fibres of the uterus; whilst others have a more extensive range of action, but affect some one organ in a marked degree, as cantharides, which acts most strongly on the muscular coat of the bladder.

CLASS II. TONICS.—(a) *general* (b) *local*. These are remedies which produce little or no direct sensible effect on the circulation, nor on the more obvious functions of the brain and nervous system. Their action is gradual, and consists, as the term implies, in giving tone and firmness to all the textures of the frame, by improving the state of the blood, or by increasing the elasticity of the capillaries of every part of the body. *General* tonics are either strong stimulants given in small doses, or weak stimulants in larger ones. As they are administered in states of debility, the characteristic effect of the stimulant on the circulation is not perceptible. *Local* tonics are those remedies which restore the relaxed capillaries of parts to which they are applied to their healthy condition. These, too, are stimulants applied with caution, and of strength proportioned to the condition of the parts affected.

The principal *general* tonics are the stronger metallic preparations in small doses, or the less active, as zinc and steel, in larger quantities; the mineral acids, and a variety of vegetable substances, as myrrh, cascarilla, gentian, quassia, serpentary, cinchona, quina, &c. To these must be added, cold applied repeatedly in the form of shock, and followed by reaction. The *local* tonics are nitrate of silver, sulphate of copper, cold in the form of *douche*, &c.

CLASS III. DEPRESSANTS.—The action of depressants is the reverse of that of stimulants. They prostrate the powers and functions of the entire frame. They increase the frequency, but diminish the fulness and force, of the heart's contractions, except where they remove an existing disease accompanied by a frequent, full, and hard pulse: in this case they render the pulse less frequent, smaller, and softer.

The best depressant which we possess, next to blood-letting, is tartar-emetic. The lobelia inflata belongs to the same class. Tobacco is still more powerful, but is a narcotic as well as a depressant. Digitalis, ipecacuanha, squill, and colchicum, possess this quality in a high degree, but with certain peculiarities of action.

CLASS IV. SEDATIVES.—(a) *general* (b) *local*. This class comprises those remedies which soothe excitement of the nervous system, without producing a state approaching to syncope on the one hand, or that of narcotism on the other. They bear to depressants nearly the same relation that tonics do to stimulants. Local sedatives are remedies which blunt nervous sensibility, soothe pain, and allay spasmodic action of the muscular fibres.

Among *general* sedatives cold is the most important. Belladonna, conium, and stramonium, are of the same class. The same substances locally applied are *local* sedatives. Nitrate of potash, tris-nitrate of bismuth, the preparations of lead, and creosote, belong also to this class of *local* sedatives. Depressants in small doses become sedatives, as stimulants in small doses are tonics.

CLASS V. NARCOTICS.—The property of this class is to produce sleep, and when given in poisonous doses coma and apoplexy. Morphia is the type of this class, to which belong carbonic acid, carbonic oxide, and sulphuretted hydrogen gases, hyoscyamus, lactucarium, camphor, (and hydrocyanic acid?) Opium and nutmeg combine a narcotic and stimulant property, whilst the hop is a narcotic and tonic.

In addition to the foregoing classes of remedies, there are other groups of less importance which require only a cursory mention; such are the emollients, the antacids, the antilithics, the anthelmintics, &c. The nature and mode of operation of the substances included in these groups are sufficiently obvious.

TABLE

Showing the doses for an adult of some of the more active and important remedies employed in the treatment of disease.

Acidum arseniosum	...	gr. $\frac{1}{10}$ to gr. $\frac{1}{8}$.
Acidum hydrocyanicum dilutum	m. iii. to m. v.	
Ammoniae sesquicarbonas	...	gr. v. to gr. x.
— liquor...	...	m. v. to f $\frac{3}{4}$ ss.
Antimonii potassio-tartras	...	{ gr. $\frac{1}{12}$ to gr. $\frac{1}{8}$ (sudorific.) gr. $\frac{1}{4}$ to gr. i. (emetic.) gr. $\frac{1}{2}$ increased to gr. iv. (depressant.)
Argenti nitras	...	gr. $\frac{1}{6}$ increased to gr. iv.
Belladonnæ extractum	...	gr. i. gr. v.
— tinctura	...	mii. to miv.

Brucia	...	...	gr. $\frac{1}{2}$ increased to gr. v.
Colchici pulvis	...	...	gr. i. increased to gr. iv. or more.
— tinctura	...	...	℥xx. ʒii.
— vinum	...	...	℥xx. ʒiss.
— acetum	...	...	℥xx. ʒii.
— extractum	...	...	gr. i. gr. iii.
Creosoton	...	...	℥ii. ℥xl.
Cupri sulphas	...	...	gr. $\frac{1}{4}$ to gr. ii.
Digitalis pulvis	...	...	gr. $\frac{1}{2}$ to gr. $1\frac{1}{2}$.
— infusum	...	...	ʒss. increased to ʒss. or more.
— tinctura	...	...	℥x. ʒi. or more.
— extractum	...	...	gr. i. gr. iii.
Elaterii extractum	...	...	gr. $\frac{1}{16}$ to gr. $\frac{1}{2}$.
Ferri sulphas	...	...	gr. iii. to gr. v.
Hydrargyri bichloridum	...	...	gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$.
— iodidum	...	...	gr. i. increased to gr. iv.
— biniodidum	...	...	gr. $\frac{1}{16}$ gr. $\frac{1}{4}$.
— bicianidum	...	...	gr. $\frac{1}{16}$ gr. $\frac{1}{2}$.
Iodinium	...	...	gr. $\frac{1}{2}$.
Lobelia inflata	...	...	gr. i. to gr. v.
Oleum crotonis	...	...	℥i. to ℥iii.
Plumbi acetas	...	...	gr. i. increased to gr. x. or more.
Potassæ liquor	...	...	℥x. to ʒj.
Potassii iodidum	...	...	gr. v. increased to gr. x. or more.
— bromidum	...	...	gr. iv. gr. x.
Quinæ disulphas	...	...	gr. i. to gr. v.
Secale cornutum	...	...	ʒi. to ʒi.
Stramonii extractum	...	...	gr. $\frac{1}{4}$ increased to gr. i. or more,
Strychnia (salts of)	...	...	gr. $\frac{1}{16}$ gr. $\frac{1}{2}$.
Zinci sulphas	...	...	{ gr. i. to gr. v. or more (tonic). gr. x. to ʒss. (emetic.)

TABLE

Showing the quantity of opium and certain preparations of antimony, arsenic, iodine, and mercury, contained in their respective pharmaceutical compounds.

Confectio opii, contains	...	gr. i. of opium in gr. xxxvi.
Linimentum opii	...	gr. iii. fʒss.
Pilula saponis composita	...	gr. i. gr. v.
— styracis composita	...	gr. i. gr. v.
Pulvis cretæ comp. cum opio	...	gr. i. ʒii.
— ipecacuanhæ compositus	...	gr. i. gr. x.
— kino compositus	...	gr. i. ʒi.
Tinctura camphoræ composita	...	gr. ii. fʒi.
— opii	...	gr. i. ℥xix.
Vinum opii	...	gr. i. ℥xix.

PART II.

PRACTICE OF MEDICINE.

CLASSIFICATION OF DISEASES.

IN former editions of this work, Cullen's Nosology was followed; in the present, that order of arrangement is adopted which seems most likely to be useful in a practical work. It is not founded upon any theoretical principles, but is intended to bring together those subjects which have the most obvious connexion with each other.

The subjects are first divided into *general* and *special*. The first division has six subdivisions: 1. Febrile diseases without essential local complication. 2. Febrile diseases arising from local irritation. 3. Febrile diseases with essential local complication. 4. General diseases (not febrile), without essential local complication. 5. General diseases (not febrile), with essential local complication. 6. Local diseases affecting all or several of the textures or organs of the body.

The second division consists of eleven subdivisions: 1. Diseases of the nervous system. 2. Diseases of the organs of circulation. 3. Diseases of the organs of respiration. 4. Diseases of the primæ viæ, organs of digestion, and chylopoietic viscera. 5. Diseases of the absorbent system. 6. Diseases of the urinary organs. 7. Diseases of the organs of generation. 8. Diseases of the organs of sense. 9. Diseases of the skin and its appendages. 10. Diseases of the organs of locomotion; and 11, Parasitical diseases.

The several divisions are treated in distinct chapters, an arrangement which is adopted solely on account of its convenience, and not in pursuance of any general theory. The subjects contained in the several subdivisions are placed at the head of the respective chapters.

GENERAL DISEASES.

CHAPTER I.

I.—FEBRES. FEVERS.

GENERA.

Continued Fevers.

- | | |
|--------------|---------------------|
| 1. SYNOCHA. | INFLAMMATORY FEVER. |
| 2. TYPHUS. | NERVOUS FEVER. |
| 3. SYNOCHUS. | MIXED FEVER. |

Intermittent Fevers.

- | | |
|----------------|------------------|
| 1. QUOTIDIANA. | EVERY-DAY AGUE. |
| 2. TERTIANA. | THIRD-DAY AGUE. |
| 3. QUARTANA. | FOURTH-DAY AGUE. |

Remittent Fevers.

- | | |
|------------------------|------------------|
| 1. FEBRIS REMITTENS. | MARSH REMITTENT. |
| 2. SYNOCHUS ICTERODES. | YELLOW FEVER. |

CONTINUED FEVER.

Definition.—After shivering, languor, weakness, and loss of appetite, increased heat and frequency of pulse, great debility of the limbs, and disturbance of most of the functions, without well-marked remissions, and without primary local disorder.

SYNOCHA.—INFLAMMATORY FEVER.

GENERIC CHARACTER.—After chilliness or rigors, a steady and great increase of heat; pulse strong, large, and frequent; urine high-coloured, and deposits a red sediment; the functions of the mind not disturbed; little diminution of muscular power; tending generally to terminate in sweating.

SYMPTOMS.—Lassitude and general anxiety coming on, for the most part suddenly, with sickness and perhaps vomiting, with frequent and feeble pulse, succeeded by headache, pain in the back and loins, rigors, or cold shiverings, terminating in a violent and continued heat; the countenance is flushed; there is pulsation of the temporal and carotid arteries, intolerance of light and sound, great sense of weight in the head, a suffused redness of the eyes and skin generally; the pulse is frequent, strong, and regular; great thirst; white tongue; scanty and high-coloured urine, depositing a red sediment; costiveness; morbid sensibility, and intolerance of usual impressions; hurried respira-

tion; extreme anxiety; dull pains in the limbs; an exacerbation in the evening, or at night. In favourable cases recovery takes place by critical evacuations; in unfavourable ones, typhoid symptoms come on when the fever becomes the synochus of Cullen.

CAUSES.—*Predisposing*.—Plethoric habit of body, with a strong muscular system, a good and unimpaired constitution.

Exciting.—Sudden alternations of temperature, as the application of cold to a heated body; violent exercise; intemperance; the suppression of usual evacuations; repulsion of eruptions; strong passions of the mind; the free use of vinous or spirituous liquors; contagion.

DIAGNOSIS.—*From Typhus*.—By the more sudden accession of the disease, by its arising from the common causes above enumerated, as well as from contagion; by the *strength* and *hardness* of the pulse; by the *whiteness* of the tongue; by the *high* colour of the urine, and its affording the lateritious sediment; and by the slight disturbance of the functions of the mind.

PROGNOSIS.—*Favourable Symptoms*.—About the seventh day a moisture appearing upon the skin, succeeded by an universal and natural perspiration; hæmorrhage from the nose; the appearance of scabby eruptions about the mouth and ears; suppuration of glandular parts; the formation of abscesses; diarrhœa; the urine depositing a furfuraceous or lateritious sediment; diminished sensibility: the pulse more slow and soft.

Unfavourable Symptoms.—Intense pain in the head, with violent delirium; extremely laborious respiration; strong, hard pulse, and other symptoms indicating excessive action, by the inordinacy of which the disease usually proves fatal; or by a determination to internal organs, when the disease ceases to be synocha, and runs into phrenitis, pneumonitis, hepatitis, or an inflammation of some other viscus; picking the bed clothes; hiccup; subsultus tendinum or starting of the tendons; involuntary evacuations. Recovery may, however, happen under all these circumstances.

Terminations.—In recovery by critical evacuations, in local inflammation, or in typhoid symptoms, (the *synochus* of Cullen).

Morbid Appearances.—Traces of local inflammation in some of the internal organs.

TREATMENT.—*Indication*.—To lower excessive action.

1. By rest, and diminishing or removing those natural impressions, which, in the febrile state, become morbid stimuli; such are impressions upon the senses, the exercise of the mind, food, light, and sound, the contents of the intestinal canal, &c.

2. By diminishing the quantity of the circulating fluids, and lowering the tone of the vascular system: this is to be effected by bleeding, depressants, laxative clysters, saline purgatives, cold ablution, sponging with cold fluids, cooling drinks, free ventilation, light bed-clothes, &c.

At the commencement a copious and rapid evacuation of blood

will generally be necessary, and subsequent smaller bleedings are to be instituted according to the strength and hardness of the pulse and the urgency of the symptoms. If there is much head affection, leeches may be applied to the temples, and cold lotions or ice to the head. The rule with regard to venesection in this and all cases is, that we should be guided by the effect produced, and not by the quantity of blood abstracted, and therefore we can never prescribe the exact amount to be taken. One person will faint on the removal of $\frac{3}{4}$ vj., and another will bear the loss of $\frac{3}{4}$ lx. Whenever blood-letting is required, the patient should be placed in the sitting or erect posture, a free orifice should be made in the vein, and the blood should be allowed to flow till the approach of syncope. The effect produced should be followed up immediately by tartar emetic, in doses varying from one-eighth to a sixth of a grain, according to the severity of the symptoms. The test of its favourable action will be a lowering of the strength and hardness of the pulse, a diminution of external heat, and an increase of the secretions, especially of the perspiration.

Local complications must be treated in the same way as idiopathic diseases of the organs affected. If the disease assume the typhoid character, it must be treated by the remedies appropriate to typhus.

TYPHUS.—NERVOUS FEVER.

SYNONYMES—PRISON, JAIL, HOSPITAL, CAMP FEVER.

GENERIC CHARACTER.—Contagious pyrexia; heat but little increased; pulse weak and small, and in general frequent; urine little changed; the mental functions much disturbed; great prostration of strength.

In general the heat is but little increased at first; but in some cases of typhus, the heat is great and peculiar, leaving an unpleasant penetrating sting or sensation on the fingers.

Species.

- | | |
|----------------------------|------------------------|
| 1. <i>Typhus mitior</i> , | The low nervous fever. |
| 2. <i>Typhus gravior</i> , | The putrid fever. |

TYPHUS MITIOR.—NERVOUS FEVER.

SYMPTOMS.—Languor and lassitude, in general beginning gradually; dejection of mind; loss of appetite; alternate chilliness and flushing; dulness and confusion of thought; in a few days giddiness and pain in the head, with aching pains over the body; nausea and vomiting; short, anxious respiration: frequent, weak, and often intermittent pulse; at first the tongue is moist and covered with a whitish mucus, but afterwards becomes dry, brown,

and tremulous ; there is little thirst ; the urine is pale and watery ; low, muttering delirium, arising from the torpid state of the sensorium, inducing indistinct or ill-associated ideas.

As the disease advances, the heat often becomes very great, rising several degrees above the healthy standard ; the tongue dry and brown or morbidly red ; drowsiness, frightful dreams, eyes contorted, answers slowly given ; delirium, from a determination of blood to the head, indicated by the suffused redness of the eyes, the flushed countenance, the throbbing of the temporal arteries ; pulse intermittent or irregular ; scanty, high coloured, and fætid urine ; sometimes a disposition to immoderate sweating ; diarrhœa ; subsultus tendinum, coma, involuntary excretions, cold extremities, convulsions, death.

CAUSES.—*Predisposing*.—Weak and delicate habit of body, accompanied with much sensibility and irritability ; a studious and sedentary life ; depressing passions of the mind ; poor living ; too free indulgence in the use of spirituous liquors ; excess in venery ; profuse evacuations ; warmth of climate, cold and wet seasons.

Exciting.—Contagion ; intemperance ; exposure to cold and wet ; those causes which in constitutions so predisposed would induce synocha.

DIAGNOSIS.—*From typhus gravior*.—At the commencement, by the attack being gradual, and the symptoms much more mild. (vide Typhus gravior).—In the progress of the disease, by the absence of those symptoms of putrescency enumerated in typhus gravior, and by its being accompanied by less heat and thirst, less frequency of pulse, and no bilious vomitings.

PROGNOSIS.—*Favourable Symptoms*.—About the seventh, fourteenth, or twenty-first day, the tongue peeling and becoming moist, first at its edges, afterwards on its surface ; a moisture breaking out upon the skin ; a gentle diarrhœa ; salivation, not unfrequently accompanied with aphthæ ; the pulse becoming fuller and more slow ; the cessation of delirium, with some return of sleep and appetite ; the appearance of scabby eruptions about the mouth, or of phlegmonous tumors in different parts of the body ; the urine increasing in quantity, and depositing a sediment.

Unfavourable Circumstances.—All those indicating extreme debility ; as diminished energy of the brain, marked by a continued state of insensibility or confusion of intellect, with low muttering delirium ; muscular debility, indicated by the presence of convulsions, subsultus tendinum, tremulous motion of the lips, tongue, and other parts ; impeded deglutition ; by the patient lying prostrate on his back with extended arms, or insensibly gliding down to the bottom of the bed ; falling of the lower jaw ; involuntary evacuations ; small, rapid, intermittent pulse ; hiccup ; partial sweating about the breast and head ; a peculiar yet indescribable expression of anguish in the countenance ; picking of the bed-clothes ;

catching at imaginary objects in the air. All these symptoms may occur, and recovery happen; but in general they are fatal.

Morbid appearances.—In simple or mild typhus there is no morbid alteration discoverable on examination after death; but in complicated cases, there is often disease in the head, chest, or abdomen. The local complications of most frequent occurrence are inflammation and ulceration of the mucous membrane of the intestines, pneumonia, and inflammation of the membranes or substance of the brain.

TREATMENT.—*Indications.*—I. To remove all existing causes of irritation.

II. To diminish febrile excitement at the same time that we support the strength of the patient.

The *first indication* is fulfilled by the operation of an emetic, followed by a saline aperient; by complete rest of mind and body, and by external quiet.

The second indication is best fulfilled by such remedies as do not produce permanent debility: general blood-letting should be avoided, and local depletion sparingly employed; existing fever should be subdued by depressants in small doses, a strict farinaceous diet, cold drinks, fresh air, and free ventilation. Local symptoms should be carefully watched, and treated on the same principles. The head should be shaved, and cold should be applied according to the severity of the existing symptoms; the bowels should be gently acted on by the milder mercurial preparation, as the hydrargyrum c. cretâ, followed by small doses of castor oil, or of the saline aperients. If the heat of the skin rises above the natural standard, cold sponging should be used. Towards the close of the disease, when much debility is present, tonics, stimulants, and nourishing diet, according to the degree of debility, should be had recourse to.

TYPHUS GRAVIOR.—PUTRID FEVER.

SYMPTOMS.—The attack of this disease is much more sudden than that of the preceding, and its progress more violent and rapid; the rigors are extremely severe; the prostration of strength greater and more early, and the expression of anguish and horror more acute; the heat of the skin is often moderate, though in some instances it rises early in the disease, as high as 108 degrees of Fahrenheit, and conveys a peculiar stinging or burning sensation to the touch; the pulse is frequent, small, and sometimes hard; nausea and bilious vomiting; intense pain in the head; singing in the ears; preternatural throbbing of the temporal and carotid arteries; ferreted redness of the eyes; extreme anxiety; violent delirium; the tongue is dry and covered with a brown or black crust; the breath is hot and offensive; foetid sordes accumulate about the teeth and lips; the urine, at first pale, then becomes

extremely high-coloured and fœtid, and in the last stage of the disease often deposits a dark or black sediment.

In the advanced stages hæmorrhages break out from different parts of the body; blood is effused under the skin, forming petechiæ, maculæ, and vibices. The excretions become involuntary, and extremely offensive; the fæces black, the urine passed in bed, or retained; the features are changed and sharpened; there is great prostration of strength, difficult deglutition and respiration;—gangrenous aphthæ appear about the mouth and throat; the pulse sinks and intermits; the extremities grow cold, and covered with a viscid cold sweat; hiccup ensues; and death soon follows.

Morbid appearances.—Putrefaction rapidly advancing, mucous membrane of the lungs and intestinal canal softened or gorged with a thin black blood. Results of inflammation in some cases observable in the head, chest, and abdomen; in other instances there is no disorganization apparent, but a rapid tendency to decomposition of the viscera and other parts of the body. The most common morbid appearance is ulceration of the intestines.

CAUSES.—*Predisposing.*—All those causes inducing debility already enumerated under typhus mitior; want of cleanliness; confined air; close and humid state of the atmosphere.

Exciting.—Contagion, if not the only, is the chief exciting cause. It has been frequently traced to contagion; but has never been satisfactorily traced to any other cause. It is true that it occurs in the midst of poverty, want, and filth, and especially in badly-drained streets and alleys, and ill-ventilated houses; but as these are the situations in which contagion is most likely to lurk, the coincidence of fever with these conditions cannot be admitted as a proof that they are alone sufficient to produce it. The question is a difficult one, but fortunately of no practical importance. The same hygienic precautions which will remove the assumed causes will also prevent the concentration of infection.

A disease resembling true typhus may be produced by other causes besides contagion. Thus, local inflammation occurring in broken constitutions sometimes produces general febrile symptoms, allied in character to those of typhus; such is also the case with synochus occurring in unhealthy persons. The febrile symptoms which accompany pneumonia sometimes take the same shape, and severe and long-continued inflammation of the mucous membrane of the intestines in rare instances takes on the same character. Typhus may also supervene on all deep-seated inflammations, in severe burns, wounds, fractures, phlebitis, dissection wounds, local injuries, and eruptive fevers. The history of the case, however, will generally suffice to distinguish idiopathic fevers of all kinds from the effects of local inflammations.

MM. Gaspar and Magendie caused symptoms similar to those of typhus by injecting putrid matter into the veins of animals; and the more concentrated was the poison the more violent the fever, and the local inflammation which succeeded it.

DIAGNOSIS.—*From typhus mitior.*—Vide Typhus mitior.

From synocha.—By the sudden and great prostration of strength which ensues on its first attack; by the brown or black tongue; the livid flush of the countenance; the black and fœtid sordes about the teeth; the less degree of strength, yet greater frequency and hardness of pulse; the acrid and more intense heat of the skin; the symptoms of putrescency above mentioned.

PROGNOSIS.—*Favourable.*—The countenance preserving nearly its natural state, the look firm and clear, and the face not attenuated. A crisis accompanied with any of the symptoms mentioned under typhus mitior; an abatement of febrile heat and thirst; a gentle, warm moisture diffused equally over the whole surface of the body, succeeded by increased fulness and strength, with diminished frequency, of pulse; the absence of delirium and stupor; the prostration of strength not great; the petechiæ or hæmorrhages being of a florid red colour.

Unfavourable.—In addition to those already enumerated as marking extreme debility in typhus mitior, the peculiar appearance of the patient; his eyes inflamed and staring, his speech thick, the sound of his voice altered; extreme anxiety and perpetual watchfulness; increased vascular action and diminished muscular power; high delirium; loss of sight; dry, black tongue; nausea, or constant vomiting; fœtid and involuntary excretions; passive hæmorrhages; dark-coloured, livid, petechial eruptions; yellowness of the skin; tension of the abdomen; black and gangrenous aphthæ, gangrene of blistered places; partial cold and clammy sweats; cadaverous smell of the whole body.

TREATMENT.—*Indications.*—I. To moderate fever. II. To subdue local inflammations, and relieve local congestions. And, III. To support the patient's strength.

I. The first indication must be fulfilled at as little expense of strength as possible. If general bleeding appear necessary, blood should be withdrawn from a large orifice, and in the erect or sitting posture, so that the greatest effect may be produced with the least loss of blood. But depletion will rarely be required in cases of typhus fever, except in plethoric persons, when the system, previous to the invasion of fever, was overloaded with blood. Depressants in small doses, gentle aperients, cool air, cooling drinks, and cold sponging, where the surface is hot and dry, will suffice to subdue any degree of fever present in cases of typhus.

II. Local inflammations and congestions must be subdued or relieved by as small an expenditure of blood and strength as possible. The application of a few leeches, cold lotions, or mustard poultices, as counter-irritants, will go far in the removal of local complications. The lancet must be employed rarely and with great caution.

III. As the patient's strength requires to be economised during the first stage of fever, so does it require to be supported in the

last stage. Stimulants must be administered with care and caution, our selection and the dose employed being proportioned to the existing debility. Where the debility is not extreme, the remedies belonging to the class of tonics, such as quinine, mineral acids, and the infusions of cusparia or serpentaria, may be given. In greater degrees of debility the diffusible and spirituous stimuli should be preferred, such as ammonia, spirits of sulphuric or nitric æther, wine, brandy, &c. Ammonia may be used with great advantage in those cases where some doubt is entertained of the propriety of administering stimuli. Its effects being of short duration, should it be found to raise the pulse or increase the fever, it may be withdrawn, without leaving behind it any permanent bad effects. The choice of stimulants should be determined by the degree of the debility, the amount of febrile action, the presence or absence of local affection, and the character of the pulse. When the pulse is frequent, hard, and quick, stimulants are contra-indicated; but when the pulse is frequent, small, and compressible, or infrequent and compressible, stimulants may be given with safety. When stimulants render a frequent pulse less frequent, or but slightly increase the number of an infrequent one, they may be safely administered. The practitioner will do well to visit patients labouring under fever soon after the administration of the first dose of the stimulant, and ascertain by these simple tests, whether or not the treatment he is adopting is a safe one. A dry tongue, great thirst, a flushed countenance, and a hurried respiration, also, forbid the use of stimulants. In opposite states they may be employed with advantage.

Another indication is often added to the preceding—that of “obviating the putrid tendency of the fluids.” There is one sense in which the fluids in typhus have a putrid tendency—they undergo rapid decomposition as soon as they are removed from the body, and the discharges are generally extremely offensive. This indication, therefore, may be added to the foregoing. It may be fulfilled by improving the condition of the blood. The blood in typhus is found to be poor in solid animal ingredients and in salts. The only means of supplying the first deficiency is by such articles of diet as are likely to find their way into the circulation, even without undergoing the process of digestion. The farinaceous liquids, and the lighter broths, are to be preferred for this purpose, and these may be administered either by the mouth, or by injection, or in both ways. The deficiency of salts may be supplied by saline drinks, such as imperial, nitrate of potash in barley-water, &c. or saline effervescing draughts. The acescent fruits, such as lemons, oranges, grapes, roast apples, &c., from their acknowledged efficacy in sea-scurvy, may be employed in fever with the effect of improving the condition of the fluids.

The patient should, at the same time, be placed in those circumstances which are known to be most favourable to health. The

utmost attention should be paid to cleanliness, excretions should be promptly removed, the linen should be frequently changed, the sick chamber should be well ventilated and fumigated by sprinkling the room with vinegar or camphorated spirits, or a solution of chloride of lime or soda. If hæmorrhage occur, the acidulated infusion of roses, or the mineral acids in combination with tonic infusions or stimulating remedies, are indicated.

In cases of extreme restlessness, cold applications to the head, and a stream of warm or cold water poured from the height of a few inches, upon it, will often procure sleep where other remedies fail. Opium is inadmissible where the functions of the brain are already much disturbed, but cold thus applied is not counterindicated in any condition of the system. In using it, its effects should be narrowly watched, and the hand should be kept on the pulse. Its application should be gradual, as a shock, however slight, may prove fatal in one already greatly exhausted by disease. In extreme debility, great care should be taken to prevent all sudden changes of position; and in any case it would be better to apply this remedy whilst the patient is in the recumbent posture. This may be easily done by putting a mackintosh round the patient's neck, and conducting the water as it flows over the head into a vessel placed for its reception.

SYNOCHUS.—MIXED FEVER.

This is a compound of synocha and typhus. It commences with some of the symptoms of the former, and terminates in those of the latter. At first the pulse is strong and hard, the tongue white, the urine high-coloured; soon, however, the tongue becomes yellow, then brown; the pulse loses its strength, yet retains its hardness, and becomes more quick; prostration of strength supervenes; and the disease assumes the form of typhus mitior, or gravior, as certain predisposing circumstances of constitution, or of cause, may happen to be present.

The *treatment* has been already fully described. In the commencement, it will be that laid down for the cure of inflammatory fever: the utmost caution must however be employed in the use of those means which lower the tone of the system, especially bleeding, so that sufficient strength may be left to combat the succeeding stage, in which the treatment of typhus must be employed.

ADDITIONAL OBSERVATIONS ON CONTINUED FEVER.

The subject of continued fever is too important to be dismissed without some attempt to present it in a more general point of view, free from those minute distinctions which only tend to produce confusion. There is a synocha, a synochus, and a typhus; that is to say, there is a form of continued fever with high action, and a

tendency to *acute local inflammations*; a form of fever with low action and a tendency to local *congestions*; and a third form, beginning with high action and ending in low action. Now all these forms of fever have been observed in the same city in different epidemics. In Edinburgh, for example, continued fever took the form of synocha in the early epidemics of 1817—20; it assumed a character more nearly allied to synochus in 1826—9; whilst in the latter epidemics, it has put on the character of typhus from its first invasion. Nevertheless, all these epidemics have agreed in two essential points—they were all continued fevers, and were all distinctly referable to contagion. Their minuter differences arose from causes little understood, but their increasing severity and fatality both in Edinburgh and Glasgow may be safely attributed to increasing poverty and destitution.

A few observations on continued fever in general, arranged under distinct heads, cannot fail to be useful to the practitioner.

Nature of continued Fever.—It is now almost universally admitted, that continued fever is a general disorder or disease of the system not caused by local inflammation, though this is a frequent but not an invariable consequence. The phenomena of the first stage of this fever are exactly similar to those of an intermittent, but in a minor degree and of longer duration. We observe a cold stage ushered in by rigor or shivering, languor, and lassitude, disinclination to mental or corporeal exertion, loss of appetite, constipation, urine diminished, surface of the body cold and pale, pulse smaller and weaker than in health, more or less headache, obtuse pain in the back or limbs, as after fatigue; all which symptoms depend upon a diminished energy of the sensorial and nervous power, and clearly prove that the cerebro-spinal, or brain and nervous system are deranged; and hence most writers maintain that the brain and nervous system are primarily affected in all idiopathic fevers. These symptoms may continue for three or four days, constituting the first stage or period of congestion; and now the system rallies, the *vis medicatrix naturæ*, or inherent power in the system to remove or combat all diseases, is exerted, and the state of reaction or excitement is induced, which may continue from the fifth or sixth to the twelfth or fourteenth day. During this period all the functions of the body are excited, the sensorial powers are active, there is increased headache, intolerance of light and sound, great restlessness and irritability, flushed face, rapid pulse, hot skin, great thirst, &c. This state corresponds to the hot stage of an intermittent, but is of longer duration; and the hurried circulation may induce inflammation in any part of the body predisposed to disease, and especially in the vascular organs, as the brain, lungs, and abdominal viscera, the gastrointestinal mucous membrane, spleen, kidneys, or uterus. Local inflammation therefore is the consequence and not the cause of fever. Daily observation incontrovertibly proves that fever may

go through its whole course without inducing local inflammation, though this is a frequent complication. Inflammation will appear in different organs according to the predisposition of the patient; it will attack the brain in one, the lungs in another, the digestive system in a third, and so on. The complication of fever with local inflammation of vital organs renders the disease highly dangerous, and the treatment extremely difficult. This frequent complication has also thrown doubts on the real nature of fever. Some observers, as those of Paris, witnessing epidemics in which gastro-intestinal irritation exists in the majority of cases during life, and a peculiar affection of the glands of the intestines after death, have regarded this state of the intestinal canal as the essential cause of fever; hence the theory of Broussais: others, again, in our own country, having observed cerebral complications in the majority of cases have assumed them to be the cause. There is no real ground for these theories, and the majority of medical men are now convinced of their fallacy. There is every reason to anticipate an entire unanimity of opinion on this subject, as all the best and most recent authorities agree in representing fever as an essential disease, *sui generis*, liable to be complicated with, but not caused by, local affections.

Cause of Fever.—A similar agreement seems likely to take place as to the cause of fever. Synocha, synochus, and typhus, are all held, by the best authorities, to be communicated from one person to another, the peculiar character of the fever being determined by the season, the epidemic constitution, as it is called, and the condition of those whom it attacks. It is not, however, denied that local disease may give rise to febrile symptoms difficult to distinguish from those of true continued fever.

Laws of Infection.—1. "All the forms of primary continued fever are communicable, and probably in an equal degree." 2. Fever is probably communicable to all constitutions, though after very variable periods of exposure. 3. The infection is by no means virulent, requiring in most cases concentration of the infection itself, and long exposure to it. 4. The infection operates with greatest certainty where cleanliness and ventilation are neglected, and on persons whose bodies are enfeebled by privation. 5. One attack of fever is in some measure a protection against future ones. (Dr. Tweedie, Physician to the London Fever Hospital, has had it three times, and Dr. Christison of Edinburgh, six times.) 5. The existence of other febrile or inflammatory diseases acts as a protection as long as they last, but they probably leave behind them a greater susceptibility. 6. "The infection of fever takes effect on an average more readily among those who are constitutionally infirm than among the robust." 7. "The infection of fever diminishes in effect as life advances." 8. "The sexes seem equally exposed to receive infection." 9. The poison of fever is very apt to take effect under the casual co-operation of cold, fatigue, excesses, and

other occasional causes of the febrile inflammations. 10. "The ravages of fever are invariably promoted by all circumstances of national or public poverty and distress." 11. "Fever is probably apt to extend its devastations with peculiar impetuosity in localities which are damp or exposed to noisome effluvia, arising from organic matter in a state of decay." 12. "In regard to fever, it seems probable that fomites (substances by which infectious effluvia are absorbed) do not contribute much to its propagation, and that infection is not retained by them long." (Christison, *Libr. Pract. Med.* vol. i. p. 158, et seq.)

STATISTICS OF FEVER.—Influence of age on the prevalence of the disease.—From 5 to 10 years, 1 in 134 of the population living at that age; from 10 to 15, 1 in 66; from 15 to 20, 1 in 41; from 20 to 30, 1 in 53; from 30 to 40, 1 in 85; from 40 to 50, 1 in 140; from 50 to 60, 1 in 271; and above 60, 1 in 929. The chance of seizure between 15 and 20 being represented by 100, it becomes in round numbers between 20 and 30, 78; between 30 and 40, 49; between 40 and 50, 29; between 50 and 60, 15; and above 60, $4\frac{1}{2}$. (From data supplied by Dr. Cowan, for the epidemic of Glasgow in 1836.)

Influence of Sex.—Males, 49·5 per cent.; females, 50·5 per cent. (Glasgow epidemic). Males, 43 per cent.; females, 57 per cent. (Edinburgh epidemic of 1819). It must be borne in mind, that females are more employed about the sick than males. When this is taken into account, the influence of sex will appear considerable.

MORTALITY OF FEVER.—Order of fatality.—Synocha rarely fatal, synochus more frequently, typhus most frequently of all. Ex. In the Edinburgh epidemic of 1817—20, which presented the inflammatory character (synocha) the mortality was 1 in 22, 1 in 25, or 1 in 30; but in the recent epidemics of Edinburgh, which have assumed more and more of the typhoid or adynamic character, the mortality has been 1 in 10·33 (epidemic of 1826—7); 1 in 10 (epidemic of 1837); and 1 in 6·27 (epidemic of 1838). The following is the mortality observed in various epidemics in this climate. In Edinburgh, from the year 1817 to 1838, the mortality ranged from 1 in 30 to 1 in 6·27; in Glasgow in the epidemic of 1835—37, from 1 in 15 to 1 in 10; in Manchester from 1818 to 1828, from 1 in 11·75 to 1 in 6·66, the average mortality for the whole period being 1 in 8·25; in the London Fever Hospital, during the same number of years, from 1 in 10 to 1 in 5, the average of the whole period being 1 in 6·50. In the year 1816, according to Dr. Marcet, one-fourth of all the fever cases admitted into Guy's Hospital died; whilst one-half of all the seizures proved fatal in Dr. Willan's experience at the Carey Street Dispensary. In the Parisian fever, complicated with gastro-enteric affection, the mortality, according to Louis, has been as high as 1 in 2·9.

Mortality at different ages.—In the Edinburgh epidemic of

1818—20, in which the mortality was 1 in 22 for all ages, the deaths under 20 were 1 in 65; between 20 and 30, 1 in 29; between 30 and 40, 1 in 18; between 40 and 50, 1 in 11·4; and between 50 and 60, 1 in 6. These numbers represent the general rule, but this rule is liable to exception. Thus, in the London Fever Hospital, during the years 1828—9, when the general mortality of the hospital was 1 in 7·22, that for children under 15 was as high as 1 in 7·33; between 15 and 30, 1 in 9·5; between 30 and 50, 1 in 7·33; and above 50, 1 in 2·5.

Mortality in the two sexes.—According to the tables of Dr. Cowan of Glasgow, founded on an examination of 2,259 patients, the deaths for all ages amount to 1 in 6·75 among the males, and only 1 in 11·2 among the females; below puberty the proportion is 1 in 25 for boys, and 1 in 28 for girls. Dr. Welsh's tables, formed from 743 patients, observed in the Edinburgh epidemic of 1817—20, give 1 in 16 for males, and 1 in 30 for females; under 20 years of age the mortality for both sexes was 1 in 68; above 20, for men, 1 in 11, for women, 1 in 24. This disparity after 20 is ascribed by Dr. Christison, and with apparent justice, to the greater prevalence of intemperance among men.

Duration of continued fever.—From tables contained in Dr. Davidson's Thackery Prize Essay, it appears that the duration of synocha (by him named febricula), in 30 cases, was from 3 to 10 days, the average being 8 days for males and females; whilst the duration of eruptive typhus, calculated from 181 cases, was 19·7 days for males and 21·3 days for females, the average for the two sexes being 20½ days. The least duration in males was 12 days, the greatest 29 days; in females the least duration was 13 days, the greatest 54 days. The duration of the disease is calculated from its commencement to the establishment of complete convalescence.

Critical days.—The ancient doctrine that favourable cases of fever have a decided tendency to terminate on certain days, called critical days, has lately been confirmed by the observations of Dr. Welsh in the Edinburgh epidemic of 1819. The critical days are 3, 5, 7, 9, 11, 14, 17, 20; the non-critical are the intervening days, with the exception of the 4th and 6th, which are considered as secondary critical days. Of 690 cases, a crisis took place in 470, on critical days; in 52, on the secondary days; and in 108, on non-critical days. The cases included all the forms of fever.

Secondary affections in continued fever.—*Head affections.*—These consist in inflammation of the membranes of the brain, and more rarely of its substance, in cases of synocha or inflammatory fever; and of *congestion* in cases of typhus. This congested state of the vessels occurs more or less in all cases of typhus fever in this country, but appears to be of much less frequent occurrence in Paris. It is indicated by dingy redness of the skin of the face, increased heat of the integuments of the face and scalp, and minute injection of the

conjunctiva of the eyes with dark blood, an extreme degree of stupor, constant muttering delirium, increased frequency, with great feebleness of pulse, irregular distribution of heat over the surface of the body, a dark, dry, furred tongue, protruded with difficulty, and slowly withdrawn,—all the symptoms, in short, of typhus in its most aggravated form. *Chest affections.*—*Catarrhal symptoms* often occur very early in the disease, arising from the same state of congestion of the vessels of the air-passages which exists in the membranes of the brain. This complication is indicated by cough, at first dry, and afterwards accompanied with clear mucous expectoration; there is slight dyspnoea and the ear detects the mucous rhonchus. This affection, though of frequent occurrence in some epidemics, is rarely attended with much danger, and in favourable cases is soon and easily subdued. *Pneumonia and pleurisy* may also occur as secondary affections. Their symptoms are apt to be masked by the torpor of the senses and of the mind, which renders the patient insensible to pain. The stethoscopic signs are the same as in idiopathic affections of the same kind. Aphthous ulceration of the mouth and throat, cynanche tonsillaris, cynanche laryngea, and cynanche parotidea, are of occasional occurrence. The latter may often be regarded as a favourable symptom. *Affections of the abdomen.*—*Gastritis.* Patients are often affected, towards the end of the first and beginning of the second week, with sickness, vomiting, and pain and tenderness in the epigastrium. These symptoms differ in no respect from those of idiopathic gastritis. The pain, which is rarely severe in the idiopathic gastritis, is only made apparent by deep pressure. When it is complicated with severe head-affection, it is necessary to watch the expression of the patient's countenance, as this will often betray uneasiness when he does not complain of pain. *Enteritis.*—This affection is indicated by distension and firmness of the abdomen, pain and tenderness on pressure, and yellow diarrhoea. This latter symptom, however, is not always present. The same remark applies to the tenderness in enteritis as in gastritis, and the same means must be used to ascertain its existence. Inflammation of the mucous membrane and its consequences are much less constant accompaniments of typhus in this country than in the epidemics of Paris, of which it forms one of the distinctive characters. The inflammation, when it occurs, may assume the common form of idiopathic inflammation, or may consist in a peculiar affection of the glands of the intestines, presently to be noticed. Perforation of the intestines sometimes occurs. *Hepatic disorder*, accompanied by jaundice, is another complication. All the other viscera of the abdomen are subject to occasional congestion or inflammation.

The skin.—The skin is the seat of various secondary affections in typhus fever. These are various forms of *petechiæ*, and a peculiar *measly* eruption. Dr. Christison describes the following forms of skin affection. 1 Small, pale-brown, lenticular spots, without

elevation or roughness of the skin, and much resembling freckles. This is rare, and met with only in advanced stages of bad synochus or typhus, for a short time before death. 2. Small, dark, reddish-looking, roundish, circumscribed, and often closely-crowded spots, without elevation of the skin, and closely resembling flea-bites, but without the dark point in the centre which characterises the flea-bite. Their usual seat is the head, shoulders, forearms, and legs. They occur most commonly in synocha, and generally make their appearance towards the close of the first or beginning of the second week. 3. Spots, more or less numerous, of a pale lake-red or rose-red tint, irregular in shape, not distinctly circumscribed, but rather diffuse round the edge, with sufficient elevation of the skin to impart a sense of roughness to the finger. They present some resemblance to measles, and are occasionally difficult to distinguish from it. They are usually most abundant over the chest, shoulders, forearms, legs, loins, flanks, and abdomen; and they often exist on the abdomen, when they are not to be found elsewhere. They occur in some epidemics with much regularity on the fourth day; in others, on the seventh; and they are peculiar to typhus. M. Louis states that they are an invariable concomitant of the intestinal disease which he considers as the anatomical character of true typhus. This connexion of the efflorescence of the skin with disease of the glands of the intestines is by no means constant in the epidemics of this country. *Petechiæ*, in the ordinary sense of the term, are also of frequent occurrence in continued fever, occurring sometimes early in the disease, but more commonly towards the close of it, and where debility is extreme. The size of the spots varies from that of a pin's head to that of a crown piece. *Erysipelas* is apt to occur as a secondary affection when idiopathic erysipelas is prevalent. *Gangrene* and *sloughing*, preceded by erythema of the skin, are of common occurrence in the advanced stage of the disease, in parts submitted to pressure.

Sequelæ of Fever.—*Relapses* are of frequent occurrence in synocha (in one-fifth of the cases in the inflammatory epidemic of Edinburgh in 1807—20, according to Dr. Welsh): they are less common in typhus. They are frequently brought on by want of care and premature exposure to cold, &c. during convalescence. *Œdema* is a common consequence of the debility of the capillary vessels. It soon disappears with returning strength. Partial rheumatism, neuralgia, a swelling of the leg resembling phlegmesia dolens, phthisis pulmonalis, mania, and various local inflammations, are mentioned among the occasional sequelæ.

Anatomical Characters.—In the *mucous membrane of the intestines*, inflammation and its consequences, and inflammation and ulceration of the clustered glands of the intestines (Peyer's glands), occupying, for the most part, the ileum near its termination in the cæcum; and more rarely of the isolated glands (Brunner's glands). This disease assumes various forms,—as the soft, the hard, the

granular, the pustular, the ulcerous, and the gangrenous. Softening of the parenchymatous substance of all the organs—the brain, the heart, the liver, the spleen, the kidney, &c.; softening and ulceration of the mucous membranes lining the several viscera, leading sometimes to perforation; inflammation or congestion of the membranes of the brain, of the pleura, peritoneum, &c.; the several appearances of the skin already described; to which may be added a want of cohesion of the blood itself.

Diagnosis.—From idiopathic local diseases, by the history of the symptoms, the want of correspondence between the severe general disturbance and the comparatively slight local affections, and in many cases of typhus by the presence of the peculiar eruptions on the skin.

Prognosis.—*Favourable* in the absence of local complication, or when the local disease is slight; when the debility is not extreme; the tongue still moist or not greatly coated, the pulse steady and compressible and not very frequent; the respiration infrequent; the skin of moderate and uniform temperature; the countenance clear and not flushed; the eye uninjected; the posture approaching to that assumed by healthy persons; the absence of delirium and stupor. The *unfavourable* symptoms are the reverse of these. The existence of severe local disease; extreme debility; dry, brown, coated tongue; frequent, small, and irregular pulse; skin universally hot, or the temperature unequally distributed; the countenance muddy; the eyes suffused; decubitus on the back; the body falling towards the foot of the bed; low, muttering delirium; stupor; subsultus tendinum; picking at the bed-clothes; involuntary evacuations; retention of urine; tympanites; petechiæ; gangrene; and sloughing of the back and sacrum. In estimating the importance of these symptoms, whether favourable or unfavourable, the character and tendency of the existing epidemic, and of other diseases prevailing at the time, must be borne in mind.

Treatment.—Continued fever can only be effectually treated on general principles applied to individual cases, with due regard to the character of the existing epidemic, the peculiarity of the patient's constitution, and the period of the disease. Experience has proved that there is no stage of the disease at which remedies will prove effectual in cutting it short, and that it will run a certain course, and endure for a certain period, in spite of remedies. In every stage of the disease, and in every part of the treatment, therefore, the practitioner must bear this fact in mind. If, in the early stage, the disease calls for prompt antiphlogistic treatment, it must be borne in mind that a period of depression is at hand, and that that depression will be increased by undue activity in the early stage. On the other hand, it must not be forgotten, that local complications are apt to occur in the course of the fever, which may be aggravated by a neglect of proper antiphlogistic measures during the period of reaction. Moderation in the use of

remedies, constant watchfulness, and early and prompt attention to symptoms of local complication, are peculiarly necessary in all cases of continued fever. The treatment of continued fever will be best understood by dividing the disease into five stages: 1. The incipient period or cold stage; 2. The period of reaction; 3. The middle period, combining the high action of the second period with the debility of the fourth; 4. The period of debility, in which the symptoms assume more and more of the so-called typhoid character; and 5. The period of convalescence.

1. The incipient period or cold stage. Our object is to shorten this period as much as possible, and to remove from the *primæ viæ* any matter which in a later stage of the disease may become a source of irritation. The remedies prescribed with a view of shortening the first stage are blood-letting and emetics. Experience has shown that these remedies have no power of cutting short an attack of fever, but they have an undoubted efficacy in shortening the cold stage. If blood-letting is used for this purpose, it should not be carried further than merely to relieve the existing congestion of the vessels. It is strongly indicated where there are signs of existing plethora. Emetics, though they possess no power of cutting fever short, are useful in promoting reaction, and in emptying the stomach of ingesta, which might afterwards become a source of irritation. Purgatives may be usefully employed for the same purpose. The treatment of the incipient or cold stage then consists in general blood-letting to remove existing plethora or congestion, and emetics and purgatives to clear the stomach and bowels. The emetic may consist of tartar-emetic and ipecacuanha, the purgative of castor-oil, or the common senna draught.

2. During the stage of *reaction*, which rarely extends beyond the first week, antiphlogistic measures are indicated; the practitioner being guided in the selection of them by the consideration that a period of debility is at hand. Emetics, blood-letting, and cold affusion, have all been recommended in this stage with a view of arresting the fever. There is little reason to believe that the first remedy, emetics, has ever been successfully employed with this view, but instances have undoubtedly occurred in which fever has been cut short by bleeding and cold affusion. These cases, however, are rare, and the cutting short of the fever in this stage cannot be reasonably made an indication for treatment. If this result follow, so much the better, but the indication to be borne in mind is simply to reduce action by the smallest possible expenditure of strength. The remedies most efficacious for this purpose are general and local bleeding, cold affusion, and tartar-emetic. In bleeding, our object is to produce the greatest possible effect at the smallest cost of blood. The patient, therefore, should be supported in the erect posture if possible, or he should be raised in bed: a free orifice should be made in the vein, and blood be taken to the approach of syncope. Cold affusion is only applicable

when the temperature of the surface is above the natural standard, as measured both by the touch and by the thermometer. Applied on the second and not later than the fourth day, it has sometimes cut the fever short, but after that period it acts merely as a palliative. Cold affusion is one of the most powerful remedies which we possess, and requires to be applied with due caution. Perhaps there are few cases in which it will be necessary to have recourse to this mode of applying cold to the surface. Instead of pouring water over the surface, or dipping the whole body in cold water, it is much better to sponge the entire surface with warm water with cold water, or with vinegar and water, and allow it to evaporate until the heat is reduced and the pulse lowered. Cold sponging has this advantage over other modes of applying cold—that it creates no fatigue. When the desired effect has been produced, the body should be carefully dried with a warm towel, and the remedy may be repeated as often as the temperature of the skin rises steadily and uniformly above the natural standard. The head should at the same time be shaved and kept cold by cloths dipped in cold lotions and constantly renewed. *Tartar-emetic* may be administered with advantage in that stage of fever which is accompanied by high action. It may be given in doses of from one-eighth to one-fourth of a grain every one or two hours, and is advantageously combined with small doses of sulphate of magnesia. The patient should be allowed to drink freely of cold water. Where there is much fever, iced-water or ice may be allowed, according to the degree of thirst.

3. In the intermediate stage, or that which intervenes between the stage of reaction and that of extreme prostration—a period which extends from the end of the first week to about the eleventh, or from that to the seventeenth day,—no precise plan of treatment can be laid down. If high action is present, antiphlogistic treatment, varying in activity with the severity of the symptoms, must be persevered in; if debility, tonics and stimulants according to the degree of the debility; and local complications must be treated with an activity proportioned to their severity on the one hand, and the remaining strength of the patient on the other. If there is little febrile action, a moderate degree of strength, and no local complication, no remedies will be needed beyond gentle laxatives, cooling drinks, and saline draughts. If there is restlessness and want of sleep, without local disease, opiates may be resorted to, but their action must be carefully watched.

4. The treatment of the last stage, or that which immediately precedes recovery or dissolution—a period of three or four days—consists in the continued administration of such stimulants as have been found useful in the previous stage; a strict attention to local affections of the skin produced by the previous use of counter-irritants, or the continued pressure upon the integuments of the spine and sacrum; and the use of glysters in place of purgatives.

The state of the urine must also be carefully inquired into, and retention guarded against by the frequent use of the catheter. At this period the wishes of the patient, should he express any, for particular kinds of food, may often be indulged with advantage, provided there is no delirium present. The choice of stimulants in this and the preceding stage will greatly depend upon the previous habits of the patient. Wine in doses of from two to four ounces daily, increased according to the effect which it produces, will generally suffice for the temperate ; but the stronger spirits will often be necessary for those previously accustomed to the use of them.

5. The stage of convalescence requires much care and watching. Two indications are to be fulfilled—to restore the strength, and to guard against relapse. The strength will be best restored by the gradual substitution of nourishment for stimuli, the nourishing quality of the food being increased as the stimuli are withdrawn. When, however, the debility is very great, and, as often happens, there is a constant tendency to fainting, stimulants must be administered frequently and in large doses. In the commencement of convalescence simple farinaceous diet should be prescribed, or farinaceous diet with milk, then the weaker soups, then fish, boiled or fried, then the boiled or roasted meat of full-grown animals. In the regulation of the diet, the appetite is the best guide, and this should determine both the quality and the quantity of the food.

A foul dry tongue, increased frequency and sharpness of pulse, flushing of the face, and disturbed sleep, are indications that the diet is too large in quantity or of too nourishing a kind. If the patient is restless and obtains little sleep, opium, or morphia in combination with a stimulant, may be administered. The cautious regulation of the diet, an avoidance of all violent exertion, and of exposure to cold, will generally prevent a relapse.

The treatment of local inflammations arising in the course of continued fever is regulated by the same general principles which apply to the fever itself. They must be subdued at as little expense as possible of blood and strength. General blood-letting will rarely be required, and the application of a few leeches, with tartar-emetic internally, will generally succeed. Counter-irritants may be advantageously employed where the inflammation is not entirely subdued by the local abstraction of blood. The mustard poultice, stimulating embrocations, or a blister applied for a sufficient period to produce redness of the skin without vesication, should be preferred to the full action of a blister. Where the head is the part affected, the constant application of cold in the form of cold lotions or ice-bags, or, if these are insufficient, the cold *douche* should be preferred to the abstraction of blood.

Prophylaxis.—Spacious and airy apartments for the sick, complete ventilation, fumigations with chlorine, frequent change of linen, and the prompt removal of excretions, are the chief precautions to prevent the spread of contagion. The attendants on the

sick should not be young persons, and they should be selected, if practicable, from such as have already had an attack of fever. During their attendance, their diet should be nourishing, they should avoid excessive fatigue, and be allowed regular exercise in the open air. All unnecessary intercourse of other persons with the sick should be prevented. Rooms which have been occupied by fever patients should be well washed and ventilated, and the bedding and furniture should be freely exposed to the air. More careful precautions will scarcely be required in the case of a disease which is proved by experience not to be virulently contagious.

INTERMITTENT FEVERS, OR AGUES.

FEBRIS INTERMITTENS.—INTERMITTENT FEVER.

GENERIC CHARACTER.—A fever consisting of paroxysms or periods of fever, between each of which there is a perfect intermission, or period without fever.

The chief varieties of intermittent fever are, 1. The *Quotidian*, in which a paroxysm occurs every 24 hours: 2. The *Tertian*, 48 hours: 3. The *Quartan*, 72 hours.

Other varieties of less importance are, 1. The *double tertian*, in which a paroxysm occurs every day, those of the alternate days being of equal duration and intensity: 2. The *triple tertian*, in which two paroxysms occur on one day, and only one on the other. 3. The *duplicated tertian*, which returns twice on each alternate day. 4. The *double quartan*, in which a paroxysm occurs on the day succeeding that of the regular quartan, so that there is a perfect intermission only on the third day. 5. The *duplicated quartan*, in which two paroxysms occur on the day of attack, with two days of intermission. 6. The *triple quartan*, in which a slight paroxysm occurs on each of the usual days of intermission. These forms of ague, as well as those which have longer intervals, and are called *erratics*, require the same treatment as the three primary types.

The paroxysm consists of three stages, which in by far the majority of cases follow each other with much regularity;—a cold, hot, and sweating stage. The time intervening from the commencement of one paroxysm to that of the next is called the *interval*, and that which elapses between the cessation of one paroxysm and the beginning of the next is called the *intermission*.

SYMPTOMS.—*Of the Cold Stage.*—Languor and sense of debility; listlessness; yawning and stretching; an aversion to motion. The face and extremities become pale; the features shrink; the bulk of every external part is diminished, and the skin over the whole body appears constricted, as if cold had been applied to it. Sensibility is greatly impaired; the secretions and excretions are diminished; the urine is scanty, pale, and limpid; the pulse is small,

frequent, and irregular; and the respiration short and anxious. There is more or less head-ache, and blueness of the fingers and toes. At length the patient feels a sensation of cold, first arising in the back, and thence diffusing itself over different parts of the body, though sometimes it is confined to a particular part, as to the extremities, side of the head, &c. This is succeeded by rigors, which terminate in universal and convulsive shaking.

Of the Hot Stage.—After a longer or shorter continuance of shaking, the heat of the body gradually returns; at first irregularly, by transient flushes, soon however succeeded by a steady, dry, and burning heat, rising much above the natural standard. The skin, before pale and constricted, is now swollen, tense, and red, and possesses an unusual tenderness and soreness to the touch. The sensibility, which in the cold stage was diminished, now becomes preternaturally acute; pains arise in the head, and flying pains are felt over different parts of the body. The pulse is quick, strong, and hard; the tongue white; there is great thirst; the urine is high-coloured.

Of the Sweating Stage.—At length a moisture is observed to break out upon the face and neck, which extending, soon becomes an universal and equable perspiration. The heat now descends to its usual standard; the pulse is diminished in frequency, and becomes full and free; the urine deposits a sediment; the bowels are no longer constipated; respiration is free and full; and all the functions are restored to their natural order.

After a specific interval the paroxysm again returns, commencing as above described.

Pathology.—During the cold stage, we have manifest proof of the derangement of the functions of the cerebro-spinal system: all the functions are disordered; there is a determination of blood from the capillaries of the surface of the body to the deep-seated large vessels; there is congestion in the head, chest, and abdomen, and this has been repeatedly shown by examination after death. The vascular spongy organs, especially the spleen, liver, lungs, and brain, if predisposed to disease, are liable to suffer. Accordingly few persons in whom the disease has lasted for any length of time entirely escape these local complications. This view of the pathology of ague has led Dr. Mackintosh to employ venesection in the cold stage to relieve visceral congestion, and consequently to free the heart and brain from oppression, to enable the system to rally, and either to stop the cold fit at once, or to induce reaction. This rational treatment is justified by the experience of Dr. Mackintosh, and of many other observers.

Comparative frequency of the different types, &c.—According to the observations of M. Andral, in 1821, of fifty-six cases, twenty-eight presented the quotidian or double tertian type; nineteen the tertian; seven the quartan; and one was erratic.

The frequency of the disease in different seasons, and the relative susceptibility of different ages to it, may be inferred from the following results :—in January, February, and March, nine cases occurred ; in April, May, and June, ten ; in July, August, and September, seventeen ; and in October, November, and December, twenty,—in all, fifty six. Ages of patients :—at fifteen years, 4 ; from sixteen to twenty, 5 ; twenty to twenty-five, 19 ; twenty-five to thirty, 14 ; thirty to thirty-five, 6 ; thirty-five to forty, 1 ; forty to forty-five, 0 ; forty-five to fifty, 5 ; fifty to fifty-five, 1 ; fifty-five to sixty, 1 ; sixty-one, 1 ; and sixty-eight, 1.

From this statement it would appear, that ague does not occur at an earlier age than fifteen years ; such, however, is not the case, as instances of the disease occurring as early as three years are on record.

The tertian type generally occurs in spring, and commences at noon : the usual duration of the fit is ten hours. The quartan is more severe, occurs in autumn, and its fit begins in general in the afternoon : duration usually about six hours. The quotidian occurs in the morning, and most readily changes into the continued or remittent : usual duration about sixteen hours. The quartan has the longest cold stage, the tertian the longest hot stage.

The type changes after some time, tertians and quartans becoming quotidians, and quotidians becoming remittents, and occasionally continued or typhus fevers.

CAUSES.—1. *Predisposing*.—Debility, however induced ; by a watery, poor diet ; great fatigue ; long watching ; grief ; anxiety ; the suppression of accustomed evacuations ; the repulsion of eruptions : preceding disease ; a former attack of ague ; cold, united with moisture, in whatever way applied to the body.

2.—*Exciting*.—Marsh miasma ; or the effluvia arising from stagnant water, or marshy ground, impregnated with vegetable matter in a state of putrefactive decomposition.

This is not, however, the only cause ; for of the fifty-six patients treated by M. Andral, a very small number had been exposed to marsh miasmata ; and in some who had been in marshy districts, the disease did not occur for some weeks afterwards. Most of the patients resided in damp situations. The fever was induced in several by want, fatigue, and exposure to cold and wet ; and in some no assignable cause could be discovered. These observations are confirmed by the experience of practitioners in this country.

PROGNOSIS.—*Favourable*.—When the paroxysms are of short duration, when they are regular in their recurrence, and leave the intervals quite free.

The circumstances giving rise to an *unfavourable* prognosis are—

1. The disease proving obstinate, and the paroxysms anticipating the usual time of their return, and there being a feverish disposition, manifesting a tendency to a continued form of fever.

2. The paroxysms being of long continuance, violent, and attended with much anxiety and delirium.

3. The disease being combined with others; or other diseases being induced by a protracted state of the original intermittent. These are most frequently dysentery, cholera, enlargement of the liver and spleen, ultimately inducing dropsy and jaundice; swelling of the tonsils and glands.

4. The presence of unfavourable symptoms, as convulsions occurring during the paroxysm, preceded by great coma; obstinate costiveness; hiccup, with vomiting and pain upon pressure in the hypochondriac and epigastric regions; depraved sense, as double vision; great prostration of strength; vertigo; dry, black tongue; fetid excretions.

TREATMENT.

In the Paroxysm.

Indications.—1. During the cold stage, to endeavour to induce the hot.

2. During the hot stage—to promote a perspiration.

The *first indication* (for the treatment of the *cold fit*) requires artificial warmth; the pediluvium; fomentations to the feet; the warm bath; dry heat applied to the pit of the stomach, abdomen, along the spine, and to the hands and feet; warm diluent liquids; and cordial diaphoretics.

Other remedies have been administered either during the cold fit or immediately before it. *Bleeding* has been recommended and much practised by Dr. Mackintosh. The cases in which it is indicated are plethoric patients, or those in whom there is great congestion of the internal viscera, especially of the brain. *Emetics* given before the fit have sometimes prevented its occurrence; and administered during the cold fit, they hasten the approach of the hot fit. A full dose of *laudanum* may be employed with much advantage before the paroxysm, or at the commencement of the cold fit. A favourite combination is one drachm of laudanum and one drachm of sulphuric æther.

The *second indication* (that of promoting perspiration) will be best fulfilled by those remedies which lower arterial action. The remedies employed in the treatment of the first stage should be laid aside, and cool air, cooling drinks, cold sponging, depressants, local or general blood-letting, should be resorted to, according to the urgency of the symptoms. Local complications must be treated in the same manner as common inflammation of the parts affected.

In the *sweating stage*, the patient must be kept cool, wiped dry after it is over, and his clothes changed. He should then be al-

lowed to sleep. When there is much debility, stimulants, as warm brandy, or wine and water.

In the Intermission.

Indications.—1. To excite a new action in the system by certain remedies administered at the commencement, or immediately before the accession, of the cold fit; and thereby to destroy the morbid concatenation induced by the cause of the disease.

2. To prevent the return of the paroxysm by invigorating the body.

The *first indication* is answered by emetics, by æther, or by opium.

In the beginning of these, as well as of other fevers, it is necessary to clear the bowels; and the best time to do this is during the intermission: any common aperient may be administered, in combination with some preparation of mercury.

The *emetic* should be administered so that its operation may commence just at the accession of the fit. Opium may be given in the form of tincture alone, or in combination with spirits of sulphuric æther, one drachm of each, about half an hour before the commencement of the cold stage. If bleeding be used for this purpose, it should be employed immediately before the accession of the paroxysm.

For the fulfilment of the *second indication*, recourse must be had to a nutritive diet; regular exercise, if the state of the patient render its use practicable; and one of those remedies which experience has shown to possess the power of preventing the return of intermittent paroxysms. These belong, for the most part, to the order of tonics.

Bark, or its active principle *quinine*, is the staple remedy for the cure of ague, and other intermittent disorders. The sulphate of quinine may be given in doses of two grains or more, every two, three, or four hours during the intermission. Larger doses are rarely required, but ʒj., ʒss, or even more, has been administered with impunity. Where there is much nervous irritability, it may be advantageously combined with opium.

Arsenic is a remedy of equal power with *quinine*, but it requires to be used with greater caution. It may be given in doses of five drops of Fowler's solution, gradually increased to twelve or more, either alone or in combination with laudanum, every four hours during the period of intermission. Its effects must be carefully watched.

Sulphate of zinc, piperin, or the active principle of pepper, salicin, or the active principle of the willow bark, and a great variety of remedies belonging to the class of bitters and tonics have been used, and apparently with success. A cure also has been effected by the power of imagination, or by a sudden shock to the mind. In obstinate cases change of air is the last remedy.

A variety of diseases are liable to assume the intermittent form in persons who have been exposed to malaria. These are called masked intermittents. They require a combination of remedies appropriate to the local affection with those which have been mentioned as curing ague. Persons who have been previously subject to ague, are very liable to have these masked intermittents, and they are more common in those who suffer from local disease brought on by continued attacks of ague. Neuralgia is the most common form which these diseases assume.

Sequelæ of Intermittent Fever.—Diseases of the spleen and liver are the most common consequences of ague. The treatment required for these affections is change of air, local depletion often repeated, and, in the case of the liver, a course of gentle mercurial preparations, or the nitro-muriatic acid. Much benefit is often derived from a course of the Cheltenham or Harrowgate waters. Counter-irritation by blisters or setons is often beneficial in these cases.

The symptoms of ague are sometimes of the most severe and alarming kind. The congestion in the first stage is extreme, leading to severe head or abdominal symptoms, and the reaction in the second stage is accompanied by local inflammation of equal severity. This form of ague resembles synocha in its most severe form. In broken constitutions, on the other hand, ague may sometimes take a typhoid character (the malignant ague of authors), and run first into remittent, and then into continued fever differing in no respect from typhus. The treatment applicable to such cases is the same as for continued fever of like severity and similar character.

FEBRIS REMITTENS.—REMITTENT FEVER.

CHARACTER.—A fever arising from the same *causes* as the intermittent; but in which, although evident and distinct exacerbations and remissions can be perceived, there is no complete interval or apyrexia, one exacerbation appearing not entirely to go off before a fresh attack ensues. Remittent fevers rarely occur in these climates, but are very common in tropical countries; and, from their frequent complication with derangement of the liver are denominated Bilious Remittents.

The *symptoms* vary according to the situation and constitution of the patient and the season of the year. Sometimes they are those pointing out a redundancy of bile; sometimes the nervous are most prevalent; at others the putrid.

The protraction of the exacerbations generally arises from some cause which keeps up an irritation in the system, and thereby prevents the disease assuming its regular form; or it depends upon fever of another type having been accidentally superinduced.

The *prognosis* will be drawn from the presence or absence of

those circumstances which indicate danger in that particular form of fever which the disease assumes; and which are pointed out under the heads of the different species of typhus, synocha, or synochus. In warm climates it is often fatal.

TREATMENT.—The *treatment* will entirely depend upon the concomitant fever or other cause which prevents the state of apyrexia, and gives to the disease the remitting form. Should it have a tendency to either of the preceding genera, the treatment will be such as is there laid down; if it depend upon some cause of irritation, as diseased viscera, this is to be removed by the appropriate means elsewhere enumerated.

This disease is seldom observed in this country; but is of frequent occurrence in Philadelphia, according to Dr. Dewees (*Practice of Physic*, 1830). He is a strong advocate for venæsection during the paroxysm, when the pulse and other symptoms require it. A mild form of this disease attacks delicate persons in the autumn, and is usually preceded by irregular action of the digestive organs, dyspepsia, flatulence, abdominal tension, or diarrhœa. It is called gastric fever by Professor Frank. The ordinary causes of fever induce it, as cold, damp, fatigue.

SYMPTOMS.—The patient complains of languor, lassitude, or drowsiness; has alternate chills and flushes, but no perspiration; skin hot and dry; thirst, nausea, or a total loss of appetite. The fever increases in the evening. Sometimes, however, the exacerbation or increase of fever occurs at noon, and sometimes in the middle of the night. When the disease is left to itself, it causes determination of blood to the viscera of the head, chest, and abdomen.

TREATMENT.—Depletion both general and local, active purgation, in which calomel must be employed, antimonials, refrigerants, &c. The disease usually continues for ten or twelve days.

SYNOCHUS ICTERODES.—YELLOW FEVER.

SYMPTOMS.—Weakness; lassitude; weariness; frequent chilliness; faintness; pains in the head and eyeballs; sighing; great tendency to coma; mouth clammy; tongue furred; pulse variable; skin hot, dry, and hard; bilious vomiting very frequent; yellowness of the eyes and skin; incessant retching and vomiting of frothy bile: peculiar delirium, attended with dilated pupils; great determination of blood to the head; occasional remissions of fever; extreme debility; petechiæ; large vibices; black vomit; dry and black tongue; teeth covered with a black fur; hæmorrhage, from mouth, ears, nostrils, or bowels; feeble and scarcely perceptible pulse; hiccup: death preceded by the symptoms of the last stage of typhus.

CAUSES.—*Predisposing.*—The climate of the West Indies, Spain, Gibraltar, America, and parts of Africa: hot, dry, and sultry weather; male sex; intemperance; depressing passions of the mind.

Exciting.—Marsh miasma. The type of the disease is generally that of a remittent, tending to become continued in the worst cases, and distinctly intermittent in more favourable ones. From its tendency to assume the typhoid form it has been named typhus icterodes.

Morbid appearances.—General yellowness of the skin, interspersed with blue or livid spots; the muscles soft or contracted; membranes of the brain congested, and occasionally an effusion of a sanguinolent serum at the base of the brain, and in the spinal canal; red, livid, or dark black spots and patches on the mucous membrane of the stomach, and its cavity filled with an inky black fluid, (hence the term black vomit,) similar to what was vomited, and to that contained in the heart. It was this similarity that led Dr. Stevens to test the black blood with acids, and alkalies, which did not change it; but when neutral salts were added, the fluid acquired a vermilion colour. The intestinal mucous membrane is often of a brown or blackish colour in certain parts; the liver is softened; the kidneys red or covered with gangrenous spots; the bladder contracted and sometimes inflamed.

TREATMENT.—The remedies must be accommodated to the type of the fever, which is mostly mixed in the beginning, and becomes exquisitely typhoid towards the height.

The early application of the most powerful remedies cannot be too strongly insisted on; these are cold affusion, blood-letting, and purging.

I. Cold affusion has been strongly recommended. Dr. Dickson, whose "Directions to the Surgeons on the Leeward Island Station" cannot be made too general, gives his opinion thus: The momentum of the affusion, regulated by the earliness of the disease and the strength of the patient, should be considerable, when these will admit. The frequency of the repetition will depend upon the effects resulting, and the recurrence of reaction, heat, &c. The benefit to be expected from the shock will almost wholly depend upon its being given before the fever is fully formed; but although this is the case, the affusion in a less powerful degree should be assiduously repeated, at such intervals as the symptoms of reaction indicate; and, when the vital powers become much impaired, gentle aspersion or ablution will produce grateful and soothing effects, and dispose to sleep, when the patient is heated, restless, or delirious. These will be farther promoted by cold applications to the head, after cutting off or shaving the hair: or, as the head is more accustomed to changes of temperature, it is probable that greater effect will be produced by the application of cloths wet with spirituous or aqueous fluids, to the epigastrium or other sensible parts.

A partial moisture upon the upper parts of the body, if the skin is hot, should not prevent the use of the cold-bath, particularly in the early stages of this fever.

Less confidence is now placed in cold affusion in the yellow fever of the West Indies.—*Stevens on the Blood, &c.*

II. The propriety, quantity, and repetition of bleeding, will depend upon the strength and fulness of the vascular system; the oppression of the sensorial and other functions; the youthful and unseasoned constitution; the effects during and after the abstraction; the ardent nature of the fever; and, above all, upon the short duration of the disease. On the contrary, its employment will be more sparing, equivocal, or altogether prohibited, in the weakly, aged, intemperate, or previously-diseased habit; and especially in an advanced stage of the disease. The efficacy of this remedy will greatly depend upon its being used as early as possible, particularly within the first twelve hours; and although it may sometimes be extended to double that period, it should be understood that its too late or injudicious employment will infallibly hasten dissolution.

Under the most favourable circumstances, this remedy should be copiously used, and may be repeated according to its good effects; but much will depend upon its being resorted to before the chain of the febrile actions is completely linked, and especially before the stomach and bowels have suffered.

III. The free exhibition of purgatives in this fever is indispensably necessary; and frequently, from the torpor of the bowels, they must be given with a liberality that might appear alarming in temperate climates. They ought to be repeated, and, if necessary, assisted with clysters until they have produced at least five or six copious evacuations. The thorough evacuation of the whole of the intestinal canal during the first two hours of the fever, cannot be too much insisted on.

The best purgatives are cathartic extract, jalap, &c., or extract. colocynth, combined with calomel; and sometimes the stomach will bear the neutral salts: but those medicines ought always to be preferred which are the least likely to be rejected.

The bowels should be kept freely open during the whole period of the disease, but they should not be too much excited during the latter stage; a distressing diarrhœa, or constant attempts at evacuation with tormina, being a most harassing and unfortunate occurrence late in the disease.

If bleeding, purging, and the cold affusion, which mutually assist each other, are vigorously employed before the fever is fully established, the danger of the second stage will, most probably, be averted; and the most unpleasant symptoms diminish within the first twenty-four hours. The young practitioner is here, however, apt to be deceived:—it is very necessary to caution him against the appearance of a deceitful lull, which, like the calm preceding a storm, is often witnessed about this period, and to recommend his watching the disease with the most assiduous caution. If the patient be really better, the pulse and skin should not only be

come more natural, but the most distressing and unpleasant sensations should be much relieved, and his feelings altogether much more comfortable. If, on the contrary, an evident amendment or change be not perceived in the course of the second day, or if, after an apparent remission, the symptoms become aggravated, with anxiety, sighing, restlessness, nausea, or a particularly disagreeable sensation at the stomach, the worst is to be apprehended, and every exertion used to mitigate the heat, general irritability, and particular symptoms, as they arise.

The means employed on the accession of the disease having failed to cut short the fever, blistering must be had recourse to, in order to counteract and arrest the fatal changes taking place in the stomach and viscera; and simple but powerful stimulants must be exhibited internally, such as the carbonate of ammonia, wine, if not nauseated, and spices.

When the approach of vomiting, or other dangerous symptoms, is apprehended, these remedies are immediately to be employed, without being deterred by the fever that is present; for if the reduction of heat and vascular action be waited for previous to the exhibition of stimulants, they will too frequently not be employed until the very changes to be prevented have taken place, and the patient is sinking into the grave.

The prevention of vomiting, which is of great consequence and difficulty, should farther be attempted by giving frequently a table-spoonful or two of arrow-root, or some other gelatinous or mild agreeable matter, according to the patient's fancy; but so little and often as equally to avoid total emptiness, or offending the stomach by quantity or quality.

Such is the plan of treatment strongly recommended by Dr. Dickson when the fever appears in its simplest and legitimate form, and attacks the youthful plethoric stranger, when he considers it as highly inflammatory in its first stage, with great determination to the stomach and brain, which, if not immediately remedied, becomes a specific inflammation, running into organic diseases of these parts of the most destructive and irremediable nature, and terminating rapidly in disorganization, gangrene, and death. It is therefore evident that the result will greatly depend on reducing increased vascular action and the energy of the brain, and evacuating the whole intestinal canal in the first, and thus averting the danger of the second, stage.

There are cases, however, in which, from constitutional causes, and a cachectic state of the system and other diseased states, this fever shows evident marks of the septic diathesis soon after its accession, and in such cases the lancet must be abandoned; the affusion of cold water resorted to, if the increased heat of the body will permit; and, after opening the bowels, acids, æther, and camphor must be given, with decoctions of the tonic barks and wine, or dilute brandy, as recommended against typhus gravior.

Much difference of opinion has prevailed, and continues to exist, as to the real nature of this disease, and the treatment which ought to be adopted. The greatest weight of authority is in favour of the administration of large doses of calomel; for instance, from five to ten grains every two hours, accompanied with mercurial inunction, with a view not merely of unloading the bowels, but of affecting the system. Most authors who have tried this plan agree in stating that when salivation takes place the patient is safe. Emetics have also been strongly recommended at the outset of the disease. Dr. Stevens asserts, that saline medicines are the only valuable remedy in this fever. He states, that the mortality was immense at Trinidad before his arrival, but never so since. Dr. Hacket, on the other side, denies the efficacy of saline medicines. Croton oil has also been strongly recommended, and, in spite of the extreme irritability of the stomach, seems to be easily retained, and to act most beneficially.

An emetic at the onset of the fever, followed by calomel in large and repeated doses, with general bleeding and cold affusion in cases of strong vascular excitement, seem to constitute the most important items of the treatment. But much must depend upon the severity of the epidemic, the character of the patient's constitution, and the symptoms present in the individual case. The practitioner must be prepared to encounter fevers of every type and every degree of severity in the same epidemic.—(See Gillkrest on Yellow Fever, Cyc. Pr. Med. vol ii.)

CHAPTER II.

FEBRIS INFANTUM REMITTENS,	Infantile Remittent Fever.
FEBRIS HECTICA	Hectic Fever.
FEBRES PUERPERALES . . .	Puerperal Fevers.

FEBRIS INFANTUM REMITTENS—INFANTILE REMITTENT FEVER.

SYNONYMS. — Infantile gastric remittent — infantile hectic — worm fever — mesenteric fever — stomach fever — low fever of children — marasmus.

SYMPTOMS. — Pallor, languor, drowsiness, and chilliness in the morning; flushed cheek, hot skin, restlessness, and the general symptoms of fever towards evening; followed at night by profuse sweating, and towards morning by a distinct remission. Skin dry; tongue moist, but coated; pulse frequent; appetite variable and

capricious, or altogether wanting; urine scanty and high-coloured, and deposits a whitish sediment; bowels costive or relaxed, or both alternately; the evacuations slimy, highly offensive, dark, green, pitchy, or clay-coloured with little or no bile, or with an abundant secretion of yellow bile; the abdomen tumid and often hot to the touch; the breath offensive; the skin extremely irritable, so that the child is constantly picking the nose, lips, corner of the eyes, fingers, and anus.

Such are the symptoms of a well-marked case of infantile remittent fever in its acute form. When less severe, the remittent character of the fever is less strongly marked; the chilliness and languor of the morning, and the febrile exacerbation of the evening, being very indistinct, and the child merely looking pale and listless, and losing its appetite. Sometimes the disease becomes chronic, and is marked by paroxysms less intense but of longer duration, the abdomen becomes harder and more tumid, the tongue more loaded, the constipation generally present in the acute form is changed for a constant and distressing diarrhœa, the little patient wastes rapidly away, until at length the plump and rosy features of the child are changed to the meagre aspect of shrivelled old age. The more the child wastes away the more restless and irritable does it become, till the last stage of debility arrives, when it lies in a state of total unconsciousness, and at length dies from exhaustion. The disease may occur at any age from one or two years up to puberty.

COMPLICATIONS AND TERMINATIONS.—A dry cough, and, if tubercles exist in the lungs, phthisis; enlargement of the cervical glands; skin disease (strophulus); irritation of the brain, and sometimes hydrocephalus; dysentery, and tabes mesenterica.

Post-mortem appearances.—Inflammation, or ulceration of portions of the alimentary canal, especially of the small intestines. Enlargement, induration, or suppuration of the mesenteric glands. Traces of inflammation and its consequences in the brain or lungs.

Diagnosis.—From hydrocephalus, by the patient being easily roused from stupor, if it exist; by the absence of strabismus; and convulsions; by the want of distension in the veins of the scalp, and the want of prominence in the fontanelles; by the absence of extreme heat of head, and the greater frequency of the respiration. In hydrocephalus, too, the bowels are more obstinately confined, and the urine more apt to be suppressed.

Prognosis.—Generally favourable.—There is hope to the very last. In the ascertained absence of hydrocephalus, and of extensive disease of the mesenteric glands, the practitioner may safely hold out a prospect of recovery.

CAUSES.—**Predisposing.**—All causes of debility, as bad air, deficient food, &c.

Exciting.—Irritation of the mucous membrane of the intestinal canal by accumulated fæces, or improper diet; worms (the symptoms in this case are generally less strongly marked); diarrhœa; teething.

TREATMENT.—*Indication.*—I. To remove all causes of irritation from the stomach and bowels. (a) By strict regulation of the diet. (b) By appropriate purgatives.

II. To support the patient's strength.

III. To subdue local inflammation and remove local irritation.

DIET.—As long as vomiting or diarrhœa is present, a strict farinaceous diet should be prescribed, or farinaceous food made with milk; as milk-gruel, arrow-root, or sago. In the absence of diarrhœa, rice milk, or bread-pudding, and in cases of extreme debility, light animal broths or jellies, may be prescribed. In young children no animal food should be allowed. In children of one or two years of age, a still stricter diet is often necessary, and the quantity as well as the quality of the diet must be carefully regulated. At this early age the stomach is apt to be peculiarly irritable, and to reject even the simplest farinaceous food. In such cases give a large table spoonful of new-milk from the cow every half hour or hour. This simple and natural diet has restored many a child despaired of by those who think it necessary to give medicine in all diseases. The stomach wants rest, and the patient wastes away because it is not allowed to rest: it rejects food in ordinary quantity, and will bear none in any quantity but that which is natural to it at that early age.

Purgatives.—When the bowels are costive, purgatives must be administered day after day, till the patient recovers. As the evacuations improve in character, the symptoms also improve, and when the bowels are restored to their natural state, the patient is well; so entirely does this disease depend upon the state of the first passages. The choice of the purgative is not very important. A combination of one or two grains of calomel, with four or five grains of rhubarb or jalap, may be given every night, or every other night, followed the next morning by a full dose of castor-oil. The calomel may be persevered in for weeks without bad effects, and in by far the majority of cases with no fear of salivation. It is not necessary to produce violent action of the bowels; one or two motions a day will be enough, and hypercatharsis must be carefully avoided. If there is obstinate constipation, however, there is no fear of giving large doses of calomel, and repeating them at short intervals. If diarrhœa exists at the outset, it may generally be removed in one or two days by the diet prescribed: if the diet is not sufficient, one or two grains of hydrargyrum c. cretâ, with three or four grains of the pulvis cretæ comp. c. opio, given three times a day, will soon succeed in removing it. When the diarrhœa has ceased, but never before, purgatives may be resorted to, and continued every night, or every alternate night, followed by the castor-oil in the morning, until the patient is entirely recovered.

The patient's strength rarely requires support; nourishing and unirritating diet is the best restorative. Should *tonics* appear ne-

cessary, the steel wine, in doses of a tea or dessert-spoonful three times a day, according to the age, or the dried sulphate of iron in doses of one or two grains, with the same quantity of hydrargyrum c. cretâ, two or three times a day, with a dose of castor-oil every morning, will answer our purpose.

Depletion is rarely required in any form of infantile fever. If the brain, however, is much affected, the head hot, and the patient very restless, one or two leeches or more, according to the age, may be applied, but they are employed much more frequent than they are required. Cold to the head will generally suffice to subdue any inflammation that may be present. If the child is teething, the gums must be well lanced; if there are worms, they will be removed by the common purgatives already recommended; if there should be any irritation in the lungs, accompanied with mucus in the bronchial tubes, tartar-emetic in doses of $\frac{1}{10}$ to $\frac{1}{6}$ of a grain may be given according to the age, in combination with one or two grains of hyd. c. cretâ, three or four times a day; if the disease is complicated with dysentery, clysters of gruel may be frequently used; if the belly is very hard and tumid, with enlargement of the mesenteric glands, much good may be derived from repeated friction with the hand or with a flannel moistened with olive-oil; if the cervical glands are enlarged, they may be covered with a small piece of the emplastrum hydrargyri c. ammoniaco. This simple application is to be preferred to the tincture of iodine.

Tabes mesenterica requires the same treatment as the infantile fever, of which it is a frequent consequence. Strict diet, purgatives, if there is no diarrhœa, emollient clysters, frequent frictions to the abdomen, and tonics when they do not displace these more important remedies—constitute the treatment.

FEBRIS HECTICA—HECTIC FEVER.

This fever is, in almost every instance, a symptomatic affection. It differs from a continued, an intermittent, and a remittent fever; yet in some respects it resembles each, and approaches most to the last.

SYMPTOMS.—These present themselves in obvious exacerbations, beginning with a sense of chilliness, which is succeeded by an increase of heat, and an accelerated pulse, and these are followed by a perspiration. There are two exacerbations in the twenty-four hours. The first occurs generally about noon, and abates mostly in about four or five hours: this remission is but of short duration; a more violent exacerbation soon follows, which keeps increasing in violence until morning, when, about two o'clock, a perspiration breaks out which resolves the paroxysm.

The pulse during the exacerbations, is generally strong, and beats from 96 to 130, or even more; the urine is high-coloured, and

deposits a lateritious sediment: the cheeks are flushed, and have a florid, circumscribed redness; there is burning heat in the palms of the hands and soles of the feet; in the periods of remission the pulse is mostly reduced in frequency, but seldom so low as in health: the appetite is not much impaired; tongue clean, moist, and red. The bowels are generally costive at the beginning.

From the commencement of this fever the body wastes away, and in the advanced stage, the emaciation is very considerable indeed.

At length the fever becomes more continued, and the exacerbations more violent; the appetite falls off; colliquative sweats alternate with diarrhœa; the facies Hippocratica makes its appearance, and under an increased severity of these symptoms, and those of the disease which causes the hectic fever, the patient sinks.

TREATMENT.—This must depend on the disease of which the hectic fever is symptomatic. If debility is the cause, or there is no apparent disease to produce the hectic symptoms, the medical treatment must be very similar to that of an ague, with a vegetable and milk diet. A course of sarsaparilla, with a mild or vegetable diet, now and then removes a hectic fever, the cause of which is not apparent. Quinine often does good. In colliquative diarrhœa, the sulphate of copper with opium is the best remedy.—(See Diarrhœa.)

This fever is generally supposed to arise from absorption of pus from large surfaces, as in suppuration of the lungs, liver, hip-joint, &c. But it may arise from local irritation in debilitated constitutions, even when no suppuration exists. For instance, it is often present in the early stage of phthisis pulmonalis, before there is any reason to believe that suppuration has taken place. It is in advanced stages of this disease that hectic fever is developed in its most characteristic form.

FEBRES PUERPERALES.—PUERPERAL FEVERS.

Under this designation authors have described several forms of disease differing in many of their characters, but agreeing in the general feature of combining a well-marked febrile affection with a local disease, varying in seat, character, and intensity. The following distinct forms are recognized by authors.

1. Acute puerperal peritonitis.
2. Adynamic, or malignant puerperal fever.
3. Puerperal intestinal irritation.
4. False peritonitis.—To which may be added—
5. Milk fever.

ACUTE PUERPERAL PERITONITIS.

SYMPTOMS.—Severe rigor, commencing on the second, third, or fourth day after delivery, and in some cases much later; followed by acute pain in the abdomen, and generally in the hypogastric region. The pain is constant, augmented at intervals, increased by pressure, and by motion, and accompanied by fulness and tension of the abdomen. The secretions, especially the milk and lochia, are checked; the skin is hot; the pulse sometimes frequent, small, and wiry, at others full and bounding; the tongue furred. There is headache, restlessness, and sleeplessness, with anxious and suffused countenance, occasional vomiting, and hurried respiration. In unfavourable cases, the pain and tension of the abdomen increase, and it feels hard and tympanitic; the pulse becomes more and more rapid, the skin cold and clammy, the head first feels confused, and then muttering delirium follows; the tongue becomes dry and brown, the teeth covered with sordes; distressing eructation and vomiting, hiccough, subsultus tendinum, facies Hippocratica, and cold extremities usher in the fatal result.

Morbid appearances.—Redness of the peritoneum, especially that covering the uterus and its appendages, or lymph effused into its cavity. The uterus, ovaries, and Fallopian tubes covered with a creamy matter. Purulent deposits sometimes found in muscular structure of uterus; ovaries often disorganized.

CAUSES.—Contagion. The common causes of inflammation. It is often epidemic, and co-exists with or precedes the malignant variety.

PROGNOSIS.—*Favourable*, but guarded, if the treatment is commenced early, and if the reigning epidemic is of a mild character.

TREATMENT.—*Indications.* I.—To reduce inflammatory action. II. To remove local irritation.

I. Prompt treatment is required.—Bleeding in the erect or semi-erect posture, to the approach of syncope, or leeches in large numbers to the abdomen, according to the severity of the symptoms and the strength of the patient; and to be repeated if necessary; hot fomentations to the abdomen; calomel in doses of five grains every two, three, or four hours, with opium, or Dover's powder, continued till salivation takes place. Cooling drinks, cool air, &c. When there is much debility, nourishing food and stimulants, as wine, brandy, and ammonia, or turpentine, taken by the mouth and in the form of injection.

II. A purgative of castor-oil, or salts and senna, to be administered at the outset, and to be followed up at short intervals, so as to keep the bowels open. Warm water injections thrown up into the rectum and vagina.

If swelling, tension, and tenderness of the abdomen continue after the antiphlogistic remedies have been carried to their full

extent, a blister may be applied to the abdomen, and dressed with mercurial ointment, or the abdomen may be fomented with hot turpentine.

ADYNAMIC OR MALIGNANT PUERPERAL FEVER.

SYMPTOMS.—More obscure than the foregoing: the rigor less strongly marked, the pain in the abdomen less severe, little increased by pressure, deeper seated, more circumscribed, and often limited to the hypogastric or iliac regions. The pulse, from the first, extremely small, rapid, and weak, ranging from 130 to 160; countenance anxious and sunk, skin of a livid yellow tinge; extreme restlessness; intellect, though sometimes clear to the last, generally wandering; low, muttering delirium; tongue at first white, then dirty yellow, then dry and brown: if blood is taken, its colour is dark, and the coagulum very loose; eructation, vomiting, hiccough, diarrhœa; the evacuations highly offensive; lochial discharges fetid and often suppressed; breasts flaccid; abdomen tumid and tympanitic. Death after the usual typhoid symptoms, or slow recovery.

MORBID APPEARANCES.—Peritoneum of a dusky colour, the effused fluid dirty, brown, often bloody, and very glutinous, and mixed with shreds of lymph. Fetid gas in the intestines. Uterus disorganized, softened, or gangrenous; ovaries broken down and reduced to a pulp. Pus in the veins of the uterus; in the joints; inflammation, and abscess of cellular membrane of leg, &c. In a few cases, a remarkable destruction of the eye.

CAUSE.—Contagion.

PROGNOSIS.—*Unfavourable* in all cases; chances of recovery slight.

TREATMENT.—*Indications.*—1. To reduce local inflammation at the least sacrifice of strength. 2. To remove local irritation. 3. To support the patient's strength.

I. Blood-letting, if employed at all, must be used with great caution. The hand must be kept on the pulse, and the effect carefully noted. If the pulse increases in fulness and force after the abstraction of a small quantity of blood, it may be allowed to flow more freely. Calomel, in doses of from three to five grains, every two or three hours, with half a grain or a grain of opium; or calomel in combination with three or four grains of ipecacuanha, or equivalent doses of James's powder, or tartarized antimony. Hot fomentations, hot turpentine, or blisters to the abdomen.

II. Purgatives, injections of warm water into the rectum and uterus.

III. Nourishing diet, ammonia, spirituous stimulants, oil of turpentine, &c.

PUERPERAL INTESTINAL IRRITATION.

SYMPTOMS.—General uneasiness, coming on at any period after delivery, if the bowels have been neglected; loss of appetite; tongue furred; chills alternating with flushes; headache; frequent pulse; abdomen large and rather tense; slight, deep-seated pain, relieved by steady pressure; nausea and vomiting of a dark and offensive fluid; diarrhœa; evacuations dark, fetid, watery, or slimy; flatulence; fœtor of breath. In unfavourable cases, the exacerbations of fever become more severe and of longer duration, and attended with extreme debility and despondency; there is the red tongue of acute gastric irritation; the mucous membrane of the tongue and mouth often covered with aphthæ. The diarrhœa continuing and the strength diminishing, the febrile symptoms become more constant and severe, and the disease gradually assumes the shape of the malignant puerperal fever.

Morbid appearances.—Generally none. Sometimes inflammation, with or without ulceration of the mucous membrane of the intestines. When the disease towards its termination assumes the form of the foregoing species, the morbid appearances are those proper to each species.

Prognosis.—Generally favourable, if promptly treated.

TREATMENT.—*Indications.*—I. To remove the offending matter from the bowels. II. To support the strength.

I. The first indication is fulfilled by a full dose of calomel and opium, followed, after an interval of two or three hours, by castor oil or the senna draught. The effect on the bowels may be kept up by calomel in doses of from three to five grains every three or four hours, and enemata of warm water may be administered from time to time.

II. The second indication is fulfilled by the usual stimulating remedies, and nourishing diet.

If the disease runs into either of the foregoing, the remedies appropriate to those forms of the disease must be employed.

FALSE PERITONITIS.

Symptoms.—After a slight rigor, pain and tenderness of the abdomen, a slightly-coated tongue, a rapid and very compressible pulse; temperature of the skin but little increased; expression of the countenance free from anxiety; strength much less impaired than in the other forms. Is most apt to occur in delicate and nervous females, and after unusually severe after-pains, or the violent operation of a purgative.

Prognosis.—Favourable.

Diagnosis.—From true puerperal peritonitis by the symptoms, and by the unfavourable effect of blood-letting.

Treatment.—Fomentations, poultices, diaphoretics, and opiates, with an occasional mild laxative.

There is a form of puerperal fever of occasional occurrence, and characterised by symptoms similar to those of false peritonitis, but with the addition of profuse perspiration, and frequently of diarrhœa, with nervous excitement and violent palpitations of the heart. This is called Hidrosis or Hidrotic fever. The therapeutic indications are, 1. To remove local irritation; and 2. To support the strength. For this latter purpose quinine, or stimulants in combination with opium, may be employed.

MILK FEVER.

SYMPTOMS.—After well-marked rigor, occurring about the third day after delivery, great pain and throbbing in the head; intolerance of light and sound; flushed countenance; contracted pupils; conjunctiva injected; pulse frequent, full, and hard; skin hot and dry; thirst excessive; tongue dry and coated. If the symptoms are not speedily relieved, the secretion of milk is suppressed; the breasts become flaccid; the head symptoms more severe; and delirium sets in.

CAUSES.—Heated atmosphere, undue exertion, mental agitation.

DIAGNOSIS.—From other fevers occurring in puerperal women by the great disturbance of the circulation, with the strong determination to the head.

INDICATIONS.—1. To reduce arterial action. 2. To promote the secretion of the milk.

I. Arterial action may be subdued in slight cases by purgatives, with salines and tartar-emetic in small doses, by antiphlogistic diet, rest of mind and body, cool air, and warm diluent drinks. In more severe cases, blood-letting in a full stream, and repeated if necessary, followed by tartar-emetic in full doses, and brisk mercurial purgatives. Cupping, or leeches to the temples, and cold lotions or ice to the head, according to the severity of the head-symptoms. Hot water to the feet, and, in severe cases, mustard poultices to the legs.

II. To fulfil the second indication, the milk should be gently drawn off, and the breast be fomented or poulticed. The child should also be occasionally applied to the breast, with a view of re-exciting the secretion. (See article Puerperal Fevers, in Lib. of Pr. Med., by Dr. Latham; also Dr. Ferguson's recent work on Puerperal Fever.)

GENERAL OBSERVATIONS ON PUERPERAL FEVER.

The diseases which are usually characterized by the term Puerperal Fever, are the two first of the present group—acute puerperal peritonitis, and adynamic or malignant puerperal fever. Both

these diseases have been observed in different epidemics: and cases of both forms occur in the same epidemic, just as continued fever in one year takes the shape of synocha, in another of typhus, whilst in a third, cases of both are observed to occur at the same time. In the mode of commencement, too, there is an analogy between puerperal fever and common continued fever. The first stage of congestion sometimes assumes so marked a character in both as to give to the disease the name of *congestive*; in like manner, the stage of reaction may be so strongly marked, as to gain for the fever the name of *inflammatory*; or the symptoms from the first may be accompanied by that extreme debility and nervous depression which is characteristic of the *typhoid* state. These strong analogies, added to the acknowledgedly contagious character of both diseases, leads to certain general views which have an important bearing on the treatment. It is only by recognising in these different forms the same essential disease, varying with the season, and "epidemic constitution," on the one hand, and with individual peculiarities on the other, that the treatment of the disease can be conducted on rational and safe principles. In this disease, more than in most others, it will not do to treat a name; to place reliance upon any approved prescriptions, or to follow implicitly the experience of any single author in a single epidemic. Puerperal fever, like continued fever, must be treated on general principles; reaction must be brought about by prompt measures when congestion exists; inflammation must be subdued by depressing remedies, where the disease takes on the inflammatory character; local complication must be treated with as little expense of blood and strength as possible, and the strength must be carefully supported where the typhoid character prevails from the first, or supervenes in the course of the disease.

CHAPTER III.

EXANTHEMATA—ERUPTIVE FEVERS.

CHARACTER.

Contagious diseases, attacking a person, for the most part, only once in his life, beginning with fever, and followed, after a short and nearly definite interval, by cutaneous eruptions.

GENERA.

VARIOLA	.	.	.	.	Small-pox.
VACCINA	.	.	.	.	Cow-pox.
VARICELLA	.	.	.	.	Chicken-pox.
RUBEOLA	.	.	.	.	Measles.
SCARLATINA	.	.	.	.	Scarlet Fever.

PESTIS	.	.	.	.	Plague.
ERYSIPELAS	.	.	.	.	Saint Anthony's Fire.
MILIARIA	.	.	.	.	Miliary Fever.

VARIOLA.—SMALL-POX.

SPECIES.—The small-pox is distinguished into two species; the *distinct* and *confluent*; implying that in the former the pustules are perfectly distinct and separate from each other, and that in the latter they coalesce.

1. VARIOLA DISCRETA.—*Distinct small-pox*.—The eruption of distinct small-pox is ushered in by rigors, lassitude, headache, severe pains and extreme weakness in the back and loins, nausea, vomiting, pain in the epigastrium upon pressure, disposition to drowsiness, occasionally coma, and in infants by convulsions or epileptic fits. These symptoms are followed by fever of the inflammatory type, with frequent pulse, hot and dry skin, restlessness, diminished secretions, &c., continuing up to the period of the eruption, and generally suffering considerable abatement at that time.

At the end of *forty-eight hours* from the first occurrence of rigors, the eruption makes its appearance on the face and forehead, in the form of minute papulæ, sensibly elevated above the surface of the skin.

During the *third*, or *third* and *fourth* days, it extends itself successively to the sides of the nose, chin, and upper lip, to the neck and wrists, and at length to the trunk, thighs, and the whole body.

About the *fifth*, a little vesicle, appearing depressed in the middle, containing a colourless fluid, and surrounded by an inflamed areola or margin, perfectly circular, may be observed on the top of each little point or pimple.—The eruptive fever now undergoes a still further abatement, or entirely disappears.

About the *sixth*, the saliva becomes increased in quantity and viscid; at the same time that there is a degree of swelling of the throat, difficulty of deglutition, and hoarseness.

On the *eighth* day, the pustules are completely formed and spherical, or prominent, and appearing almost to terminate in a

point; the inflammatory areola attains its full size, and the contained matter has assumed the appearance of pus. The face swells; and the swelling extending to the eyelids, these often become so much enlarged as to close the eyes. The mouth, nose, and fauces are also covered with pustules.

About the *tenth* or *eleventh*, (the eighth or ninth from the appearance of the eruption,) the inflammatory areola subsides, the matter has changed from a white to an opaque yellow, and a dark spot appears on each.—At this time the tumefaction of the face subsides, and the hands and feet begin to swell.

After the *eleventh* day, the pustules from being smooth, become rough, break, and discharge their contents; which drying on the surface a small crust is formed over each of them. These in a short time fall off, and leave the part they covered of a dark brown colour, which often remains for many days; and in cases where the pustules have been large, or late in becoming dry, deep indentations of the skin. The swelling of the hands and feet gradually subsides, and about the seventeenth day the secondary fever disappears.

The period occupied by the change from papulæ to pustules is called the period of *maturation*. At different stages of this process, according to the amount of eruption, but generally towards the end of the period, *secondary fever* sets in, characterised by extreme restlessness, sleepless nights, a frequent and quick pulse, scanty and high-coloured urine, and frequently by delirium, especially at night.

2. VARIOLA CONFLUENS. — *Confluent small-pox*.—Both in its symptoms and progress, the confluent kind differs materially from the distinct or benign. The eruptive fever is more intense, and increases from the first appearance of the eruption to the period of pustulation. The *secondary fever*, which accompanies the decline of the disorder, is also more intense, and often assumes the typhoid character. Coma and delirium are more frequent concomitants; severe diarrhœa is sometimes present, and profuse salivation is apt to occur.

The eruption is irregular in its appearance, and in the succession of its stages. It is usually preceded by an erythematic efflorescence upon the face, from which the pustules emerge on the second day in the form of small red points; many of which soon coalesce and form clusters greatly resembling the measles. Maturation is more early; but the pustules do not retain their circular form, are of an irregular shape, often flattened, and appear like thin pellicles fixed upon the skin, and containing, instead of true pus, a brownish ichor; nor are they surrounded by an inflamed margin, the intermediate spaces between the clusters appearing pale and flaccid. The inflammation extends to the subjacent cellular membrane, and tends in severe cases to extensive sloughing. The swelling of the face and salivation commence earlier, and rise to a much greater

height than in the distinct form of the disease. The fever, though it generally suffers a slight remission, does not cease upon the appearance of the eruption, and about the ninth day it suffers a remarkable exacerbation; and in some instances all the worst symptoms of typhus supervene; the eruption assumes a dark livid or black hue; petechiæ, and passive hæmorrhages, bloody urine or dysentery, make their appearance; there are coma, convulsions, sordes on the lips and teeth, and the patient is often carried off on the night of the eleventh day from the commencement of the disease. Should recovery happen, the pits or scars will be much deeper than in the milder form.

CAUSES.—Variola is the effect of a specific contagion.—It is produced either by subjecting the body to the effluvia arising from those who already labour under the disease, or by the introduction of a small quantity of the variolous matter into the system by inoculation.

PROGNOSIS.—Variola, in its regular and benign form, seldom proves fatal, unless in consequence of improper management; but it often leaves behind it a predisposition to inflammatory complaints, particularly to ophthalmia and visceral inflammation, more especially of the thorax; and it not unfrequently excites scrofula into action, which might otherwise have lain dormant in the system.

The circumstances which lead to the apprehension of danger are,

1. The appearance of symptoms announcing the approach of the confluent form of the disease, or the disease in its progress approaching to the malignant character before described; the fever assuming the form of typhus, and the pustules becoming flattened, livid, or interspersed with petechiæ.

2. A sudden disappearance of the eruption, subsidence of the swelling of the face or extremities, suppression of saliva, or depression of the pustules, followed by great prostration of strength, universal pallor of the skin, great anxiety, oppression at the chest, syncope, convulsions, coma, or delirium.

3. Complications with visceral disease, as inflammatory affections of the brain, of the throat, larynx, or lungs, or of the alimentary canal, and suppurations in these viscera, or in the joints.

In general the fate of the patient is determined in the interval between the eleventh and seventeenth day. The crisis of the secondary fever is usually accompanied with a diarrhœa, or sediment in the urine.

The disease is most dangerous to adults and pregnant women, and often proves fatal to the latter.

The sequelæ of small-pox often prove fatal. Among these are inflamed pustules, abscesses, superficial ulcers, boils, sloughing of the skin, erysipelas, suppuration of the joints, in the hip, &c.; ophthalmia, followed by blindness from opacity of the cornea;

inflammation of the serous membranes of the chest and abdomen ; developement of tubercles in the lungs, laying the foundation of phthisis ; mesenteric disease ; and scrofula. During the period of convalescence patients are often attacked with other prevalent diseases, as typhus fever, erysipelas, and hospital gangrene.

POSTMORTEM APPEARANCES.—On dissection, the trachea, bronchi, lungs, liver, stomach, and intestines, are covered with pustules ; there are traces of local inflammation in various organs ; the entire body runs rapidly into putrefaction.

DIAGNOSIS.—Difficult at the commencement of the disease. The suddenness of the attack, the intense pain and extreme debility of the back and loins, the severe head-ache, the sickness, the absence of the local affections of the more severe exanthemata, the prevalence or otherwise of the disease at the time, and the exposure to contagion. The regular succession of appearances, and changes in the eruption, afterwards render the distinction easy.

The distinct may be often distinguished from the confluent, before the eruption appears, by the mildness of its attack ; by the synochal type of the fever, and the absence of typhoid symptoms.

MORTALITY.—In those unprotected by vaccination or by previous attack, about 1 in 4, of patients attacked. Average of twenty-five years at the Small-pox Hospital prior to the introduction of vaccination, 32 per cent. or about one-third ; extremes in different epidemics 15 per cent. and 42 per cent. *Proportion in total deaths from all causes prior to 1800—16 per cent. Comparative mortality of the unprotected and of those protected by vaccination.*—Period, the epidemic of 1838. Unprotected, (all forms of the disease,) 157 in 396, or 1 in 2·52 ; protected, 31 in 298, or 1 in 9·61. The natural small-pox, therefore, is nearly four times as fatal as the modified.—(Dr. Gregory.) *Mortality in the several forms of natural small-pox.*—Confluent 1 in 2 ; semi-confluent 1 in 10 ; distinct 0 in 19. *Influence of age on the mortality from small-pox.*—From 0—5 years, 41·97 ; 5—10, 24·24 per cent. ; 10—15, 19·12 per cent. ; 15—20, 24·10 per cent. 20—30, 34·07 per cent. ; 30—40, 46·54 per cent. ; 40—50, 58·33 per cent. ; 50 and upwards, 79·41 per cent. (Period 1780—99, and 1826—35, Mr. Farr, in Medical Annual.)

LAWS OF CONTAGION.—Communicated by contact or through the air, by the living and dead body, by the pustules, or by substances imbued with the variolous matter. Rarely occurs twice in the same person. Epidemic at certain seasons, as in 1781, 1796, 1825, and 1838. *Period of incubation.*—Usual duration twelve days ; limits seven to fourteen days. (Gregory.)

TREATMENT.—In the first stage, before the appearance of the eruptive fever, the treatment will be the same whatever may be the nature of the impending disease. An emetic, followed by purgatives, to remove any offending matter from the primæ viæ ; bleeding in case of plethora, antiphlogistic regimen in case of inflamma-

atory symptoms, stimulants in extreme nervous depression. Bleeding and stimulants in congestion in order to restore reaction and to relieve the circulation. Opium in case of great nervous irritability.

During the eruptive fever, when this is pure synocha, the febrile symptoms, if considerable, are to be moderated by exposing the body of the patient to a cool atmosphere; by frequently administering cold diluent fluids, as lemonade, imperial, saline draughts, &c.; at the same time administering saline aperients, so as to keep the bowels loose. Cold affusion also may be employed with advantage when there is much heat of skin.

After the appearance of the Eruption, the indications are,

- I. To moderate the fever when violent.
- II. To support the strength when deficient.
- III. To obviate all those circumstances that may produce any irregularity in the appearance, or in the progress, of the disease. The free admission of air, first proposed by Sydenham, is of great importance.

In cases of violent action, in full and plethoric habits, bleeding has been had recourse to, and is recommended by many; but it is a practice mostly replete with danger, and to be avoided, if possible; for the subsequent debility generally overbalances the temporary advantage that may be gained by this remedy.

Purging is often successful in diminishing the violence of febrile action without inducing much weakness.

If there be great irritability and restlessness, opium in small quantities, with a saline draught, will be serviceable, or with small doses of tartarized antimony.

Small doses of mercury are often serviceable in moderating the febrile action of variola, even when exhibited so as slightly to affect the gums; and no inconvenience is likely to arise from its use.

When the eyelids swell much, and are inflamed, a blister may be applied behind the ears, or leeches to the temples. In such cases, and when the face is swollen, olive oil or cream is often applied with advantage.

If the throat be much affected, and there is difficulty in swallowing, a blister is to be applied to the neck, and gargles of infusion of roses directed.

Determination to the head or chest, or other viscera, requires blisters, pediluvium, sinapisms to the feet, and the ordinary remedies applicable to idiopathic inflammation.

Obstinate vomiting, which in this disease often proves both a troublesome and dangerous symptom, is most effectually allayed by saline remedies, in the act of effervescence, with opium.

If the febrile symptoms indicate a tendency to typhus, the mode

of treatment recommended for the milder form of typhus fever should be resorted to.

As debility comes on, recourse must be had to quinine, wine, and nourishment.

In all cases where there is a great propensity to sweating, after the eruptive fever has passed by, a cool regimen will be particularly necessary.

Diarrhœa, when excessive, is to be checked by small doses of opium with chalk mixture.

When the eruption suddenly recedes, or the pocks sink and become very much dimpled, and any alarming symptoms supervene,—as rigors, convulsions or delirium,—recourse must be had to blisters and sinapisms, leeches to the temples, blisters to the nape of the neck, and sinapisms to the feet and legs. The cold dash applied to the head whilst the body is in a warm or vapour bath, may be used with great benefit.

Upon the accession of the secondary fever, if this preserve the character of synocha, and be not attended by any debility, recourse must be had to the same means of moderating it employed at the commencement of the disease.

If, on the contrary, the secondary fever be typhoid, the means recommended for the cure of typhus gravior must be enforced.

VACCINA, VACCIOLA.—COW-POX, KINE-POX, VACCINE DISEASE.

The benefits conferred on mankind by the discovery of vaccination, as a preventive of small-pox, are now universally admitted. If the virus be genuine and properly inserted by inoculation, the human body is to a certain extent protected from the attack of small-pox, and the disease, if it occur, is in most cases greatly mitigated. The protection seems, however, to be less effectual during severe epidemics, when the power of the contagion is at its height.

The vaccine lymph should be inserted under the cuticle, by three or four punctures, made near each other, in each arm. If the inoculation is properly performed, we observe on the *second* day small red spots which feel hard, but when viewed through a microscope are seen to be vesicular. On the *third or fourth* day the spots are larger and more perceptible, and on the *fifth* small pearly vesicles appear. These are surrounded by a crimson or pink areola, but sometimes not before the *seventh* or *eighth* day, when they become circular or annular, and the efflorescence is about an inch in diameter. The surface of the vesicle is uneven; there is a depression in the centre. On the *ninth* day the edges are elevated, and the rosy blush is increased, hard and tumid. At this period an erythema may extend over the arm, and sometimes over the whole body. About the *ninth* or *tenth* day the disease is at its height

and there is a slight degree of fever for a few hours. On the *eleventh* or *twelfth* day the areola, or rosy blush, diminishes; the centre of the vesicle is covered with a brown scab, which falls off in a few days, generally on the *twentieth*, leaving a deep mark, or indentation, on the skin, of a circular form, about an inch in diameter, with as many pits as there were cells in the vesicle. Unless all these symptoms are observed, a spurious cow-pox has been communicated, and re-inoculation is absolutely necessary.

The best time for taking the matter is from the fifth to the eighth day, and from that to the twelfth, but after this time it cannot be depended on; or if any cause, such as friction or injury, has disturbed the progress of the vesicle. The disease will not be properly communicated should there be a chronic eruption on the arms; if scarlatina, measles, or other cutaneous diseases supervene; or if dentition, disordered bowels, or any other malady be present at the time of inoculation.

Infants should be vaccinated after the sixth week. The only preparatory step to be taken is to open the bowels. There should be no cutaneous eruption on the arms, and no disease present at the time of vaccine inoculation. The best vaccinators prefer three or four slight punctures in each arm, and sometimes a single puncture in each; while others make as many as thirty, and others prefer longitudinal scratches with a lancet. When many punctures are made, the arm becomes much inflamed, and sometimes ulcerates, giving rise to great constitutional irritation. Such a practice is cruel and unnecessary. Sometimes boils, pustules, leprous and impetiginous eruptions succeed the vaccine disease; but this seldom happens when the child's health is good at the time of vaccination. Such eruptions are readily cured by mercurial alteratives, hydr. c. cretâ, rhubarb, carbonate of iron, syrup of quinine, &c.

Some have recommended the repetition of vaccination at intervals of a few years. It is, perhaps, a wise precaution, and if adopted should be performed a second time at about ten years of age, or from this to the age of puberty.

VARICELLA.—THE CHICKEN-POX, SWINE-POX, BASTARD-POX, GLAND-POX.

SYMPTOMS.—Within twenty-four hours after slight symptoms of fever, as lassitude, loss of sleep, wandering pains, loss of appetite, &c. an eruption appears; first on the back, consisting of small reddish pimples, much resembling the first appearance of the small-pox. On the *second* day the red pimples have become small vesicles, containing a colourless fluid; and sometimes a yellowish transparent liquor. On the *third*, the pustules arrive at their full maturity. Soon after, the fluid becomes extravasated by spontaneous, or acci-

dental, rupture of the tender vesicle, and a thin scab is formed at the top of the pock, without pus ever being formed, as in the true variola. Generally before the *fifth* day the whole eruption disappears, without leaving behind it any cicatrix or mark.

DIAGNOSIS.—*From variola*.—By the small degree of fever; by the short interval (24 hours) between the first symptoms and the appearance of the eruption; by the pimples first appearing on the back; by no suppuration taking place; by the absence of indentation; by the pustules falling off, in scales, about the fifth day; at which period the eruption in variola is only just completed.

PROGNOSIS.—It is entirely free from danger, unless the eruption be of the confluent kind, when the danger may be judged of from the degree of violence of the concomitant fever.

TREATMENT.—This complaint is of so trivial a nature, as seldom to require the aid of medicine. Gentle cathartics are all that are in general necessary. Should there be accidentally much fever, the means may be employed for moderating it that are recommended in small-pox.

MORBILLI OR RUBEOLA.—THE MEASLES.

SPECIES.—1. *Rubeola vulgaris*.

2. *Rubeola maligna*.

SYMPTOMS.—1. *Rubeola vulgaris*.—After premonitory symptoms of catarrh, or, in more severe cases, after rigors and flushes, lassitude, heaviness, pain in the head and drowsiness; ringing cough; hoarseness; difficulty of breathing; frequent sneezing; itching of the face; smarting of the eyes, swelling of the eyelids, copious secretion of watery fluids from the eyes and nostrils; nausea or vomiting, thirst, furred tongue, frequent pulse, and the general symptoms of synocha.

On the *fourth* day, small red points appear, first on the face, and afterwards successively on the lower parts of the body. They are generally in crescentic clusters, do not rise into visible pimples, but by the touch are found to be a little prominent.

On the *fifth* or *sixth* day, the vivid red is changed to a brownish hue; and in a day or two more the eruption entirely disappears, with a mealy or furfuraceous desquamation of the cuticle.

The febrile symptoms are not diminished upon the appearance of the eruption, but rather increase, and become attended with much anxiety and oppression of the præcordia, and symptoms of pneumonia. The fever, however, undergoes considerable abatement on the 6th or 7th day. At the period of desquamation of the papulæ, a diarrhœa frequently comes on, and continues for some time. The eruption may occur without catarrh (*rubeola sine catarrho*.)

2. *Rubeola maligna*.—This form of the disease is ushered in by more severe premonitory symptoms, and soon assumes the typhoid

character. The eruption appears early, but irregularly; alternately receding and reappearing; it assumes a dark or livid hue, (*rubeola nigra*,) and is often interspersed with petechiæ. The fauces often assume a dusky red or livid hue; all the symptoms are aggravated; there is great tenderness in the abdomen, with dark offensive stools; delirium is present, or coma or convulsions; and the affection of the mucous membrane of the air-passages passes into croup or severe pneumonia. The patient dies exhausted by diarrhœa, or asphyxiated by the congestion of the lungs, or comatose from the severity of the head-affection.

CAUSE.—Specific contagion, of which patients are generally susceptible only once during their lives.

DIAGNOSIS.—The pathognomonic symptoms which distinguish the eruptive fever of measles from variola and other diseases, are the peculiar dry ringing cough and hoarseness; the heaviness of the head and drowsiness; sneezing; coryza; the appearance of the eyes, which are red, swelled, itchy, very sensible to light, and frequently loaded with tears. It is distinguished from scarlatina, by its darker hue, by the defined character and crescentic arrangement of the patches, by the marked catarrhal symptoms, and the absence of the severe affection of the throat: from roseola, by the darker hue and more sudden appearance of the eruption, and greater severity of the symptoms.

PROGNOSIS.—*Favourable*.—The febrile and other symptoms slight; moderate diarrhœa; early and free expectoration; a moisture on the skin at the appearance of the eruption.

Unfavourable.—A high degree of fever; hot and parched skin; hurried and difficult breathing; flushed countenance; unusually hard pulse.

The fever increasing after the appearance of the eruption, and assuming the form of typhus; great pain in the head and eyes; shooting pains in the chest; symptoms of pneumonia or cynanche; no expectoration before the fourth day; the pulse rapid and small; delirium or coma; extremely anxious respiration.

The sudden disappearance of the eruption, succeeded by delirium; great anxiety; laborious respiration; acute pains in the chest, or violent diarrhœa; the eruption becoming of a livid hue; a pallid appearance of the pimples, with great prostration of strength, small intermitting pulse, petechiæ, and other typhoid symptoms. Continued diarrhœa or vomiting.

SEQUELÆ.—Pneumonia, cynanche trachealis, bronchitis, phthisis; diarrhœa, enlargement of the mesenteric glands; ophthalmia, abscesses in the ear, swelling and suppuration of the parotids; aphthæ and gangrene of the mucous membrane of the mouth.

Period of incubation.—Six to sixteen days.

TREATMENT.

Of the Rubeola vulgaris.

Indications.—I. To diminish the inflammatory action.

II. To relieve urgent symptoms.

The first indication is to be attempted :—

1. By abstinence from animal food, and strict adherence to the antiphlogistic diet.

2. By placing the patient in a moderately cool atmosphere, the temperature of which should be regulated in a great measure by his own feelings, carefully guarding against any sudden change or exposure to severe cold.

3. By the common refrigerants and diaphoretics, of which tartar-emetic is the best.

4. By the occasional exhibition of saline aperients.

5. When the synochal febrile symptoms run high, and more especially when symptoms of local inflammation are present, recourse must be had to general and local bleeding, combined with tartar-emetic in nauseating doses.

Practitioners differ much with respect to the time at which blood-letting may be employed with the most advantage. Dr. Morton thinks it requisite as soon as the eruption is completed. Sydenham recommends it after the eruption has disappeared ; but the practice in this respect should be regulated by the degree of the accompanying pneumonic symptoms, without attending to the particular period of the disorder, or the state of the eruption.

Where the inflammatory symptoms become urgent, with much anxiety, pain, and oppression at the chest, general bleeding cannot be dispensed with, unless extreme debility be present. Topical bleeding, under less urgent symptoms, may suffice.

6. By the application of blisters to the chest, in cases where the fever is violent, with delirium or pneumonic inflammation. In bad cases ulceration or sloughing succeeds vesication.

The second indication regards symptoms.

1. If the disease be accompanied by inflammation of the lungs, general and topical blood-letting must be enforced ; with nauseating diaphoretics, and occasional purges, as recommended for the cure of pneumonia.

2. Hoarseness, cough, and inflammation of the fauces, will be palliated by barley-water, with acacia gum ; thin arrow-root ; orgeat and water ; the compound decoction of barley, or capillaire and water, taken in very small quantities and frequently, not cold, but with the chill just removed. The addition of a little nitre, or of a small quantity of lemon juice, will render them more palatable. Inhaling the steam of warm water is also serviceable.

Mild opiates are occasionally useful after the febrile action is abated ; but when given before, they neither procure rest, nor an

abatement of the cough. An opiate given at bed-time, should always be combined with a saline diaphoretic.

3. When diarrhœa does not take place towards the resolution of the disease, a purge or two of the submuriate of mercury should be administered.

4. Where diarrhœa is excessive, astringents and opium are necessary. Should the diarrhœa continue, and threaten great exhaustion, recourse must be had to the opiate confection, astringent clysters, and the more powerful astringent remedies recommended in the treatment of diarrhœa.—See *Diarrhœa*.

5. If the symptoms manifest a tendency to a putrid or malignant form of disease, they must be treated accordingly, as directed in typhus.

Of the putrid or malignant species.

The treatment of malignant measles is similar to that of typhus fever: it requires the exhibition of mineral acids, cinchona, wine, &c. Delirium, pneumonic symptoms, cough, &c., must be treated as before recommended.

When the eruption of measles disappears before the proper period, and convulsions, or great anxiety, or delirium, take place, the indication will be to restore the eruption to the skin. To effect this, recourse must immediately be had to the warm bath, blisters or sinapisms to the chest and feet, the administration of warm wine and water, camphor and æther, or other appropriate stimulants.

When convalescence commences, the diet should be nutritious, the bowels regulated, the dress warm to prevent pulmonic inflammation, which is very apt to occur, and to lay the foundation of consumption.

SCARLATINA.—SCARLET FEVER.

SPECIES.—1. *Scarlatina simplex*.

2. *Scarlatina anginosa*.

3. *Scarlatina maligna*.

SYMPTOMS.—*Scarlatina simplex*.—After the usual premonitory symptoms of fever, viz. cold chills, shivering, nausea, and sometimes vomiting; the symptoms of synocha,—thirst, hot skin, frequent pulse, &c. On the *second* day, in the greater number of cases, a bright scarlet efflorescence is perceptible on the face, neck, and breast, whence it extends itself over the entire trunk and limbs. At first it consists of innumerable red points, separated by interstices of the natural colour; these spots soon coalesce, so that in a few hours the redness becomes universal. The skin is rendered pale by pressure, but the colour immediately returns. After the lapse of *one* or *two* days, the efflorescence again becomes partial, is arranged in large irregular patches, and does not disappear on pressure. The skin is perceptibly rough to the touch, and in some instances it is studded with small miliary vesicles.

The rash generally begins to decline on the *fifth* day, is very indistinct on the *sixth*, and wholly disappears by the *eighth* day. Desquamation of the cuticle generally begins on the parts first affected about the end of the *fifth* day, and soon extends to the entire body. The cuticle separates in the form of scurf on the trunk and limbs, and in large scales from the hands and feet. The mucous membranes are more or less affected at the same time; the eyelids, the lips, the edges of the tongue, the soft palate, the pharynx and nostrils, are of a bright red colour; the tonsils are slightly enlarged, and there is some difficulty in swallowing. The papillæ of the tongue are elongated, and project as bright red points through the white mucus which covers its surface; or the whole tongue is of a bright-red colour with prominent papillæ. The appearance of the tongue in the first case bears a close resemblance to that of a white strawberry; in the second, to that of the red variety. The febrile symptoms subside with the rash, leaving, in most cases, great debility behind them.

Although the eruption in scarlet fever usually occurs on the second day, there are many exceptions to the rule. During the prevalence of scarlet fever, cases are constantly occurring in which there is slight sore throat and a suspicious appearance of tongue, with little disturbance of health for three, four, or five days, at the end of which time the eruption makes its appearance, and the disease generally runs a mild course. I at first felt some difficulty in my prognosis in these cases, but I soon found that however slight the other symptoms might be there was always during this latent period a very frequent, full, and peculiarly compressible pulse. Wherever such a pulse exists, with suspicious symptoms, some febrile disease may be confidently looked for. On the other hand, there are cases in which the eruption makes its appearance much earlier, as in a young lad of sixteen, who felt ill for the first time at five o'clock in the evening, and had the eruption full out upon him before twelve o'clock at night. The case was intermediate in severity between scarlatina simplex and scarlatina anginosa. (G.)

Scarlatina anginosa.—Lassitude; dejection of mind; pain in the head, followed by soreness, with sense of straightness in the muscles of the neck and shoulders; rigor; horror; and other symptoms of typhous pyrexia.

On the *second* day, difficulty of swallowing; hoarseness; loss of appetite; nausea, and often vomiting; hurried respiration, interrupted by frequent sighs; the breath is hot and burning to the lips; great thirst; hot and dry skin, the temperature often rising to 106° , 108° , or 112° ; small pungent pains, as if occasioned by the point of a needle; quick, weak, sometimes hard pulse.

On the *third* day, the face, neck, and breast, appear redder than usual; or scarlet stains, or patches, are observed about the mouth and nose; the submaxillary glands are enlarged and painful to the touch; the velum pendulum palati, the uvula, the tonsils, and

pharynx, as far as the eye can reach, partake of the general redness. Collections of thick mucus, and specks, are often observed, much resembling the sloughs in cynanche maligna; yet real ulceration seldom takes place. The papillæ of the tongue are elongated and elevated, the organ itself is very red, the inflammation may extend along the mucous membrane of the fauces, nostrils, and Eustachian tube, and be followed by purulent discharge from the nostrils and ears. The redness in a few hours becomes universal over the body, and increases to a great degree of intensity. It disappears upon pressure; is perfectly smooth to the touch; nor is there the least appearance of pimples or pustules.

On the *fifth* or *sixth* day, the intense scarlet gradually abates; a brown colour succeeds; when the skin, becoming rough, peels off in small scales; and the patient begins to recover strength and appetite. Not unfrequently, however, after a few days' amendment, an unaccountable languor and debility is felt; stiffness in the limbs; accelerated pulse; disturbed sleep; disrelish for food; scarcity of urine; dropsical swellings; sometimes anasarca alone; sometimes combined with ascites or hydro-thorax.

Scarlatina maligna.—Intense inflammation of throat at the onset of the disease, followed by extensive sloughing, and accompanied by great enlargement of all the salivary glands. The eruption appears late in the disease, in irregular patches, of a paler colour, sometimes disappearing suddenly. The other symptoms are those of typhus in its worst form.

CAUSE.—Specific contagion.

DIAGNOSIS.—*From measles*.—By the absence of cough, sneezing, coryza; by the affection of the throat; by the appearance of the eruption; its greater extent, and its less defined form.

From erysipelas.—See Erysipelas, p. 205.

PROGNOSIS.—*Favourable*.—The concomitant fever purely inflammatory, and slight affection of the throat; remission of the febrile symptoms, and of the affection of the throat, upon the appearance of the eruption; hæmorrhage from the nose of a florid red colour.

Unfavourable.—The eruption being preceded by great anxiety, nausea, vomiting; the fauces of a dark red or purple colour, without swelling; ash-coloured or brown specks, soon becoming ulcerated; great prostration of strength; delirium; coma; the eruption appearing as early as the second day; its coming out in patches is more unfavourable than an universal efflorescence; or not appearing at the usual time or for several days afterwards, when cerebral congestion may suddenly come on and prove fatal. In bad cases, the lips and genitals may mortify and become gangrenous. On dissection, the fauces, larynx, and trachea, are found inflamed, ulcerated, or gangrenous. When these symptoms appear, the disease is called scarlatina maligna. The fever continuing after the period of desquamation; glandular swellings; anxious diffi-

culty of breathing, and peculiarly stridulous voice, indicating the extension of the disease to the larynx and trachea; acute pain in the ear, with deafness; the saliva tinged with blood of a dark colour; discharge of acrid matter from the nose; running from the ears; skin continuing obstinately dry; the desquamation followed by a fresh efflorescence and increase of fever; diarrhœa, inflammation and suppuration of the parotid, sub-maxillary, salivary, and cervical glands; congestion or inflammation of the brain or lungs.

TREATMENT.—All that will in general be requisite in the treatment of scarlatina simplex, in its mild form, is to keep the patient in a moderate and equable temperature, about 60° of Fahr.; to preserve the apartments clean and open; to enforce a light diet without animal food; to direct cooling acidulated liquors for common drink, and to administer gentle aperients, more particularly towards the decline of the eruption.

Scarlatina anginosa.—*Indications.*—1. To lower febrile action. 2. To reduce the inflammation of the throat without exhausting the strength of the patient.

1. The first indication is fulfilled by the ordinary antiphlogistic treatment. When the heat of the body is much, and steadily, above the natural degree, the *cold affusion* may be employed, or the body may be frequently sponged. When this remedy is used with due precaution, it is attended with the best effects, and there is little fear of repressing the eruption.

2. Where severe inflammation of the throat is present, prompt remedies are necessary. General blood-letting should be avoided, unless there is very high febrile action; but local bleeding by leeches may be advantageously resorted to. Ice swallowed freely, and cold lotions or ice, applied externally to the throat, are the chief remedies. In employing them, we must take care that the heat of the body generally is not too much reduced. Used with this precaution, this local application of cold will not be found to interfere with the progress of the eruption, nor to be attended with any other risk. Where ice cannot be procured, cold liquids must be substituted. Blisters, strong liq. ammoniæ, sinapisms, or hot turpentine, may be applied externally with some advantage. Acidulated gargles may be used to clear the throat of the tenacious mucus which is thrown out; but if ice can be procured, these are unnecessary.

At the decline of the eruption, tonics are required, especially quinine, cinchona, or cascarilla; a nutritious diet also, with wine.

Scarlatina, which assumes the typhoid character, at whatever period it may happen, is a highly dangerous disease, and requires the employment of cordial tonics, acids, and wine, in large and repeated doses, as recommended for the cure of typhus gravior and cynanche maligna. When the throat is covered with sloughs, sti-

mulating and astringent gargles must be used very often. Of these, the cayenne-pepper gargle is the most efficacious.

Children sometimes are with difficulty prevailed upon to gargle and take the medicines; when they refuse, the gargle must be used by means of a syringe, or of a piece of sponge or lint tied on a stick of wood or whalebone, and passed into the fauces.

When anasarca, ophthalmia, pneumonia, cerebral affections, or other diseases succeed scarlatina, they are to be treated on ordinary principles. Purgatives, tonics, nutritious diet, warm clothing, and cautious avoidance of exposure to cold or damp, must be employed and observed after recovery from this disease.

Sometimes scarlatina occurs without the eruption, but with the characteristic sore throat, strongly marked. This usually happens in adults who have already had the disease in its complete form.

For an account of the dropsy, which is the most common sequela of scarlet fever, see Anasarca. See also Cynanche Maligna.

PESTIS.—PLAGUE.

Definition.—"An exanthematous disease, the eruption consisting of buboes, carbuncles, and pustules, white, livid, or black, and generally attended with malignant and very fatal fever."

SYMPTOMS.—The patient attacked suddenly, or after slight premonitory symptoms,—consisting of rigors, lassitude, depression of spirits, pain and weight of head, and giddiness,—with indescribable feeling of anxiety about the præcordia, and extreme restlessness and severe pain referred to the region of the heart. The countenance is expressive of exhaustion and anxiety, the eye is dull and sleepy, the eyelids closed, the mouth half open. The gait becomes staggering and uncertain, like that of a drunken man; the debility soon becomes extreme, the head falls upon the breast. The eyes become more dull and sunken, the complexion dingy; there is bilious vomiting; the tongue is swollen, furred, and glistening, but moist and clean towards the tip and edges; pulse from 115 to 130, and very feeble; respiration hurried; speech indistinct and faltering. Darting pains in the axillæ and groins now indicate the commencement of the characteristic glandular swellings and carbuncles. In favourable cases, these swellings are of a bright-red colour; in the more dangerous, livid or purple. This first stage, which commonly lasts twelve hours, is followed by reaction, with increased restlessness, disturbed sleep, confusion of thought alternating with coma; the countenance retains its former expression, but the eye assumes a peculiar brightness, and the pupil is dilated. The pulse is hard and full, or very infrequent, or weak, fluttering, and intermittent; the tongue is dry, parched, of a yellowish colour, red in the centre and at the edges; then brown, cleft, and horny; the lips, teeth, and nostrils coated with dry sordes: there is constant nausea, with occasional vomiting of a blackish fluid; the evacua-

tions from the bowels dark and offensive, and occasionally mixed with grumous blood; and hæmorrhage sometimes takes place from the nose.

In favourable cases, the crisis is by profuse perspiration and suppuration of the tumors; but in unfavourable ones, the skin remains harsh and dry; the pulse is small and fluttering; low muttering delirium and laborious breathing set in; the eye is sunk, the countenance wears a ghastly expression, the skin becomes covered with petechiæ and vibices, the buboes remain stationary; the powers of life give way, and death takes place without a struggle.

Cause.—Contagion. This is doubted by some authorities. The disease is endemic in Egypt, often spreads to the surrounding countries, and formerly prevailed in almost every part of Europe.

MORTALITY.—In Smyrna, during five months of 1834, out of 5,727 persons attacked, 4,831 died and, 907 recovered: 1 in 23 of the whole population suffered, and about 1 in 27 died; the deaths constituting 84 per cent. of the cases. (See Lib. and Cyclop. Pract. Med., Art. Plague.)

PROGNOSIS.—The most favourable cases are those in which the buboes form early, are firm and moveable, and pass rapidly into suppuration. Profuse perspiration is one of the best symptoms, and often proves critical. An absence of severe fever, and the survival of the patient beyond eight days, also promise recovery.

The *treatment* is that of typhus fever, with appropriate local applications to the buboes and carbuncles. Mercury carried to salivation has been recommended, and, where salivation has taken place, seems to have been beneficial. The disease appears, however, to be almost equally fatal under all modes of treatment.

ERYSIPELAS—ST. ANTHONY'S FIRE.

SYMPTOMS.—Rigors, and other symptoms of pyrexia; great confusion of the head, sometimes amounting even to delirium; coma, nausea, vomiting; tongue moist and covered with an uniform white fur; quick, hard pulse; strong, or small, as the fever may incline to the inflammatory or typhus kind. About the *second* or *third* day, the skin of a particular part of the body becomes inflamed; soon after, an efflorescence appears of a florid red colour; at first of no great size, but gradually spreading, and at length occupying a large extent of surface. There is considerable tumor, and a peculiar acrid heat of the inflamed parts; when the face is the seat of the disease, the whole hairy scalp becomes affected, and the eyes are frequently closed by the swelling of the palpebræ; as the redness extends, it disappears from, or gradually subsides in, the parts at first occupied. After a longer or shorter time the efflorescence terminates in phlyctænæ, which are small watery vesicles the size of lentils; or in larger vesicles, or in a desquama-

tion of the cuticle ; the fever, however, does not always, at this period, suffer a remission ; but is frequently aggravated by increase of coma, or delirium, and in fatal cases the patient expires about the ninth or eleventh day.

TERMINATIONS.—1. Vesication and desquamation of the cuticle. 2. Resolution. 3. Œdema (*erysipelas œdematodes*). 4. Inflammation of cellular membrane (*erysipelas phlegmonodes*), with consequent suppuration, or gangrene (*erysipelas gangrænosum*). 5. Metastasis to internal organs, especially to their serous investments. 6. The disease sometimes suddenly leaves one part of the surface, and attacks a distant part (*erysipelas erraticum*).

Parts affected by the disease.—The face is the most common seat of idiopathic erysipelas. That which follows wounds (traumatic erysipelas), may occur on any part of the body. Erysipelas of the face commonly begins on the nose and thence gradually extends over the entire face. Sometimes it descends and spreads over the neck and trunk, but more commonly attacks the scalp. In its passage over the head the membranes of the brain are commonly more or less affected, and there is delirium of the violent or muttering kind, according as the accompanying fever is of the inflammatory or typhoid type. From the head it generally extends down the back, and sometimes affects the membranes of the spinal cord. In severe cases, traces of the affection of the membranes of the brain and spinal cord remain for some time after the recovery of the patient, and are shown by mental excitement, and by numbness and spasmodic twitchings of the extremities.

CAUSES.—*Predisposing.*—A full plethoric habit ; constitutional peculiarity ; previous affections of the same nature.

Exciting.—Cold ; excessive heat, or vicissitudes of temperature ; exposure to the rays of the sun ; abuse of fermented liquors ; suppressed evacuations, or other causes inducing plethora ; the presence of irritating matter in the primæ viæ ; more especially of acrid bile. Contagion ; wounds or local inflammation of the common kind occurring in certain constitutions, in certain seasons, and in places where the disease already exists. It is often epidemic, most prevalent during spring and autumn, and frequently prevails in hospitals, jails, and other crowded situations. A frequent concomitant of puerperal fever.

PROGNOSIS.—*Favourable.*—The fever purely inflammatory ; the eruption of a bright scarlet or red colour ; not extending over a large surface ; no vesications ; the fever and coma diminishing upon the appearance of the efflorescence ; and this, soon after, assuming a yellowish hue, with an abatement of the swelling.

Unfavourable.—The fever assuming the typhoid form ; its being protracted to the seventh, ninth, or eleventh day, with increase of coma, and delirium ; the inflammation becoming of a dark rose-colour ; its suddenly receding from the surface, and attacking an internal part ; its extending over a large surface without leaving

the part it originally occupied; livid vesications; weak, rapid irregular pulse; great prostration of strength; early coming on of coma; the disease being epidemic; the constitution of the patient originally weak, or emaciated by previous illness; the disease being combined with dropsy, jaundice, or other affections, originating in organic disease.

TREATMENT.—*Indications*.—I. To reduce the arterial action if the fever be of the inflammatory kind.

II. To support the strength of the patient, if it assume the typhoid form.

III. To obviate the tendency to a determination to the head or other important organs.

IV. To subdue inflammation, and promote salutary changes in the part affected.

I. High action, if present, is to be reduced.

(a) By *Bleeding*.—This operation is, however, to be adopted with the greatest care, for it seldom happens, that the fever is purely inflammatory, but mostly mixed, having strong synochal symptoms in the beginning, and running soon into typhoid. When, however, the subject is young, in the country, the constitution unimpaired, and the symptomatic fever high, the lancet may be resorted to with advantage; on the other hand, in persons accustomed to the air and living of a large town, and more especially if the constitution has suffered or is naturally weak, the abstraction of blood would favour the speedy change from an apparently inflammatory into a typhoid state of the febrile symptoms.

(b) By cooling or mercurial *purges*.—These are extremely serviceable; the submuriate of mercury may be administered frequently in doses of from three to five grains, with rhubarb or any aperient. Calomel in small and repeated doses may be employed with advantage when there is biliary derangement.

(c) By nauseating *diaphoretics*: especially tartarized antimony.

When the synochal symptoms are degenerating into typhoid, large doses of camphor are highly beneficial.

(d) By cooling drinks, and *dilutents*: as acidulated soda-water, lemonade, tamarind-water, and the like.

II. To support the strength of the patient, when erysipelas assumes the typhoid character, recourse must be had to the remedies recommended in the cure of typhus, viz., stimulants, as wine and ammonia, and to the stronger stimulants in persons previously accustomed to their use. These may be combined with opium when the head is not affected.

The treatment of erysipelas will vary, therefore, according to the type of the fever with which it is attended. If it be well-marked synocha, which it seldom is, the usual means of diminishing inflammation are to be resorted to; and, above all others, the frequent exhibition of mercurial purges. If, on the contrary, it possesses the character of typhus, quinine, Peruvian bark, wine, and other

remedies of the invigorating kind, enumerated under typhus, are to be relied on. If the patient is seen in an early stage, an emetic should be given and followed by a brisk purgative.

III. In cases of head affection with coma and delirium, much relief will be afforded by the semicupium, together with the application of sinapisms to the feet, mustard pediluvia, or a blister between the shoulders. Diseases of other internal organs must be treated by the remedies applicable to similar idiopathic diseases, taking into account the patient's strength. When the eruption has disappeared from the surface, and attacked an internal part by *metastasis*, an attempt must be made to restore the inflammation of the skin by the prompt application of strong stimulants, as mustard poultices, acetum cantharidis, or hot water.

IV. The topical applications resorted to by surgeons are various.

1. Warm fomentations.

2. Cold spirituous applications where the inflammatory action is strong.

3. Dry absorbent powders, to take up any acrimonious fluid that may be oozing out; as starch, meal, chalk, litharge.

In phlegmonous erysipelas, the vessels may be relieved by leeches, by small punctures, or by moderate incisions. When gangrene has taken place, deep incisions are necessary, and we must use general and local stimulants, fermenting poultices, the chlorides of lime or soda, &c. Should suppuration occur, the abscess must be timely opened. Erysipelas may sometimes be prevented from extending by applying nitrate of silver at a short distance from the margin of the inflamed part.

MILIARIA.—MILIARY FEVER.

SYMPTOMS.—Synochus; oppression, and sense of tightness about the præcordia; the breathing becomes laborious, and is interrupted with frequent sighs, or teasing cough, while the spirits are oppressed with unusual sadness and timidity. As the heat increases, there is a sense of pricking or itching in the skin, which Vogel says is also sometimes felt in the bowels; numbness in different parts of the body; *profuse sweat*, of a sour, rank odour, during which there is often a contracted pulse. On an *uncertain day*, a number of small red papulæ, about the size of millet-seeds, are observed first upon the neck and breast, and thence gradually extending to the trunk and extremities; their prominence is imperceptible to the sight, yet evident to the touch; they often lose their redness, and appear of the ordinary colour of the skin. After *ten or twelve hours*, a small vesicle appears upon the top of each: this at first is of a whey colour, but afterwards becomes white. At other times, the vesicles retain their red colour, which has given rise to the division into the red and white eruptions; they generally appear separately; sometimes, however, they are intermixed; in both, the matter contained in the vesicles, has a peculiarly offensive smell. In *two*

or three days the vesicles break, and are succeeded by small crusts which fall off in scales.

CAUSES.—*Predisposing.*—Lax habit of body; sanguine temperament; childhood; the female sex; the period of childbirth; old age; preceding attacks of the same disease; debility, however induced; excessive evacuations; long-continued and copious menstruation; fluor albus; the presence of irritating matter in the primæ viæ; abuse of tea-drinking.

Exciting.—Immoderate sweating, produced by excessive heat, or by heating medicines. Too much bed-clothes and warmth in the puerperal state.

DIAGNOSIS.—The uncommon anxiety and dejection of mind; the profuse sweating; its peculiarly fœtid, rank smell. Afterwards, the appearance of the eruption.

PROGNOSIS.—*Favourable.*—The fever inclining more to the nature of synocha than typhus; remission of the symptoms upon the appearance of the eruption; the papulæ of a florid red colour.

Unfavourable.—The sweating obstinately continuing after the eruption of the papulæ, with increase of fever; great anxiety; flaccidity of the parts covered by the eruption; profound coma; difficulty of breathing; dejection of mind; the sudden disappearance of the eruption, followed by great prostration of strength, anxiety, difficult respiration, violent vomiting, delirium, convulsions; the appearance of petechiæ interspersed among the papulæ; rapid, weak, and intermitting pulse; anasarcaous swellings.

TREATMENT.—*Indications.*—I. To diminish the immoderate heat and sweating.

II. To support the strength of the patient, where there are concomitant symptoms of great debility.

The first indication will be accomplished,

1. By the cautious application of *cold*;—the air of the bed-room should be cooled, and part of the bed-clothes removed; the patient desired to lie with the arms exposed.

2. By gentle *cathartics*, if the debility be not great; neutral salts are to be preferred. When these are inadmissible, the union of rhubarb with submuriate of mercury.

3. By mineral *acids*; especially the sulphuric, which may be given in the infusion of roses, or with decoction of bark or quinine.

The second indication requires,

Bark and wine; opium; and the other means proper for typhus fever.

Should a retrocession of the eruption take place, followed by the alarming symptoms above mentioned, musk, camphor, opium, blisters, and frictions to the skin; endeavouring by every means, to bring out and support a copious diaphoresis; external warmth; powerful diaphoretics, &c. The skin may be washed with a solution of chloride of lime.

There are other cutaneous eruptions of less moment, preceded by constitutional and febrile symptoms, which might have been treated in this place; but they are reserved for a future chapter. See Skin Diseases.

CHAPTER IV.

PLETHORA.	.	.	.	.	Fulness of blood.
ANÆMIA.	.	.	.	.	Bloodlessness.
CACHEXIA.	.	.	.	.	Bad habit of body.
CHLOROSIS.	.	.	.	.	Green sickness.

PLETHORA.—FULNESS OF BLOOD.

SYMPTOMS.—General aspect of the body full and florid; capillaries of the surface injected; redness of the skin momentarily removed by pressure; pulse frequent, full, firm, and bounding; or infrequent, indistinct, and labouring; or irregular in force and frequency, according to the degree in which the heart is oppressed; tongue clean and red, or slightly furred; appetite good, or, in extreme cases, variable; bowels generally confined; skin dry; extremities generally cold; palpitation and dyspnœa on exertion; frequent sighing; dull, heavy pain in the head; listlessness; debility.

PROGNOSIS.—Favourable.

TERMINATIONS.—In local inflammations and hæmorrhages; apoplexy; suppression of the menstrual discharge in females.

TREATMENT.—*Indication.*—To diminish the quantity of blood. To fulfil this indication, general blood-letting is required. The quantity taken must depend on the effect produced and the relief afforded. The system will often safely bear the removal of forty or fifty ounces or more. It should be taken from a small orifice in the semi-erect or recumbent posture. The pulse should be examined, to ascertain the effect produced. Where it is frequent full, and bounding, blood may be abstracted till it falls to its natural frequency and force; if it is labouring, till it becomes full and free; if irregular, until it becomes regular. To prevent the rapid formation of fresh blood, a diet consisting chiefly of vegetables, with small quantities of animal food, and total abstinence from malt or spirituous liquors, must be enjoined. The bowels must be kept freely open by the compound rhubarb or aloetic pill

at night, followed by saline aperients every morning, or twice or thrice daily.

If in females the disease is complicated with amenorrhœa, blood may be taken from the groin by leeches applied at the menstrual periods.

ANÆMIA.—BLOODLESSNESS.

The term anæmia is here used to designate a state of system the exact opposite of plethora, viz. a diminution of the total quantity of blood contained in the body, without any change in the constitution of that fluid.

SYMPTOMS.—Universal pallor of skin, gums, and lining membrane of the mouth; dead whiteness of the substance of the tongue; cold extremities; debility; palpitation and dyspnœa on the slightest exertion; faintings; headache, consisting generally in a fixed pain over the eyebrows or on the top of the head; pulse frequent, small, and quick, and easily accelerated by emotions of the mind; the patient is easily agitated by slight noises or unexpected events, and suffers from depression of spirits; the secretions and excretions generally scanty; the bowels torpid.

CAUSES.—Loss of blood; excessive discharges, as leucorrhœa, menorrhagia, prolonged lactation, &c.; scanty food.

TERMINATIONS.—In extreme cases, syncope, convulsions, delirium, coma, sudden death. States simulating inflammation of important organs.

TREATMENT.—*Indications.*—1. To remove the cause. 2. To restore the strength.

I. The first indication is fulfilled by remedies applicable to the local disease which is draining the system of blood. If hæmorrhage exists, it must be treated on the principles laid down under that head; if increased secretion, it must be checked by appropriate means. In cases of undue lactation, the further suckling of the child must be prohibited.

II. The patient's strength must be restored by nourishing diet, combined with tonics or stimulants, according to the degree of the existing debility. Quinine and steel in full doses are the best tonics; ammonia, æther, wine, the best stimulants. Opium may also be administered in full doses, in combination with stimulants, with the best effect. A combination of opium, digitalis, and one of the mineral acids, is very beneficial, especially in those cases which owe their origin to increased secretions. The mineral acids increase the appetite, and have a tonic effect; the opium calms the excitement of the nervous system, at the same time that it acts as a stimulant, and the digitalis tends to restrain the inordinate action of the heart. In cases of still greater debility, ammonia may be substituted for the mineral acid. If steel is administered, it should be in full doses. For an adult, the dose of the dried sulphate of

iron should not be less than four or five grains three times a day. An excellent combination consists of five grains of dried sulphate of iron, with an equal quantity of extract of gentian, three times a day. If the skin has a tinge of yellow, and the secretions of the liver seem defective, one or two grains of hyd. c. cretâ may be combined with the steel and gentian with the best effect. Wherever the skin, gums, and tongue are pale, whatever may be the other symptoms present, steel may be safely given in full doses. [I have administered it in a well-marked case of anæmia during the most severe and distressing head-ache, and with the carotid arteries pulsating violently, not only with safety, but with the most prompt and decided benefit.—G.]

The Effects of Loss of Blood.—A few additional observations are necessary on the effects of loss of blood, in any of the ways above mentioned. The most familiar of these effects is *syncope*, of which the symptoms are vertigo, followed by loss of consciousness; suspension of respiration alternating with deep sighs; the pulse and beat of the heart scarcely, if at all, perceptible; the surface pale, and bedewed with cold perspiration. Recovery takes place with momentary delirium, yawning, sickness, irregular sighing breathing, and a gradual return of colour to the skin, and pulse to the heart and wrist. In profuse hæmorrhage, the state of syncope and of reaction alternate. In cases of fatal hæmorrhage, the symptoms become gradually and progressively worse; the countenance paler and more sunken; the extremities colder and colder; the breathing panting, gasping, or stertorous; the pulse imperceptible; restlessness and jactitation are followed by coma, or convulsions; at length, the patient's strength is exhausted, he sinks, gasps, and expires.

Reaction, or recovery from a state of exhaustion, is generally gradual, but its symptoms are often peculiar and strongly marked. *Excessive reaction* is characterized by forcible beating of the carotids, with a sense of throbbing in the head; palpitation of the heart, throbbing in the scrobiculus cordis and in the course of the aorta, a frequent, bounding, and often irregular sharp pulse; a hurried, panting, sighing respiration; restlessness, jactitation, mental agitation, hurried manner, sudden muscular movements. Sometimes the patient has suddenly raised himself to the sitting posture, and as suddenly died. In this state the head suffers much, and is morbidly excited. Intolerance of light and sound, sleep disturbed by fearful dreams, waking hurried and perplexed, delirium, noises in the head, flashes of light before the eyes, sense of tightness round the head, as if it were firmly bound by an iron hoop. The throbbing of the arteries is accompanied by the "bruit de soufflet." Mania, coma, amaurosis, and deafness are frequent concomitants of this state.

The sinking state is characterised by diminished energy of all the powers, especially of the nervous system. Snoring, stertor, blowing

up of the cheeks, dozing, want of recollection, sometimes slight delirium; crepitus in the lungs, passing into rattling in the bronchia and trachea; hurried, sighing, catching respiration; short cough; pulse and beat of heart fluttering or imperceptible; tympanites, loss of power over the sphincters. The pale and sunken countenance, restlessness, jactitation, delirium, and cold extremities, announce the approach of death, which generally takes place amid convulsions.

The POST MORTEM APPEARANCES produced by extreme exhaustion from loss of blood, are effusion of serum within the brain, œdema of the lungs, increased bronchial secretion, serous effusion into the pleura and peritoneum, general œdema or anasarca, tympanitic distension of the bowels.

The TREATMENT is by stimuli combined with opiates, enemata of warm barley water or gruel, nourishing farinaceous food with wine. In the state of syncope, ammonia to the nostrils, friction to the extremities, cold water sprinkled in the face, or dashed on the surface, internal stimulants. (See Marshall Hall's Principles of Medicine, p. 68, et seq.)

CACHEXIA.—BAD HABIT OF BODY.

Symptoms.—The skin sallow and dusky, harsh and dry; countenance generally emaciated; the pulse frequent, small, and compressible; the tongue, clean, moist, and red, or slightly furred; the appetite capricious, often craving and voracious, with a long train of dyspeptic symptoms; the alvine discharges foul, dark, slimy, pitch-like, and showing no trace of healthy fæces; the urine high-coloured, and depositing a dark and often fetid sediment; the perspiration acrid and stinking; the breath offensive; emaciation. Enlarged tonsils, and aphthæ are frequent concomitants.

DIAGNOSIS.—From mere *anæmia* by the sallow and dusky countenance, as distinguished from the clear and pale skin, and by the depraved character of the secretions and excretions.

CAUSES.—Unwholesome diet; continued exposure to miasmata, or to a cold, damp atmosphere; impure air; want of proper exercise; the gradual operation of mineral poisons, as mercury, arsenic, copper; or of animal poisons, as the syphilitic virus. The term cachexia is applied to those conditions of system in which certain local diseases occur in various parts, and are obviously due to some poison circulating in the blood, or to some important change in the composition of that fluid. Thus we have cachexia syphilitica, tubercular cachexy, &c.

TREATMENT.—*Indications.*—1. To remove the exciting cause. 2. To improve the condition of the circulating fluid.

I. The exciting cause may be removed in the several cases specified, by proper diet, change of air, proper exercise, change from unwholesome employments to healthy occupations, or, in the case of syphilitic cachexy by inducing a new action in the system by preparations of mercury.

II. The condition of the circulating fluid may be improved by proper diet, consisting of a due mixture of animal and vegetable food, with a proper proportion of ascendent fruits and vegetables; decoctions of herbs, combining a mucilaginous with a tonic principle, as the decoction of sarsaparilla; due attention to all the secretions; and the administration of preparations of mercury, in what are called alternative doses. Of these, the best is Plummer's pill, which may be given in doses of three, four, or five grains, three times a day, with the decoction of sarsaparilla. The iodide of potassium, or of iron, may be substituted in many cases for the preparations of mercury. The proper action of the bowels should be secured by gentle aperients frequently repeated, and the skin should be kept constantly clean by daily ablution in the morning, or by the occasional use of the warm bath. The shower bath may be used with advantage. Change of air and of scene, and a course of mineral waters, especially the chalybeates, may be resorted to with the greatest advantage.

CHLOROSIS.—GREEN SICKNESS.

This disease is, as it were, intermediate between anæmia and cachexia, partaking of the characters of both. The blood is probably less in quantity than in health; but it is also altered in quality, containing less of the red particles and of the solid ingredients.

SYMPTOMS.—Heaviness; listlessness; fatigue on the least exercise; palpitations of the heart; pains in the back, loins, and hips; flatulency and acidity in the stomach and bowels, and many symptoms of dyspepsia.

The appetite is singularly depraved; lime, chalk, and other absorbents are greedily eaten, when the accustomed food is rejected. As the disease advances, the lips lose their colour; the eyes are encircled with a livid areola; the face becomes pale, assumes a yellowish hue, and the whole body has a leucophlegmatic appearance, with every indication of want of power and energy in the constitution. The feet are affected with œdematous swellings; the breathing is hurried by the slightest exertion; the pulse is frequent, quick, but small; the patient is affected with various symptoms of hysteria, cough, and sometimes confirmed hectic fever.

CAUSES.—Debility or laxity of the constitution in general, and of the uterine system in particular; amenorrhœa; mental anxiety and disappointment.

TREATMENT.—*Indications.*—I. To invigorate the system in general.

II. To excite the action of the uterine vessels.

To fulfil the first indication,

1. A nutritive diet, and the moderate use of wine; regular exercise on horseback, taking care not to induce fatigue; cheerful society.

2. Gentle aperients of aloes, myrrh, and bitters.
3. Tonics, especially preparations of iron, either alone, or joined with myrrh, quinine, or gentian; adding an alkali, where the state of the stomach requires it: the best chalybeates are, the sulphate, the muriate, and the tartrate of iron.
5. Sea bathing, cold bathing, and the internal use of the Bath, Tunbridge-wells, Pyrmont, or Spa waters.

The other indication is fulfilled,

1. By all those means which improve the general health.
2. By gentle electric shocks through the pubic region.
3. By purges that act especially upon the rectum; as aloes and scammony.

The *secale cornutum* in decoction, $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{vii}$ of water, with decoction of aloes and the *mistura ferri composita*, in the proportion of four ounces of each, is a valuable remedy, when the digestive functions are restored to a healthy condition.

4. By the application of a few leeches at the menstrual period to the groins or vulva, or to the breasts. Dr. Loudon has applied two leeches to the lower part of each breast every second day for a month, and with good effect.

The combination already recommended (see *Anæmia*) of sulphate of iron, with extract of gentian, is perhaps the best and only one that need be used. If the form of mixture be preferred, sulphate of iron may be combined with small doses of sulphate of magnesia. Aloetic aperients may be combined with the steel. The compound aloetic pill of the *Pharmacopœia* with steel and gentian in equal parts, may be administered four times a day when the bowels are sluggish; or calomel, or hyd. c. *cretâ* may be combined with the steel with much advantage.

The best mode of treatment is by aloetic purgatives, with or without minute doses of mercurial preparations, and steel in full doses. The menstrual discharge may, in most cases, be safely left to itself.

CHAPTER V.

SCROFULA.	.	.	.	.	.	King's evil.
RACHITIS.	.	.	.	.	.	Rickets.
PURPURA.	.	.	.	.	.	Land scurvy.
PURPURA NAUTICA.	.	.	.	.	.	Sea scurvy.
RHEUMATISM.	.	.	.	.	.	{ Articular.
PODAGRA.	.	.	.	.	.	{ Muscular.
	.	.	.	.	.	Gout.

SCROFULA.—KING'S EVIL.

The various external and local symptoms produced by this disease are described by writers on surgery.

Its first appearance is usually between the third and seventh years of age, or at any period before the age of puberty, after which it seldom makes its first attack. It most commonly affects children of a lax habit, with smooth, soft, and fine skins; fair hair; a peculiar fulness and rosy appearance of the face; full upper lip; large eyes, and a very delicate complexion. It is also apt to attack such children as show a disposition to rickets: marked by a protuberant forehead, enlarged joints, and tumid abdomen.

CAUSES.—It seems to be peculiar to cold and variable climates; it is mostly the effect of an hereditary predisposition; and is excited by crude indigestible food, bad water, living in damp, low situations, and by debility however induced. Syphilitic taint?

TREATMENT.—*Indications*.—1. To improve the general health. 2. To promote the absorption or dispersion of local tumors and the healing of ulcers, &c.

I. The general health may be improved by change of air; sea-air and sea-bathing; chalybeate mineral waters; tonics, especially the preparations of iron; and a nutritious diet, with a full allowance of animal food. The state of the bowels must be carefully attended to, and gentle aperients must be administered at short intervals. A few grains of rhubarb, with small doses of hyd. c. creta, given every night, or every other night, followed by a tea or dessert spoonful of castor oil the following morning, is a good form of purgative. In severe cases, accompanied by extensive local disease, the iodide of iron, in doses of two or three grains three times a day, according to the age of the patient, may be given with much advantage.

II. Enlargements of the glands of the neck may be treated by the constant application of the emplastrum ammoniaci c. hydrargyro, or they may be painted frequently with the tinctura iodinii. If the patient is at the sea-side, poultices of sea-weed (the fucus vesiculosus) may be kept constantly applied. When suppuration takes place, it must be encouraged by poultices, and the matter be let out by a small incision. Caustic should never be used, as it leaves behind it unsightly scars. Open ulcers generally put on an indolent character, and must be treated by local stimulants. In the treatment of other local affections occurring in scrofulous habits, this peculiarly indolent character must be borne in mind.

RACHITIS.—RICKETS.

SYMPTOMS.—Universal softness and flaccidity of the flesh; face sallow; abdomen tumid; evacuations offensive; urine turbid.

Though the appetite is generally good, the child loses flesh. The process of ossification is extremely imperfect; dentition goes on slowly, and the teeth soon become loose and carious; the fontanelles and sutures are usually open, the head large, the forehead prominent; the chest flattened at the sides, and the sternum projecting; the epiphyses of the long bones become spongy, and the joints swell. This is commonly first perceived in the wrists and ankles. As the disease advances, the long bones yield to the weight of the body, and are twisted by the action of the muscles; the vertebræ are forced from their places, and the child becomes hump-backed. If he has begun to walk, his gait is unsteady and waddling. The mental faculties are in general unimpaired, and even more acute than in children of the same age. The disease rarely begins before the ninth month, or after the second year.

CAUSES.—Bad nursing, bad food, bad air, want of cleanliness.

PATHOLOGY.—Defective assimilation of food, leading to a deficiency of phosphate of lime in the structure of the bones.

PROGNOSIS.—Favourable. The disease is rarely fatal, though it creates great deformity.

TREATMENT.—Food of good quality, and adapted to the child's age, fresh and pure air, cleanliness, exercise, cold or tepid bathing, and frictions. Tonics, especially steel, as steel-wine, in doses of a tea or dessert spoonful, three or four times a day, or the sulphate or potassio-tartrate of iron in full doses. Careful attention to the state of the bowels.

PURPURA.—LAND SCURVY.

SYNONYMES.—Hæmorrhœa petechialis. Petechiæ sine febre.

VARIETIES.—The principal are *purpura simplex* and *purpura hæmorrhagica*.

PURPURA SIMPLEX.—*Symptoms*.—After slight uneasiness, or trifling giddiness, an eruption of small round patches, of a dark-red colour, chiefly on the thighs and legs, but sometimes extending over the whole body. After a few days, the first patches begin to fade, and new ones appear. There is little disturbance of the general health. The disease may last from three or four weeks to as many years.

CAUSE.—Obscure. Often attributed to cold.

TREATMENT.—Small bleedings from the arm, to promote the absorption of the effused blood, and tonics combined with a nourishing diet, and proper exercise, to give tone to the system.

PURPURA HÆMORRHAGICA.—*Symptoms*.—Debility, weariness, inaptitude to bodily or mental exertion, pains in the limbs, petechiæ of larger extent than in the foregoing variety; occasionally bullæ filled with liquid blood; gums swollen, livid, and spongy; hæmorrhages from the gums, nostrils, and mucous membranes generally; rigidity of the legs from effusion of blood into the texture of the muscles;

extensive bruises ; pulse feeble, but variable in frequency ; in some cases full and hard. In the more severe cases, all the symptoms of the sea-scurvy.

CAUSES.—A diet deficient in nutriment, or consisting chiefly of one kind of food.

TREATMENT.—If the pulse is full and hard, bleeding is indicated, followed by tonics and a generous and nutritious diet. When there is great debility, depletion is contra-indicated, and tonics and stimulants with a generous diet must be prescribed.

This disease, like most others, must be treated on general principles. Sometimes the effusions of blood are the result of general high action in a person whose capillaries are naturally weak ; at others, of a general as well as of a local debility. The treatment must be modified accordingly.

PURPURA NAUTICA. SCORBUTUS.—SEA SCURVY.

SYMPTOMS.—Heaviness, weariness, dejection of spirits, aversion to exercise, dull pains in the limbs, anxiety and oppression at the præcordia ; the countenance pale, sallow, and bloated ; the skin in some cases hot, in others cold and contracted ; respiration hurried by the least exertion ; the breath offensive ; wandering pains in different parts of the body, particularly during the night ; the pulse in some cases infrequent, in others small and frequent ; the gums swollen, spongy, and livid, bleed upon the slightest touch ; they separate from the teeth, which become loose ; the tongue clean, moist, and pale ; petechiæ and maculæ appear in various parts ; the slightest scratch degenerates into a foul and ill-conditioned ulcer ; the slightest pressure produces a bruise, and old cicatrices open afresh, and discharge a thin sanious fluid ; spontaneous ulceration likewise takes place upon the gums, and upon the surface of the body ; the joints become swelled and stiff ; the muscles of the legs, and the muscles of the calf especially, rigid, contracted, and exceedingly painful ; the bowels are either obstinately constipated, or there is diarrhœa ; the urine is transparent, high-coloured, and acid ; great emaciation ensues ; passive hæmorrhages take place from the gums, nose, and ears, from the stomach and bowels, and occasionally from the lungs and bladder ; all the excretions become intolerably fetid ; still, however, the appetite frequently remains entire, the patient retains his intellectual faculties, talks with a loud voice, but is apt to faint on the slightest motion ; and many patients have expired as they were being carried from their hammocks. Sudden death has often taken place in the earlier stage of the disease, from some sudden effort of the patient.

CAUSES.—A deficiency of vegetable food. Impure air, moist atmosphere, depressing passions of the mind, and the general causes of impaired health act as predisposing causes, or lead to the first appearance of the characteristic symptoms.

DIAGNOSIS.—*From malignant fever.*—By the absence of feverish symptoms; by the intellectual faculties being little impaired; by the disease coming on more gradually, and continuing a much longer time; by its not being contagious.

PROGNOSIS.—Will be drawn from the severity of the disease, and the situation of the patient with respect to vegetable diet, or other proper substitute.

Favourable circumstances.—The constitution not having been weakened by previous disease; little reduction of strength; moist skin; bilious diarrhœa; the patient capable of muscular motion; infrequent pulse; the petechiæ, if any appear, being of a bright red colour; the absence of ulceration.

Unfavourable.—Great prostration of strength; redness of the eyes, flushed countenance; frequent weak pulse; profuse hæmorrhages; petechiæ and maculæ of a dark livid colour; extreme oppression at the præcordia; fetid and involuntary evacuations.

TREATMENT.—*Indications.*—I. To supply what is wanting in the diet.

II. To palliate urgent symptoms.

The first indication is fulfilled by the use of—

Vegetable food of every description, especially of the ascendent fruits, as the orange, the lime, the lemon; or the citric acid in a concrete form; if there be great prostration of strength, they may be united with wine; fermented and fermenting liquors, as ale, cyder, spruce beer, infusion of malt, fermenting wines, &c.; the subacid fruits; sugar, molasses.

Occasional aperients of infusion of tamarinds, cream of tartar, or the sulphates of soda and magnesia may be given, and the utmost attention must be paid to cleanliness.

With regard to the second indication,

Ulcerations of the gums require astringent gargles of alum, muriatic acid, linimentum æruginis, decoction of bark, the steam of vinegar. Acute pains are relieved by opium. Oppression at the chest, and difficulty of breathing, by stimulants; as nitric and sulphuric æther with camphor. Contractions of the muscles of the legs, by fomentations of vinegar and water, or emollient cataplasms; friction; scorbutic ulcers upon the surface of the body, by the means recommended in practical works on surgery. A due admixture of animal and vegetable food is, at the same time, the best preservative and curative measure.

ARTHRITIS.—ARTICULAR RHEUMATISM.

Species.—1. *The Acute.*—2. *The Chronic.*

ACUTE ARTICULAR RHEUMATISM.—RHEUMATIC FEVER.

Symptoms.—Lassitude and rigors succeeded by fever, a hard, full and quick pulse, and all the usual symptoms of synocha; sense

of weight, and coldness of the extremities; great restlessness; obstinate costiveness; after a short time, (in the course of one, two, or three days,) inflammation with redness of surface, acute pain, extreme tenderness, tumor, and tension, makes its appearance in one or more of the larger joints of the body. The pulse from 90 to 120, full and hard; the blood when drawn from a vein, exhibits the inflammatory surface or buffy coat; there is loss of appetite and great thirst; the tongue preserves a steady whiteness; the body is usually obstinately costive; the urine high-coloured; sometimes the skin is bathed in a profuse acid-sweat, which, however, affords no relief.

The febrile symptoms and the pain generally suffer an exacerbation at night. The disease is rarely confined to the joints first attacked; but after continuing in them some hours or days, it attacks fresh joints, sometimes continuing unabated in those first affected, at others leaving them quite free from pain or swelling. In rarer instances it returns to the joints which were first affected, and ultimately extends to all the large joints of the body. Some amendment usually takes place at the end of about a fortnight; the pain lessens, especially at night, there is less fever, and less perspiration; the urine is more abundant and less charged with deposits; the appetite returns; the thirst diminishes; the pulse falls; and the patient's movements become more free. Convalescence, however, is rarely uninterrupted, and the affection of the joints often assumes a chronic form.

Such are the symptoms when the disease is confined to the joints; but in a large proportion of cases, it extends to the fibrous tissues of the heart. The symptoms which denote this formidable complication are sudden pain in the præcordia, palpitation, dyspnoea, and a sense of oppression. The pain is increased by pressure in the intercostal spaces, by inspiration, and by lying on the left side. The pulse generally increases in frequency and is marked by a peculiar thrill.

For the stethoscopic indications of this affection of the heart see Diseases of the Heart, Carditis, Pericarditis, &c. As this affection is often obscure it should be carefully sought for. Its earliest indications are dyspnoea, with a peculiarly listless expression of countenance.

CHRONIC ARTICULAR RHEUMATISM.

SYMPTOMS.—The chronic form of rheumatism may be either a consequence and termination of the acute; or it may be independent of it. In the first case, the parts which were affected with inflammation are left weak, rigid, in some instances œdematous; and the pain, before shifting, is now usually confined to particular parts; sometimes, however, it still shifts from joint to joint, but without occasioning any inflammation or fever. Exposure to wet

and cold will often bring on an attack which continues for a considerable time, and at length goes off, leaving the affected joints in a state of debility.

ANATOMICAL CHARACTER.—Inflammation of the *fibrous* tissues of the parts affected, leading to deposits of lymph, the formation of pus, &c.

CAUSES.—*Predisposing.*—Hereditary predisposition. The male sex; previous attacks; age from 15 to 60.

Exciting.—Exposure to wet and cold.

DIAGNOSIS.—The pathognomonic symptoms are, synocha, with pains and inflammation of the larger joints, under which the integuments become distended, smooth, and of a peculiar pale red colour.

From Podagra.—By its generally attacking the larger joints only; by the pain and inflammation shifting their seat; by the disease not having been preceded by symptoms of dyspepsia; by its occurring at any period of life, whereas gout is usually confined to the adult period. It may be confounded with neuralgic affections, but the history of the case will enable us to form an accurate diagnosis.

PROGNOSIS.—*Favourable symptoms.*—A general, but not unnaturally profuse, perspiration; the deposit of a lateritious or furfuraeous sediment in the urine; eruptions on the skin; moderate hæmorrhage of florid blood from the nose or other parts.

Unfavourable.—The inflammation becoming erysipelatous, and assuming a dark red, or rose colour; and this followed by vesications, delirium, pale urine, metastasis of the inflammation to the heart and chest; producing the symptoms of the idiopathic diseases of those organs.

TREATMENT.—*Of acute rheumatism.*—The *indications* are the same as those of the other phlegmasiæ, and are to be fulfilled.

I. By general and topical *blood-letting*.

General bleeding should be had recourse to at the onset of the disease in all cases where the vascular action is strong, the heat considerable, the constitution robust, and the patient not advanced in years; and it may be repeated according to the violence of the symptoms.

The repetition of blood-letting is to be regulated by the effect produced and not by the buffy appearance of the blood, which in many cases continues to increase, notwithstanding the abstraction of blood. General bleeding may be followed up by topical blood-letting, by leeches, and cupping, when there is considerable pain and tumefaction about a joint or limb.

Thus far most practitioners are agreed, but much difference of opinion exists with regard to the other remedies. Calomel and opium, tartar-emetic and opium, colchicum, either alone or in combination with opiates, and bark or quinine—all have their advocates. The treatment which appears to me to have been most

effectual is a full bleeding, followed immediately by quinine in two grain doses every three hours. This may be combined with tartar-emetic where there is much inflammation and fever, and opiates may be given at night when the patient is extremely restless. When the disease is complicated with heart-affection, cupping to the region of the heart, followed by blisters, is indicated, and a combination of tartar-emetic, digitalis, and opium may be given at intervals of two or three hours.

Treatment of the Chronic Form.—When the inflammation is confined to one or two of the joints, local applications are of service. If there is inflammation, leeches should be applied. Blisters around the affected joint are often of use. Friction is also useful. Where the disease is more extensive, we must employ general remedies to the exclusion of local ones. The steam-bath is amongst the most powerful of these remedies. The warm-bath is of less efficacy, but the thermal mineral waters of Vichy, Aix-la-Chapelle, Karlsbad, Wiesbaden, &c. have long enjoyed a high and deserved reputation in the treatment of chronic articular rheumatism. A warm climate also proves beneficial to cases which have arisen in a cold one, though warm climates are peculiarly favourable to the occurrence of rheumatic affections. The medicines in use for the treatment of this disease are Dover's powder, colchicum in combination with opium, guaiacum, sarsaparilla, and the hydriodate of potash. The latter remedy is of great service in articular affections, produced by a syphilitic taint : its efficacy in other forms of the disease is doubtful. The nitrate of potash in large doses, which has been lately recommended in the acute form of the disease, may perhaps prove serviceable in the chronic. A remedy of certain power is still a desideratum.

MUSCULAR RHEUMATISM.

SYMPTOMS.—Pain varying in severity and kind, from a dull aching, to the most acute lancinating pains, affecting the entire body, the trunk, a single limb, or a single muscle or group of muscles; coming on sometimes suddenly, at others after shivering and slight feverishness; often forming the most distressing feature of a common cold, and remaining after the other symptoms have vanished. The pain is increased by motion of the affected part, by percussion with the points of the fingers, and by the sudden removal of pressure; but relieved by firm pressure gradually applied. It is augmented in some cases by the warmth of bed, in others, relieved by it. When increased by warmth, it is called *acute*; when relieved by it, *chronic*. Its duration is variable, extending from a few hours or days to as many months or years, and often defying all treatment. The general health is little if at all affected.

Varieties.—Some forms of the disease have obtained distinct names according to the seat of the affection; as *pleurodynia* when it

attacks the muscles of the side, *lumbago* when its seat is the loins, *crick* in the neck when it affects the muscles of the neck.

Pleurodynia is a very common affection. It is a complication of almost all the functional diseases of young and middle-aged females, occurring in dyspepsia, amenorrhœa, menorrhagia, leucorrhœa, hyperlactatio, chlorosis, &c., and in fact in almost all diseases accompanied by much debility. It almost universally attacks the muscles of the left side. In males it is equally common on both sides. Acute pain in the muscles of the left side, generally precedes by some days the appearance of shingles. Its *causes* are debility, sover-exertion, as in the effort of coughing, and distension of the stomach with flatus. The *diagnosis* is of great importance, though the disease itself is of little or none. It is distinguished from pleuritis, with which it is often confounded to the great injury of the patient, by the absence of the constitutional symptoms of the acute phlegmasiæ, and the stethoscopic indications of pleurisy; by being increased by motion of the affected parts, as in raising the arm, or twisting suddenly round, or by a sudden inspiration or expiration, by the effect of sudden and slight percussion with the points of the fingers, and by the sudden increase of the pain on the removal of pressure. Any one of these signs in the absence of severe constitutional symptoms is decisive of the character of the affection. It is distinguished from the pain preceding the eruption of shingles by its less severity. Extremely acute pain should lead the practitioner to foretel shingles as at least a possible event. Pleurodynia may be complicated with chest disease, for it is a common consequence of a cough, and with acute dyspepsia: so that the practitioner should not rest satisfied with ascertaining the real nature of the pain, but should inquire for possible complications. The treatment of idiopathic pleurodynia, is by the application of the emplastrum belladonnæ; in mild cases, of the common enplastrum roborans; in more severe ones, of a blister, with the internal administration of colchicum. Symptomatic pleurodynia must be treated by removing its cause.

Allied to pleurodynia is an acute pain of the muscles of the abdomen or diaphragm, or of both together. That of the abdomen is apt to be confounded with peritonitis, as pleurodynia with pleurisy. The diagnosis is easy. Graduated pressure gives relief, except where sudden expiration throws the muscles into action; but the sudden removal of pressure causes acute pain; percussion with the points of the fingers and sudden motion of the part affected also increases the pain. The absence of severe constitutional symptoms will assist the diagnosis, as will also the kind of respiration. In pleurodynia the respiration is abdominal; in rheumatism of the muscles of the abdomen it is carried on by the chest. When the diaphragm is much affected, the respirations are short and catching, and accompanied with acute suffering.

Muscular rheumatism also attacks internal viscera, as the muscu-

lar texture of [the heart, causing violent palpitation, and the muscular substance of the impregnated uterus leading to severe pains, similar to labour pains.

Lumbago occupies the mass of muscles in the loins, and when severe, confines the patient to bed, or obliges him to walk carefully with crutches or with the assistance of others. The slightest motion causes excruciating agony.

Diagnosis.—From the pains in the back which accompany the cold stage of febrile disorder by the effect of motion which increases the former, but has no effect on the latter; from disease of the kidneys, by the unchanged character of the urine, or if it undergoes a change by its consisting in the common lithic acid deposits, and by the absence of symptoms of disease of the kidney. Transient and severe attacks of rheumatism in a single muscle or group of muscles, sometimes pass off, lasting a few hours or a day, by a copious red sediment in the urine.

TREATMENT.—The *acute* form of rheumatism which is increased by the warmth of bed, requires colchicum and opium, the warm bath, local depletion, by cupping or leeches, where the affection is local, and the application of the belladonna-plaster, or friction with an opiate liniment. Veratria-ointment has been recommended, but must be used with caution. The *chronic* form is best treated by guaicum in combination with stimulants, in the form of the tinctura guaiaci and by local stimulants, as frictions with stimulating embrocations, blisters, and acupuncture. The latter remedy has often effected a cure of severe and lingering attacks. It may be very advantageously employed in lumbago. Electricity has also been used with advantage. Persons subject to rheumatism should wear flannel or cotton next the skin, and should carefully protect the parts most liable to the disease. They should also avoid as much as possible exposure to wet and cold.

PODAGRA.—THE GOUT.

SPECIES.—1. *Podagra regularis*; with a violent inflammation of the joints, enduring for several days, and receding gradually, with swelling, itching, and desquamation of the part affected.

2. *Podagra atonica*: debility of stomach, or other internal part, either without the expected or usual inflammation of the joints, or with slight and fugacious pain in them, often alternating with dyspepsia, or other symptoms of debility.

3. *Podagra retrograda*; with inflammation of the joints suddenly disappearing, followed immediately by debility of the stomach, or of some internal part.

4. *Podagra aberrans*; with inflammation of some internal part, preceded or not preceded by inflammation of the joints, which quickly disappears.

SYMPTOMS.—Of the regular gout.—Dyspepsia, with its usual at-

tendants, lassitude, torpor, and dejection of spirits; unusual coldness and numbness of the extremities, alternating with sense of pricking, or formication; frequent cramps; unusual turgescence of the veins of the leg. The paroxysm most frequently comes on about two o'clock in the morning, with excruciating pain, in the articulations of the great toe; succeeded by rigor, horror, and pyrexia. The pain continues to increase in violence, and having attained its acmé towards the following evening, gradually ceases; a general moisture breaks out upon the skin, and the patient, freed from his torment, falls into a sound sleep; upon awakening from which he finds the parts, before painful, now swollen and inflamed. In several succeeding evenings, there is a return of pain and fever, which continue, with more or less violence, during the night, and go off at break of day.

Of the atonic gout.—When the gouty diathesis prevails in the system, but, from certain causes, does not produce the usual inflammatory affection of the joints, it often appears in the form of an atonic affection of some internal part. If it be in the *stomach*, there are pain, nausea, vomiting, eructations, dejection of mind, and other symptoms of dyspepsia, and hypochondriasis: these are frequently accompanied with cramps in several parts of the trunk and upper extremities; sometimes there is obstinate costiveness, sometimes diarrhœa. If in *the viscera of the thorax*, it produces palpitation, syncope, asthma. When *the head* is affected, there is cephalalgia, vertigo; and apoplectic and paralytic affections are sometimes the consequence.

The retrocedent gout is where an inflammation of the joints having come on in the usual manner, but without reaching the ordinary degree of severity, or, continuing for the customary time, suddenly and entirely ceases, while the disease is transferred to some internal part. *To the stomach*; when great anxiety, sickness, violent pain and vomiting, with peculiar sense of cold in the epigastric region, are induced. *To the heart*; occasioning syncope. *To the lungs*; asthma. *To the head*; apoplexy, or palsy.

The misplaced gout is when the gouty diathesis, instead of producing the inflammatory affection of the joints, produces an *inflammation* of some internal part; which appears with the same symptoms that attend inflammation of those parts, arising from other causes.

CAUSES.—*Predisposing and remote.*—The adult age, more especially the middle period of life; hereditary predisposition; full plethoric habit of body; indulgence in the use of animal food and fermented liquors; sedentary and studious life; the large use of acids and ascents; tartareous wines; dyspepsia.

Sir C. Scudamore has proved, that in a number of patients the majority had no hereditary predisposition. It is also a well-known fact, that gout affects the poor as well as the rich. It seldom occurs before the age of twenty, or after sixty.

Exciting.—The application of cold to the extremities; fatigue; anxiety of mind; excessive evacuations; sprains; intemperance of whatever kind; the ceasing of usual labour; the sudden change from a very full to a very spare diet; the suppression of customary evacuations, as of the piles, which is a common accompaniment of the gouty diathesis.

DIAGNOSIS.—*From rheumatism.*—By the previous dyspeptic symptoms; by the pains, in the one disease attacking the smaller, in the other the larger joints. By the peculiar mode of its attack (see Symptoms); by its not being preceded, or accompanied at its commencement, with symptoms of synocha; by the age of the patient.

PROGNOSIS.—*Favourable.*—Youth, and an unimpaired constitution; the more severe the paroxysm, the shorter its duration; the longer the intermission, the more effectual is it in removing various anomalous diseases, to which the patient had been before subject; its not being hereditary.

Unfavourable.—Impaired constitution; concomitant visceral affections; hereditary predisposition to the disease; the deposition of chalky matter on the joints; the disease suddenly receding from the extremities, and attacking an important internal organ, as the stomach, heart, brain, lungs, &c.

TREATMENT.—The *indications* in the regular gout are,

- I. To alleviate pain, and shorten the duration of the paroxysms.
- II. To prevent their return.

The first indication is best fulfilled by diaphoretics and opiates.

In a regular fit of the gout the assistance of medicines is not so great as is generally supposed; all that is required is to keep the inflamed part moderately warm with flannel, wool, or fleecy hosiery; to confine the patient, if young, to a spare regimen; if advanced in life, or a high liver, to enforce a more moderate one; carefully abstaining from everything that might add to the irritation, keeping the limb as quiet and still as possible, and taking care that his mind be not ruffled, but, on the contrary, soothed and calmed.

Some practitioners have been induced to adopt an antiphlogistic mode of treatment, which, in a few instances, has soon removed a regular fit of the gout; in others, it has induced an alarming and serious train of symptoms, by inducing metastasis to the brain, heart, &c.

Many topical remedies have been recommended; pediluvium of simple water; a tepid bath of water and muriatic acid, in the proportion of one ounce to a gallon of water; leeches; very cold water; ice; blisters; stinging with nettles; burning with moxa; covering the part with oilskin, and the like; but, perhaps, the less the part is interfered with the better, for the consequence of their use is often the translation of the inflammation to an internal organ. Exciting a perspiration on the part by fleecy hosiery or flannel is

sometimes attended with the most beneficial effects. A narcotic cataplasm or anodyne fomentation also affords great relief.

Dr. Kinglake has revived the practice of applying cold water and refrigerants to the inflamed part, which in many cases has had the desired effect; but instances are not wanting in which it was supposed to have been productive of a fatal retrocession. Scudamore and Mackintosh strongly advise camphorated spirit very much diluted with water; others use a tepid evaporating lotion.

The Eau Medicinale d'Husson, and Wilson's Tincture for the Gout are dangerous medicines, the chief ingredient being colchicum or veratrine.

One mode of administering these medicines is in small doses, in which way they have no sensible operation, except that of gradually reducing the force of the symptoms. With this view the bowels are to be first cleared with proper aperients, or the colchicum may be given in conjunction with gentle saline aperients. A combination of a drachm of sulphate of magnesia, ten grains of the carbonate, from twenty to thirty minims of vinum colchici, and a few drops of laudanum, is a very useful remedy.

The second indication is effected by regularity of life; avoiding the exciting causes of the disease; abstinence from the use of animal food and fermented liquors; milk and vegetable diet; exercise; friction with the flesh-brush; tonics and stomachic bitters and chalybeates, such as are recommended for the cure of dyspepsia; Bath waters; the regular use of mild cathartics.

The long-continued use of alkaline medicines.

The atonic gout is to be treated by carefully avoiding all the causes inducing debility; gentle exercise; cold bathing; the moderate use of animal food, and the least ascendent wines, as Sherry and Madeira; tonics, stomachics, and chalybeates, such as are recommended against indigestion; guarding against the effects of cold, by wearing flannel next the skin; in severe attacks, blisters to the extremities are serviceable.

Of the retrocedent gout.—If the stomach be the seat of the disease, the liberal administration of warm brandy and water, or wine and aromatics; æther, ammonia, assafœtida, camphor, musk, and sinapisms to the feet.

GOUTY CONCRETIONS—Gouty concretions, or chalk stones, as they are called, are deposited in the cavities of joints, in the bursæ mucosæ, in the ligaments, aponeurosis, and cellular membrane, and even under the cuticle. They consist of urate of soda, which is extremely insoluble, and consequently when once deposited does not admit of removal except by some means which will convert the insoluble into a soluble salt. For this purpose, Dr. Alexander Ure (see Med. Chir. Trans., vol. xxiv.) recommends the exhibition of Benzoic acid in doses of a scruple about an hour after each meal. This substance is advantageously combined with some salt of soda, and the best for the purpose is the bicarbonate,

which may be given in doses of one, two, or three drachms. This remedy must be persevered in for a considerable period where extensive deposits have already taken place.

CHAPTER VI.

INFLAMMATION.

HÆMORRHAGE.

DROPSY.

INFLAMMATION.

SYMPTOMS.—*When external.*—Redness, swelling, heat, and pain. The *redness* arises from the increased quantity of red blood contained in all the vessels of the part; the *swelling* from the same cause, combined with the secretion of serum, albumen, or lymph; the *heat* exceeds that of other superficial parts, but never rises higher than that of the blood; the *pain* is explained by the larger supply of blood to the nerves of the part, and the pressure of the surrounding textures upon them. It is accordingly most severe where the surrounding textures are unyielding, as in whitloae; comparatively slight in the lax mucous membranes.

The local symptoms of *internal* inflammation are pain and disturbance of function. The *pain* in parts which can be submitted to pressure is increased by that pressure, and thus forms an important means of diagnosis. The *disturbance of function* consists, in secreting organs, of increase, diminution or total suppression of their appropriate secretion, according to the degree of the inflammation; in other organs of various degrees of excitement—in the brain, delirium; in the eye and ear, impatience of light and sound; in the lungs, dyspnœa.

2. *General or constitutional symptoms.*—In healthy persons, those of synocha, viz. increased heat of surface, thirst, frequent, full, hard pulse, scanty secretions, &c. In severe and extensive inflammation, or in unhealthy persons, those of constitutional irritation; in the drunkard, those of delirium tremens; in extremely debilitated subjects, those of synochus or typhus.

TERMINATIONS.—1. Resolution. 2. Increased secretion. 3. Hæmorrhage. 4. Adhesion. 5. Softening. 6. Induration. 7. Suppuration. 8. Gangrene.

CAUSES.—*Predisposing.*—Sanguine temperament; full habit of body; general debility. *Exciting.*—1. Mechanical and chemical

irritants. 2. Cold. 3. Certain alterations in the condition of the circulating fluid. 4. Morbid poisons.

CAUSES WHICH MODIFY THE CHARACTER OF INFLAMMATION.—

1. Texture. 2. Condition of system.

1. *Textures*.—The *serous* membranes in acute inflammation take on the adhesive inflammation, very rarely the suppurative; in less degrees of inflammation, they pour out serum or liquid albumen. The *mucous* membranes secrete mucus, pus, and, in rare cases, coagulable lymph, and are prone to suppuration, and not to adhesion of opposed surfaces, as also to softening. The *cellular* tissue, when inflamed, secretes serum, and, in higher degrees of inflammation, coagulable lymph and pus. Its common termination is by *abscess*. Inflammation of the cellular tissue is called *phlegmonous* inflammation. The *parenchymatous* substance of organs is apt to be softened by acute, and hardened by chronic, inflammation; it is also liable to abscess and gangrene. Of the *fibrous* tissues, tendon is prone to gangrene, cartilage and ligament to ulceration. *Osseous* inflammation terminates in gangrene (caries and necrosis). The *skin* resembles the mucous membranes in being prone to suppuration. Vesication arises from the effusion of serum from the surface of the true skin under the cuticle. Gangrene is also a common termination of cutaneous inflammation.

The general symptoms also vary materially with the tissue affected. Thus, in inflammation of the *serous membranes*, there is little heat of surface, little muscular debility, little tendency to delirium, with slight acceleration of pulse; but there is acute pain, great tolerance of loss of blood, an excess of fibrin, and a cupped and buffed appearance in the blood itself. In that of the *mucous membranes*, on the other hand, there is little pain, little tolerance of loss of blood, no increase of fibrin, and the absence of the cupped and buffed appearance. There is, however, an exception to this rule in the case of croup, where the mucous membrane of the trachea takes on the characteristic features of inflammation of the serous membranes.

2. *Condition of system*.—The effect of condition of system is well illustrated by the exanthemata. In *measles*, the inflammation which prevails is similar to that produced by a common cold, and, in severe cases, leads to the effusion of coagulable lymph from the larynx and trachea; in *scarlatina*, there is a disposition to ulceration in the mucous membrane of the pharynx and adjoining parts; in *small-pox*, the inflammation leads to gangrene and suppuration around the dead points. Another illustration of the modifications produced by states of system is afforded by common inflammation of the skin and erysipelatous inflammation.

It is of the utmost importance that the practitioner should be familiar with the constitutional symptoms which mark the several terminations of inflammation. *Acute adhesive inflammation* is accompanied by a full, strong, hard pulse, or a small wiry pulse,

somewhat increased in frequency, little or no heat of skin, no headache, vertigo, or delirium, no muscular tremor or debility, no change in the character of the urine, and there is great tolerance of blood-letting. *Suppuration* is announced by darting and excruciating pains, by severe, and often by repeated, rigor, occurring in some cases almost with the regularity of ague, and followed by heat and sweating—the symptoms, in fact, of hectic fever. *Gangrene* is indicated by sudden cessation of pain, by collapse of the entire system, pallor, cold clammy sweat, sunken features, sometimes low delirium, sometimes peculiar self-possession, a dry brown tongue, sordes on the teeth, a small, frequent, feeble pulse,—in fact, the symptoms of the typhoid state.

TREATMENT OF INFLAMMATION.—The remedies employed in the treatment of acute inflammation are either general or local. The *general remedies* are blood-letting by venæsection or arteriotomy, the tartrate of antimony, and mercury. The *local remedies* are local depletion by leeches, cupping, or scarification; division of the part; cold; cataplasms and fomentations; counter-irritants; and the nitrate of silver applied over and around the seat of the disease. In chronic inflammation, local remedies alone are employed, the general remedies being used to improve the health, and not for the purpose of removing the inflammatory action. In internal inflammations, general and local blood-letting, tartrate of antimony, mercury, and counter-irritants, are the remedies most in use. (For the theory of inflammation, see Introduction, p. 34, et seq.; and for the treatment, p. 136, et seq.)

HÆMORRHAGE.

Hæmorrhage is either *general* or *local*. Purpura nautica and purpura hæmorrhagica are examples of general hæmorrhage. Epistaxis, hæmatemesis, melæna, &c. are examples of local hæmorrhage. The *causes* of hæmorrhage are,—1. A strong action of the heart; 2. Venous congestion from obstruction to the return of blood; 3. Debility of the capillary vessels. The hæmorrhages which take place from the mucous membrane are probably examples of hæmorrhage from congestion occurring in a naturally loose and yielding texture.

Hæmorrhage, arising in healthy states of system from strong action of the heart, is called *active* hæmorrhage; that which arises from a weakened state of capillaries is called *passive* hæmorrhage; that which arises from congestion might be termed with equal propriety *congestive* hæmorrhage.

TREATMENT.—In *active* hæmorrhage those remedies must be used which are recommended in *acute* inflammation. *Passive* hæmorrhage must be combated by such remedies as give strength to the system; these belong to the class of tonics and stimulants; and by remedies which have a peculiar action on the capillary vessels, as

lead and the astringents. *Congestive* hæmorrhage must be treated by removing the existing congestion, whether it arise from pressure or from relaxation of the capillary vessels.

DROPSY.

Causes of dropsical effusions.—1. Inflammation. 2. Debility. 3. Obstruction to the return of blood. 4. Peculiar organic diseases, leading to an alteration in the constituent principles of the blood; for instance, disease of the kidney, as pointed out by Dr. Bright.

The TREATMENT of inflammatory dropsy is that of inflammation; dropsy from debility requires the same tonic treatment as passive hæmorrhage; that arising from obstruction, requires the removal of the obstructing cause; and that form which is dependent on diseased viscera, can be effectually treated only by remedies which restore the part affected to its healthy state. The increase of the secretions is an indication applicable to all forms of dropsy alike, but the choice of remedies for that purpose must be determined by the state of the system.

The various local dropsies will be treated in the following pages under the head of ascites, anasarca, hydrothorax, hydrocephalus, &c.

The strong analogy which exists between the state of the vessels in acute inflammation, in active hæmorrhage, and in inflammatory dropsy, makes the indications for the treatment of the one to be nearly identical with all the rest, and the same observation applies to chronic inflammation, passive hæmorrhage, and dropsy from debility. The state of the vessels in congestion, too, is the same, whether they pour out blood or serum, or neither. The same treatment, too, is required in either case.

SPECIAL DISEASES.

CHAPTER I.

DISEASES OF THE NERVOUS SYSTEM.

1. Of the brain.
2. Mental Disorders.
3. Of the Spinal Marrow.
4. Of the Nerves of Sensation.
5. Of the Nerves of Motion.
6. General Disorders of the Nervous System.

DISEASES OF THE BRAIN.

PHRENITIS . . .	Inflammation of the Brain.
HYDROCEPHALUS . .	Water in the Head.
APOPLEXIA . . .	Apoplexy.
CEPHALALGIA . . .	Headach.

PHRENITIS.—ENCEPHALITIS.—INFLAMMATION OF THE BRAIN.

SYMPTOMS.—Inflammation of the brain or its membranes begins with horror : extreme anxiety and sense of tension referred to the head and breast ; loss of memory ; throbbing of the temporal and carotid arteries ; excruciating pain in the head ; extreme sensibility to impressions of light and sound ; peculiarly wild expression of the countenance ; constant watchfulness ; frightful dreams ; nausea and oppression at the stomach. The face becomes flushed and turgid ; the eyes stare, and seem as if starting from their sockets ; ferocious delirium ; tears sometimes start from the eyes ; sometimes there is profuse sweating from every pore, at others the skin is dry and burning ; parched tongue, at first red, afterwards becoming white, yellow, or black ; peculiarly hard and rapid pulse. The patient often attempts self-destruction.

TERMINATIONS.—Phrenitis generally terminates in stupor and insensibility ; and if protracted, in great prostration of strength, with typhoid symptoms ; or it leaves behind it mania, dementia, &c.

CAUSES.—Exposure to excessive heats, or to vicissitudes of temperature ; subjecting the head uncovered to the rays of a vertical sun ; violent exercise ; excited passions of the mind ; intense study ; the presence of irritating matter in the stomach ; external violence ; the abuse of spirituous liquors ; metastasis of gout, rheumatism, erysipelas, otitis, exanthematous fevers, small-pox, measles, scarlatina ; whooping cough, dentition ; the repression of

cutaneous affections, as those of the scalp; pneumonia, phthisis, renal affections, and all the febrile diseases.

DIAGNOSIS.—*From mania.*—By the one being accompanied with violent fever, the other not; by the speedy termination of the one, (on the third, fourth, or seventh day,) and longer duration of the other, (for weeks, months, or years.)

From the delirium of synocha.—In phrenitis, the delirium is the primary affection; in synocha it is consequent upon the general fever. In synocha the pulse is strong and full; in phrenitis, small, hard, and more rapid. Phrenitis terminates, when protracted, in symptoms like those of typhus; true inflammatory fever, most frequently in visceral inflammation.

From the delirium of typhus.—By the mode of the accession; the affection of the head in phrenitis comes on suddenly, and is extremely violent; the delirium of typhus is preceded by the characteristic marks of that disease, and is more moderate in degree. It is distinguished from the low muttering delirium often accompanying nervous fever by there being in this no symptoms of inflammation; the face is pallid, the eyes are dull, and all the features shrunk; the contrary is the case in phrenitis.

From delirium tremens.—In delirium tremens the patient recognizes some of those about him, and will answer questions distinctly; has tremulous motions of the body and limbs, the skin is cool, the pulse small and rapid, the countenance in general pale. The patient often has no sleep for days together, even by large doses of narcotics.

The foregoing description of the symptoms of phrenitis does not distinguish inflammation of the substance of the brain from inflammation of the membranes. The two are generally so combined as to render a separate description difficult.

ENCEPHALITIS, CEREBRITIS, OR INFLAMMATION OF THE SUBSTANCE OF THE BRAIN.

In cerebritis the functions of the brain are speedily and primarily deranged; while in meningitis they are secondarily affected.

When cerebritis is general, there are tonic and clonic spasms of the muscles, subsultus tendinum or starting of the tendons, convulsions and cramps, rigid contraction of the limbs, and these attack all the limbs simultaneously; but when the disease is local or partial, some of the limbs only are affected. The action of the muscles and the sensibility are also partially but not permanently affected at first. In three or four days, these symptoms are succeeded by those of compression produced by effusion, as relaxation and immobility of the limbs; sensation is deranged or lost.

The symptoms already described are most urgent at first, and are followed in two or three days by those of compression. The

premonitory symptoms are—sense of weight in the head, noise or tingling in the ears, deception of vision, scintillations of light, change of colour of bodies, &c., irritability of the retina, numbness of one side, pain or pricking of the limbs; and these are followed by partial or general contractions of the muscles. There is pain in the head, usually referred to the side opposite to the inflamed one: sometimes the muscles of the limbs and face are contracted; one or both angles of the mouth are retracted, and the limbs may be flexed or extended. When collapse occurs, the muscles become flaccid and paralysed; the commissures of the lips, hitherto contracted, become pendent; the head and face are drawn to the sound side.

The muscles may become rigid after sudden paralysis with flaccidity, which is ascribed to the supervention of encephalitis after apoplexy, the parietes of the cavity containing the effusion having become inflamed.

When convulsions attack the unaffected side, unaccompanied by paralysis, there is arachnitis; and when paralysis succeeds, there is inflammation on the opposite side. When cerebritis succeeds arachnitis, especially at the base of the brain, as in children, one side of the body becomes paralysed. When the upper extremities are affected, the posterior fibres of the optic thalami of the opposite side are diseased; when the inferior extremities are disordered, the anterior half of the corpus striatum is implicated?

When there is paralysis of both sides of the body, the central portion of the pons varioli is disorganised. In cases in which paralysis, or muscular rigidity, is absent, and in which coma supervenes, there is inflammation of the corpus callosum, septum lucidum, or fornix?

When power of utterance is lost, the anterior lobes of the hemispheres are altered in structure?

In cases of encephalitis, accompanied by strabismus, rotation of the eye, contraction, immobility, and constant oscillation of the pupil on one side, the surface of the corpora quadrigemina of the opposite side is disorganized?

Loss of vision on one side depends on lesion of the pituitary gland, infundibulum and gray lamella of the opposite side. When the membranes of the eye lose their transparency, accompanied by paralysis of the organs of sense on one side, the ganglion of the fifth pair of nerves over the petrous portion of the temporal bone, or the corresponding walls of the fourth ventricle, are affected. Derangements of the circulatory, respiratory, and generative system, without paralysis of the limbs, depend upon lesion of one of the lobes of the cerebellum?

In arachnitis we observe spasmodic symptoms without paralysis; in hæmorrhage, sudden paralysis without spasmodic symptoms; in cerebritis spasmodic symptoms, and slow, progressive, or intermittent paralysis. (Lallemand.)

MENINGITIS, PARAPHRENITIS, ARACHNITIS.

INFLAMMATION OF THE MEMBRANES OF THE BRAIN.

According to Fordyce and Cullen, the pain is acute in meningitis, and dull or obtuse in cerebritis. Pinel, Stoll, Morgagni, Vaidy (*Dict. des Sciences Med.*, art. *Phrenitis*), Dewees (*Pract. of Physic*), Mackintosh (*Pract. of Physic*), Abercombie, and a host of others, deny the possibility of distinguishing one affection from the other; while Parent, Martinet, Rostan, and Copland hold the opposite opinion. All admit that the diagnosis between arachnitis and inflammation of the pia mater cannot be formed during life, and therefore both are included in the term meningitis.

SYMPTOMS.—Acute pain in some part of the head, exasperated at intervals; intolerance of light and sound; insomnolence; flushed countenance; suffusion or redness of the eye; frequent, quick, pulse; spasmodic twitchings or convulsions; sopor, coma, or delirium in adults; and complete relaxation of the limbs. The pain is often so violent as to compel children to scream in their sleep, and to roll their heads on the pillow: there is also knitting of the brows; and many of the symptoms of phrenitis are present in the adult, and those of hydrocephalus in children. The slightest noise is insupportable; the patient is irritable, the temperature of the head is greatly increased, and the febrile symptoms are very high. There is generally vomiting from the commencement of the attack in children, but unattended with pain in the epigastrium; this symptom is absent in the adult. Convulsive and spasmodic symptoms supervene, and are speedily followed by those of collapse, subsultus tendinum, cramps, general relaxation, and death. In lymphatic or delicate persons the disease is ushered in by prostration, disturbed sleep, loss of appetite, irritability of temper, slight febrile symptoms, and sudden invasion of stupor or coma.

When the disease is seated in the ventricles and base of the brain, as in children, the pain is referred to the forehead, temple, or occiput; and the head is often drawn backwards, which denotes that the part of the membrane covering the pons varioli is affected. Well-marked remissions occur in some cases, but these are speedily succeeded by convulsions or coma; and the last becomes permanent, the limbs relaxed, the pulse remarkably slow, and the pupils dilated. The symptoms differ in adults; there may be languor, insomnolence, inactivity of mind, instead of the spasmodic symptoms above described.

When the disease is seated on the convexity of the brain, the ideas are incoherent; the gait vacillating or unsteady; the limbs affected with tremblings; and when these symptoms come on slowly, the disease is chronic; but they will be followed according to Bayle, with maniacal delirium, characterized by an "exaggeration of all ideas, especially those of ambition;" and this terminat-

ing in mental alienation, or idiocy, or in general paralysis, which may continue to increase for years, though the functions of respiration, circulation, and digestion are performed regularly.

According to Lallemand, the following diagnosis may be relied on. In arachnitis there are spasmodic symptoms without paralysis; in hæmorrhage, sudden paralysis without spasmodic symptoms; in encephalitis, spasmodic symptoms, and slow and progressive paralysis, the progress of which is unequal and intermittent.

ANATOMICAL CHARACTERS.—*Cerebritis*.—A rosy or reddish colour in the part of the brain which was inflamed; vascular filaments; on incision through the affected part, we perceive a multitude of red points which cannot be removed by ablution, and do not afford blood on pressure as in congestion. There is softening, or ramollissement, of the inflamed part; sometimes this part is so injected as to resemble the colour of port wine. When a portion of the brain suppurates, we find well-formed abscesses separated from the substance of the brain by newly-formed membrane; and the pus may be white, yellow, or greenish, scarcely emitting any odour, unless when any of the bones of the cranium are carious, and then it will be fetid. The cineritious substance is the most common seat of cerebritis; and the corpora striata, optic thalami, the convolutions, pons varioli, and cerebellum are most frequently affected.

Meningitis.—The arachnoid membrane may be unchanged, if the disease had been of short duration, but cannot be separated from the pia mater, which adheres to it; but when the disease was severe, it will be opaque and thickened, according to Abercrombie, to a degree equal to the thickness of a wafer; others say to that of the pleura, which Martinet denies; while Money (*Vademecum of Morbid Anatomy*, 1830,) states that “it has acquired the density of the pleura, of the pericardium, of the dura mater, and even of that of the coats of the stomach!” It may adhere to the pia mater, be opaque, or highly injected and inseparable from it, except in fragments or patches. In some cases a sero-purulent fluid or real pus is effused under the arachnoid, or this membrane may be covered with false membranes. It is seldom inflamed on its cranial surface. In some cases it is rough and slightly granulated; and this state must not be mistaken for the Pacchionian glands, which are larger, more numerous, and whiter. The ventricles contain, in general, a serous, sero-sanguinolent, or sero-purulent fluid; and when these exist in children, there is ramollissement of the ventricular parietes. There may be effusion between the arachnoid membrane and pia mater, and adhesion between the latter and the brain at different points. The choroid plexus, corpora striata, and optic thalami may be covered with flakes of lymph. In some cases there is effusion of a limpid or turbid fluid at the base of the brain; the circle of Willis, basilar, and vertebral arteries may be coherent by bands of coagulable lymph, and even the lobes of the brain have been united in the same manner.

Inflammation of the dura mater is generally produced by injuries of the head, and is rarely an idiopathic disease.

PROGNOSIS.—*Favourable.*—The appearance of a warm and equable perspiration, when the skin has been before constricted; diarrhœa; sediment in the urine; hæmorrhage from the nose; the pulse diminishing in frequency, and becoming more full and soft; the return of sleep and consciousness; inflammation attacking a less important part.

Unfavourable.—After violent delirium and constant watchfulness, the pupil of the eye becoming dilated, frothing at the mouth, grinding of the teeth, profound insensibility, tremors, convulsions, involuntary evacuations; the face from being flushed suddenly becoming pale; suppression of urine; the urine of a dark red or yellow colour, or covered with a pellicle; the fæces either bilious or white and very fœtid; profuse sweats without affording relief; paralysis of the tongue or other parts; inflammation of other viscera, without diminishing the symptoms of the original disease; delirium changing to coma, while the pulse becomes weaker.

TREATMENT.—*Indication.*—To diminish the quantity of circulating fluid, and the force of the circulation, in the system in general, and in the head in particular.

1. By bleeding.—A copious and *sudden evacuation* of blood from the temporal artery, the jugular vein, or the arm, to be repeated if necessary, proportioning the quantity to the age, sex, or temperament and habit of the patient. This may be followed up, if necessary, by topical depletion, by cupping or leeches to the temples.

2. By purging; with neutral salts, or the submuriate of mercury in strong doses, so as to keep up a counter-irritation, and not to excite vomiting.

3. By depressants in doses short of inducing vomiting. Of these the tartar-emetic is the best. It may be given in doses of an eighth to a sixth of a grain, cautiously increased, and at frequent intervals.

4. By counter-irritants to the extremities, as the mustard-poultice or a large blister to the inside of the thighs, hot water to the feet, &c.

5. By local applications, as cold lotions frequently renewed, or ice to the head; or a stream of cold water may be poured over the head till the severe symptoms subside.

6. By strict antiphlogistic diet.

7. By complete rest, and perfect quiet. The most perfect tranquillity should be observed in the patient's room, all sounds and light excluded, and no food whatever be allowed during the inflammatory period, except barley-water, rennet-whey, gruel, sago, panada, arrow-root, or the like.

When the more active symptoms have been subdued, and the patient begins to be convalescent, some traces only of the disease remaining, blisters may often be applied to the neck or head itself

with advantage. The cold douche or shower-bath are also of great service during this period of convalescence. At this time, too, and for some time after, it is of the greatest importance that the mind of the patient should be kept as free from anxiety and the cares of business as possible.

The disease may be symptomatic of intestinal irritation in children, or of remote visceral disease in adults: and here the ordinary measures must be employed at the same time that the local irritation or disease is attacked. When encephalitis follows congestion, caused by narcotics, it is to be treated on ordinary principles. In some cases the most active depletion fails, and great prostration is produced: there are tremors, coma, irregular pulse, diminution of temperature, &c.; and we must exhibit ammonia, quinine, Hoffman's anodyne liquor, musk, and camphor.

Traumatic encephalitis is treated by antiphlogistic measures and cold applications, as already mentioned. As soon as the irritation and febrile symptoms cease, the face being pallid, the pulse weak, small, soft, and frequent, collapse or coma evident, we should employ diffusible stimuli, as in the last stage of typhus or synochus. In a case with profound coma, Dr. Mackintosh poured boiling water repeatedly over the legs with success. We should likewise abandon depletion so soon as paralysis is succeeded by rigidity or spasm. When the symptoms abate, and paralysis remains after convalescence, it should be treated by counter-irritation, antimonial ointment rubbed as nearly over the origins of the affected nerves as possible, by repeated blisters, moxas, issues, setons, or occasional cupping. When encephalitis is caused by morbid tumors or fluids in the brain, it can seldom or never be removed.

In all diseases of the brain the head should be raised. The most perfect tranquillity should be observed in the patient's room, all sounds and light excluded, and no food whatever be allowed during the inflammatory period, except barley-water, rennet-whey, gruel, sago, panada, arrow-root, or the like. In this and other forms of the disease catheterism may be necessary.

HYDROCEPHALUS.—WATER IN THE HEAD.

SYMPTOMS.—Languor, inactivity, loss of appetite, nausea, vomiting, parched tongue, hot dry skin, flushing of the face, and other symptoms of pyrexia; pain over the eyes; great sensibility to light; suffused redness of the eyes; the pupils are contracted; the pain in the head is now extremely acute; it comes on at intervals, and occasions the sufferer to utter piercing screams, at the same time compressing the forehead with his hand; disturbed sleep; extreme restlessness; flushed countenance; costiveness.

In a short time the pupils of the eyes begin to dilate; strabismus takes place; the vomiting and pain in the head become more

violent, especially in the evening ; at length the pain diminishes, and sleepiness succeeds a constant state of watching ; the pulse, before increased in quickness, is now preternaturally slow and often intermitting ; the strabismus increases ; the pupils become more dilated and cease to contract on their being exposed to light ; double vision or complete loss of sight, with lethargic torpor, succeed.

After a shorter or longer continuance of the second stage, the pulse again returns to a febrile state, and becomes so extremely small and rapid, as scarcely to be numbered : the eyes are now inflamed ; extreme difficulty of breathing ; stertor ; the evacuations become involuntary ; maculæ sometimes appear about the joints, and in different parts of the body ; and at length the patient expires in dreadful convulsions.

CAUSES.—*Predisposing*.—Childhood ; general debility ; scrofulous diathesis.

Exciting.—Intestinal irritation ; dentition.

The effusion of serum is sometimes the consequence of inflammation, at others of debility.

DIAGNOSIS.—The pathognomonic symptoms are the excruciating pain in the head, vomiting, impatience of light ; followed by strabismus, dilated pupil, and profound stupor. The pulse, at first preternaturally quick, afterwards becoming inordinately slow or intermitting.

PROGNOSIS.—Will ever be unfavourable, more especially where the coma is great, with total loss of sight, and weak intermitting pulse ; the head greatly enlarged, apoplectic stertor, difficult respiration, and involuntary evacuations.

TREATMENT.—*Indications*.—I. To lessen inflammation in the inflammatory stage.

II. To promote the absorption of the fluid, when effusion has taken place.

The inflammation is subdued by,

1. Bleeding ; the application of leeches to the temples or neck, by opening the temporal artery, or the jugular vein.
2. Cathartics ; of jalap, submuriate of mercury, or soluble tartar.

Half a drop or a drop of the oleum crotonis is a sure purge, which may be disguised and given to children when other medicines are refused.

Calomel in doses of two or three grains every two or three hours, either alone or in combination with tartar-emetic, in doses of one-eighth to one-sixth of a grain or more, is perhaps the best remedy. Children bear purgatives, and especially mercurial purgatives, well.

3. Antimonial preparations.

4. Nitrate of potass in large doses with digitalis has been recommended.

5. Blisters, and cold applications to the head ; cloths wetted with

cold water, or vinegar and water, which may be made very cold by ice, or solutions of muriate of ammonia and nitrate of potass, and so applied as not to interfere with blistering.

The second indication requires,

1. Mercury; mercurial friction to the nape of the neck or angles of the jaws; submuriate of mercury taken internally.

2. Digitalis; either alone, or united with the submuriate of mercury and squills.

3. Tonics; especially the preparations of iron; as the sulphas ferri; the tartrate, &c.

CHRONIC HYDROCEPHALUS.

SYMPTOMS.—Children are sometimes born with this disease. It takes place at all periods between birth and the age of eight, very seldom after, and is known by drowsiness, languor, strabismus, vomiting, costiveness, coma, convulsions; the bones of the head perhaps separate, the fontanelles enlarge, and the head acquires an immense size.

CAUSES.—The infantile age; injury to the brain during labour; tumors within the cranium; and the other causes of the dropsies; dentition, irritation in the digestive organs, especially the intestinal canal and liver.

The effusion sometimes takes place with astonishing rapidity, and hence we must endeavour to prevent it by prompt antiphlogistic treatment, leeches to the head, mustard pediluvia, warm bath, with cold to the head, purgation, &c. The cold affusion on the head during each paroxysm of fever is highly beneficial.

DIAGNOSIS.—We should carefully distinguish the *hydrocephaloid disorder* caused by worms, diarrhœa, or inanition, which closely resembles hydrocephalus, and which will be aggravated by the antiphlogistic treatment, and cured by stimulation. The diagnosis is easily formed—in the latter, the extremities are cold, the eyes half closed, the eyelids in a constant state of motion, the scalp cool, the pulse small and weak. The history of the case will also assist us. In hydrocephalus the head is large and the hair abundant, while one or both fontanelles are open—the head is of the ordinary size in the hydrocephaloid affection. Aromatic spirit of ammonia or brandy, in doses of three or four drops at a time, given in arrow root or milk; warmth to the extremities, epigastrium, and abdomen, will soon excite reaction and ultimately effect a cure.

TREATMENT.—*Indication.*—To promote the absorption of the effused fluid. No plan of treatment has hitherto been sufficient to cure this disease: but the most likely remedies to fulfil the indication are,

1. Blisters to the head.

2. Mercury; applied externally, and given internally, so as to affect the mouth.

3. Diuretics of squills, digitalis, and submuriate of mercury, as recommended for anasarca.

4. Tonics, and especially cinchona and chalybeates.

When depletion, leeching, warm bath, sinapisms, blisters, and purgatives have failed, and the pupils are dilated, the respiration stertorous, the limbs convulsed or paralysed, together with coma, and an extremely frequent or slow pulse; effusion has taken place, and we must endeavour to arrest or diminish it by promoting absorption, and by causing powerful revulsion. This is effected by blisters, antimonial ointment rubbed into the neck and behind the ears, mercurial frictions at the angles of the jaws and over the scalp. We should also exhibit calomel freely, in doses of three or four grains every three hours, so as to act freely on the bowels, and to affect the system, if possible. It is extremely difficult, however, to produce salivation in hydrocephalus. So much as 500 grains have been administered without causing ptyalism. It may be combined with James's powder, with the tartar-emetic, or with small doses of opium.

Nauseating doses of tartarised antimony, given every hour, have been strongly recommended by Dr. Mills of Dublin and others. The dose may be from a twelfth to an eighth of a grain, according to the age. Vomiting should be carefully avoided in inflammations of the brain or its membranes. It often happens that the disease lingers for a long time, and that the digestive functions are unaffected. In such cases, a mild, nutritious diet, composed of sago, arrow-root, tapioca, and light puddings, may be allowed; and if there be much prostration of strength, a teaspoonful of some of the white wines, sherry or Madeira, may be given at short intervals throughout the day. The disease now assumes a chronic form, and may continue for months or years, unless tapping be resorted to, which may effect a cure.

When hydrocephalus supervenes on scarlatina, measles, or small-pox, the treatment already described must be employed; in addition to which, M. Martinet advises frictions over the whole surface of the body with tincture of squills or digitalis, vapour-baths, nauseating doses of tartarized antimony, and the compound ipecacuanha powder.

M. Charpentier and others object to the application of blisters or counter-irritants near the head in the early stage of the disease; they place them successively on the legs, thighs, arms, neck, and lastly on the scalp.

When the disease is chronic, tapping the brain for the removal of the fluid, and then compression, have lately been tried with complete success. Tapping would not be warrantable in acute hydrocephalus, because the convolutions of the brain are not expanded or thinned, and fatal inflammation would be induced.

M. Recamier and M. Andrieux have strongly recommended warm-baths, with from one to five ounces of tartarized antimony in each,

the effects of which were a copious discharge of urine, emaciation, and a sensible diminution of the head.

Goelis exhibited calomel and juniper-berries, and employed frictions with the Neapolitan ointment over the scalp, covering it with a woollen cap, so as to keep up continued irritation. He ordered issues and alkaline baths. *Monro tertius* applied a plaster of wax and tartarized antimony to the scalp, others have cauterised the scalp with nitrate of silver, and some have advised a blister to be kept discharging for several days or weeks.

Sir Gilbert Blane and Dr. Barnard tried compression, but without success, except in one case.

P. Frank thought that hydrocephalus was induced by washing the scalp with cold water; and M. Martinet states, that it appears to be endemic in low, hot, damp, confined situations, as the Valais. He therefore recommends a change of situation to a more elevated and salubrious position.

PROGNOSIS.—The disease generally ends fatally; though, after the bones begin to separate, its fatal termination is protracted. Death is commonly preceded by convulsions.

The following cases by Dr. Conquest will show with what safety and advantage tapping may be performed.

“My first successful operation was performed at St. Bartholomew’s Hospital in the autumn of 1829, when only $\frac{3}{4}$ iss of serum escaped, but during the subsequent two days, not less than $\frac{3}{4}$ xiv flowed. The child had been the subject of frequent convulsions, &c. before tapping; but only one paroxysm followed. Two years afterwards the child was in perfect health. The second patient was tapped thrice; first on the 20th of November, when $\frac{3}{4}$ xij of serum were taken away; secondly, on the 2nd of December, $\frac{3}{4}$ viii were evacuated; and on the 16th $\frac{3}{4}$ ij. Dr. Hodgkin assisted me in this case.

“The third terminated fatally after drawing $\frac{3}{4}$ lvijss by five operations, a fortnight intervening between each.

“The fourth case was and is a patient of Dr. Caldwell of the City Dispensary; $\frac{3}{4}$ xxiv of serum were taken away by two operations, $\frac{3}{4}$ xij of fluid escaping each time, a month having intervened between them.”

In the *Lancet* of September the 15th, 1832, Dr. C. further details the history of this case, and states, that at the end of two years the child continues well.

“The fifth patient is a child yet living, but will eventually die. I have tapped it four times since February, 1832, and taken away $\frac{3}{4}$ xlvi altogether. I believe the child would have recovered had the parent consented to one or two more operations.

“I have operated on five other cases: in one instance the child survived two tappings, (one of $\frac{3}{4}$ xvj, the other of $\frac{3}{4}$ xij,) six months, and then died of whooping-cough. In another case, the infant lived some months, and was carried off by teething. Another case is yet

under my care, promising to do well, having been tapped three times, and the others ended fatally. December 7, 1832."

Mr. Russell, of Aberdeen, details the following case. A fine trocar, such as is used for hydrocele, was introduced into the head of a female infant aged eight months, about half an inch in depth on the right side of the anterior fontanelle; and three ounces of serous fluid were discharged through the canula. A piece of adhesive plaster was applied over the wound, and a roller round the head. A slight degree of fever followed. In ten days afterwards, a similar puncture was made on the opposite side, and five ounces and a-half of turbid serum were evacuated. No unfavourable symptom followed. In five days afterwards the head was diminished two inches and a-half in circumference, and two and a quarter across the vertex. In a fortnight after the last operation the trocar was passed near the first position in an oblique direction into the ventricle, when nine ounces of serum escaped in a continued stream. The pulse became weak and feeble, and she became faint; but she soon revived, and no bad symptom followed. She recovered completely, and became a lusty child of her age.—*Edinburgh Medical and Surgical Journal*, July, 1832.

The operation has been successfully performed by others since the date last mentioned, and ought to be employed when all other means have failed.

APOPLEXIA.—APOPLEXY.

Species.—1. Simple or congestive apoplexy; congestion of the vessels of the brain without rupture; and 2. Hæmorrhagic apoplexy, or congestion with rupture.

SYMPTOMS.—The attack is sometimes sudden, at others it is preceded by various premonitory symptoms, such as giddiness, headache, a sense of pressure and constriction in the head, confusion of ideas, incoherence, hæmorrhage from the nose, flashes of light, noises in the ear, visual spectra, faltering speech, loss of memory, drowsiness, numbness of the extremities, pallor, nausea, vomiting, and faintness. These symptoms are succeeded by abolition of all the powers of sense and motion, accompanied with noisy or stertorous breathing; impeded deglutition; flushed, and sometimes livid, countenance; prominence and immobility of the eye, with dilated pupil; foaming at the mouth; grinding of the teeth; often a resolution of the sphincter muscles; the strength of circulation remaining unimpaired; the pulse strong and full. It often terminates in paralysis, or the patient is seized with vomiting, and recovers after a profuse sweat.

CAUSES.—*Predisposing.*—A certain age: from the fiftieth to the sixtieth year (it occurs from the third year to decrepit old age—*Serres*); great obesity, especially if occurring in persons having a short neck and large head; indulgence in the luxuries of the table; suppression of usual evacuations; intense study; sedentary life;

plethora, however induced; hypertrophy of the left ventricle of the heart; metastasis of gout or rheumatism; and repression or non-appearance of exanthematous eruptions, as variola, rubeola, or scarlatina.

Exciting.—Violent exercise; passions of the mind; sudden exposure to cold; intense heat; sudden or long stooping; pressure on the neck; derangement of the stomach or intestinal canal; long-continued inspiration, as during parturition; venereal excesses; overloading the stomach; certain narcotic substances, such as opium, alcohol, charcoal, mephitic airs, hot-bath, &c.

PROGNOSIS.—*Favourable.*—The senses little impaired; the function of respiration not much affected; hæmorrhage from the nose or hæmorrhoidal vessels; diarrhœa.

Unfavourable.—Protracted beyond the third day; the pulse becoming quick and hard; febrile heat; redness of the eyes; dribbling of saliva from the mouth; deglutition continuing impeded; cold extremities; cold and clammy sweats.

Anatomical characters.—In *congestive* or *simple* apoplexy, distension of the veins of the brain, with or without effusion into the ventricles, or at the base of the brain. In the hæmorrhagic apoplexy, effusion of blood in the hemisphere opposite to the affected side. The fluid is effused in several cavities, or in one mass. When recent, the blood is partly fluid and coagulated, and may be separated by ablution. The brain is lacerated about the coagulum, and of a red colour. After some time, the parts surrounding the coagulum or clot become of a yellowish colour, the latter is absorbed, the walls of the cavity approximate or cohere, or are lined by a false membrane. The parts of the brain most commonly affected are, the corpora striata, the optic thalami, and one or both ventricles. In cases of hæmorrhage of the substance of the brain, the neighbouring parts, when incised, present a number of red dots, which re-appear after sponging. The vessels of the pia mater and sinuses of the dura mater are often gorged with blood.

Serres divides apoplexy into the meningeal and cerebral. The first attacks youths after the age of fifteen, or men after sixty, and most frequently women before the last period. Meningeal apoplexy is almost always slow, and has precursory symptoms. He states that there are five species:—1. meningeal apoplexy without effusion; 2. with effusion of simple serosity; 3. with sero-sanguineous effusion; 4. with arterial rupture or aneurismal dilatation; 5. with venous rupture. There are five species of cerebral apoplexy: 1. with hemiplegia; 2. with paralysis of one arm; 3. with paralysis of one leg; 4. with double hemiplegia; 5. with complete paralysis from a single attack. In nearly 3000 cases the lobe of the brain opposite to the palsied side was disorganized. When the whole body is paralysed, and death rapidly takes place, the extravasation will be in the pons varolii or tuber annulare.

TREATMENT.—During or immediately after the fit we should loosen the neckerchief, place the patient in the erect position, and open a vein. Blood must be allowed to flow till the approach of syncope, but must be arrested before fainting takes place. The countenance, pulse, and breathing must be carefully watched for the first indication of the approach of this state. In the after treatment, the

Indication is to reduce the action of the heart, and diminish the force of the circulation through the brain.

1. By bleeding largely and frequently from the jugular vein and temporal artery, or from both arms simultaneously. The paleness of the countenance must not prevent us from bleeding when the pulse is strong.

2. The application of leeches and cupping-glasses.

Repeated depletion, cold to the head, cupping or leeching the base of the cranium, sinapisms or hot turpentine to the legs, with drastic purgatives, or croton oil applied to the tongue, must be promptly employed.

When apoplexy arises from suppression of the menstrual or hæmorrhoidal flux, we should apply leeches to the vulva, or about the anus. When there is profound coma or collapse, we should apply irritating liniments to the legs, thighs, neck, and face; and if these fail, and life is nearly extinct, we should pour boiling water over the extremities, as first advised by the Germans, or apply nitric acid to the nucha: stimulants in such cases have produced re-action; and when this happens, depletion may be necessary. The hot-air bath, or exhausted-air bath, proposed by Sir James Murray, of Dublin, (*Lond. Med. and Surg. Jour.*, 1832,) will be exceedingly valuable in these and all cases of profound collapse.

3. Blisters, or mustard cataplasms, first to the back, afterwards to the extremities, and then to the head.

4. Drastic purges.

The oleum crotonis can often be given in this disease, when the patient cannot swallow the ordinary doses of other medicines; for two drops put on the tongue will purge briskly. It is an excellent purgative, inasmuch as it seldom fails: one, two, or three drops is the usual dose. Aloes, colocynth, scammony, and gamboge, may be used in full doses.

5. Depressants, as tartar-emetic in nauseating doses.

In many instances the patient cannot swallow during the fit of this disease: in such cases great care is required lest anything get into the glottis, and suffocate; and when this is likely to happen, all attempts should be abandoned, and external means trusted to.

6. If the disease take place soon after a full meal, an emetic, or irritating the fauces, should be employed.

7. Erect position of the body.

In this disease, as in the last stage of typhus or coma, we must

examine the hypogastrium daily, and draw off the urine, if necessary. When convalescence commences, we should regulate the digestive system; employ counter-irritation on the neck, insert an issue or seton in that situation, or in the middle of the arm, or on the external surface of the knee. When paralysis ceases in one limb, and seizes another, we must resort to general and local bleeding, counter-irritation, purgatives, &c., provided the general symptoms justify the use of active measures.

When apoplexy supervenes after a retrocession of gout or of acute rheumatism, we should irritate the site of the latter disease by sinapisms, blisters, warm turpentine, or antimonial ointment: depletion in such cases is generally injurious.

For the treatment of paralysis following apoplexy, see Paralysis.

PROPHYLAXIS.—As apoplexy depends on a determination of blood to the head, and generally on a plethoric habit, we should advise the total abstinence from animal food and from all ardent or fermented liquors, spirits, wines, porter, ale, &c. Arrow-root, sago, rice, tapioca, barley, stale bread, oatmeal, potatoes, turnips, and parsnips, are the most easily digested of the vegetable aliments. Ripe fruits may be allowed; cabbage, beans, cauliflowers, salads, radishes, onions, and cucumbers, are difficult of digestion, and ought to be avoided. Bread or biscuits and milk are the best articles of diet. If animal food be used, it should be in very small quantity. Late suppers must be avoided. Exercise in the open air is of great importance. The patient should wear nothing tight about the neck or waist. Cupping the neck occasionally is a valuable prophylactic.

The term *serous apoplexy*, is in use to describe a disease accompanied by symptoms similar to those of sanguineous apoplexy, but caused by the effusion of serum at the base of the brain, or into the ventricles. It is caused by debility of the capillary vessels, and that debility by general exhaustion. It consequently forms the termination of many lingering diseases, and is apt to occur where symptoms of sanguineous apoplexy have been treated with undue activity, and too much blood has been removed. It must be treated by remedies appropriate to the debility which has induced it, viz. by tonics and stimulants.

CHRONIC DISEASES OF THE BRAIN.

RAMOLLISSEMENT, OR SOFTENING OF THE BRAIN.

This disease is the result of encephalitis, according to a preponderating majority of pathologists, while a few consider it a degenerescence *sui generis*.

SYMPTOMS.—In most instances there are symptoms of encephalitis or meningitis, though of a slight character; there is more or

less head-ache, which is constant ; the countenance is expressive of cerebral disease ; the sensibility and muscular power gradually diminish, and somnolence supervenes, and generally becomes constant. These symptoms may persist for several days. When paralysis, rigidity of the muscles, and convulsions, are absent, but the patient is comatose, and the pupils are dilated with strabismus, there is reason to believe that softening of the corpus callosum, septum lucidum, or fornix, are present. This form of the disease is often confounded with arachnitis of the base of the brain.

Softening of the brain, occurring in aged persons, is marked by the following symptoms:—Vertigo ; diminution of the moral and intellectual faculties ; of perception, attention, memory, judgment, and imagination, followed by senile mental alienation, or great depression of spirits ; somnolence, prickings, numbness or twitchings of the limbs, and much difficulty in laying hold of small objects. The senses of sight, taste, smell, and hearing, are more or less impaired.

These symptoms are succeeded by partial or hemiplegic paralysis, coma, and death.

Anatomical Characters.—The medullary part of the brain is of a dull white colour, and softened, while the grey substance is in its normal condition. There is no sign of pus or increased vascular action in the diseased part, nor does the brain when incised exhibit any drops of blood. When the convolutions are the seat of the disease, there is no corresponding vascularity of the pia mater. The parts of the brain most commonly affected are those that are least firm, as the walls of the ventricles, the corpora striata, and the optic thalami.

Dr. Abercrombie relates cases of acute and chronic encephalitis, accompanied by softening, and thinks the last-mentioned disease caused by inflammation. Lallemand is of the same opinion.

Ramollissement, or softening of the brain, may be caused by inflammation, or may occur without any symptom of cerebritis, fever, or even head-ache, especially in aged persons (Rostan). It is also ascribed to failure of circulation in old persons (Abercrombie).

TREATMENT.—Counter-irritation to the neck ; drastic purgatives ; tonics ; improvement of the digestive functions ; and escharotics, moxas, antimonial ointment, and galvanism over the origin and along the course of the nerves of the paralysed part.

OTHER DISORGANIZATIONS OF THE BRAIN.

There are numerous other disorganizations of the brain and its membranes caused by congestion or inflammation, as hypertrophy, tubercles, cancer, ossification, and other morbid changes which are described in systematic and monographic works, to which the reader is referred. (See Abercrombie, Olivier, Copland's Dictionary, Mayo's Pathology, &c.)

The SYMPTOMS of chronic degeneration in the brain are frequent, severe head-aches, continued or intermittent, with spasms, neuralgic or anormal sensations in one or both sides of the body, gradual, and finally, total abolition of the faculties, coma, and death.

There are many chronic diseases of the brain and its membranes which may exist for months or years, whose pathology cannot be positively determined during life. These only admit of palliation.

In many cases, chronic diseases of the brain are unattended with any symptoms which could lead us to suspect their existence. Thus, we have it on the authority of Louis, that out of twenty cases of fungus of the dura mater, three only had cerebral symptoms of any kind; and chronic abscesses, hydatids, cysts, exostoses, &c., sometimes attain uncommon size, without any attendant symptoms of cerebral disorder.

TREATMENT.—The same remedies as in ramollissement of the brain, apoplexy, paralysis, and hydrocephalus.

CEPHALALGIA.—CEPHALÆA.—HEADACHE.

Headache is a symptom of almost all acute and chronic diseases of the brain, as well as a distinct functional derangement of very frequent occurrence. Though a subject of much difficulty, it is of too frequent occurrence to be passed over without notice.

SPECIES.—(a) External, (b) Internal.—(a) External. 1. Cephalalgia muscularis; 2. Cephalalgia periosteosa; 3. Cephalalgia neuralgica.

(b) Internal. 1. Cephalalgia congestiva; 2. Cephalalgia dyspeptica, vel sympathetica. 3. Cephalalgia organica.

EXTERNAL.—1. *Cephalalgia muscularis*, or pain of the muscular covering of the head, affects the occipito-frontalis and temporal muscles. *Diagnosis*.—The pain is diffused over the head, remitting in character, increased by motion of the eyebrows and jaws, by pressure, and by percussion with the fingers. It is generally accompanied by pain in the face, neck, shoulders, or other parts of the body. *Cause*.—Exposure to cold. *Treatment*.—That of muscular rheumatism. In very severe cases, leeches or a blister to the back of the neck.

2. *Cephalalgia periosteosa*.—Seat, the pericranium. *Diagnosis*.—Pain extending over the entire head, or limited to one spot, increased by firm and deep pressure, but less affected than the preceding form by motion of the surrounding muscles. It generally affects the periosteum of the face at the same time, so that the nose is tender to the touch; and it sometimes extends to other parts of the body. It is generally accompanied by some cerebral excitement and slight symptoms of dyspepsia. When limited to one spot it is commonly attended with swelling. *Causes*.—Over-excitement of the brain, from anxiety of mind or intense application, combined probably with the effect of cold. In such cases the pain is generally

diffuse. When the pain is limited to one spot or to a few points only, it is often traceable to a syphilitic taint, and will be found to co-exist with, or to have followed, similar affections of other bones. *Treatment*.—Depends on the existing state of the circulation through the brain, and on the state of the general health. If the scalp is hot, leeches, aperients, and antimonials. If it is traceable to syphilitic taint, the iodide of potassium in five grain doses, three or four times a day. If the bone beneath seems to be affected, free incisions will be necessary.

3. *Cephalalgia neuralgica vel periodica*.—*Seat*, the nerves of the integuments of the internal angle of the orbit and side of nose (megrin), or of one side of the head and face (hemicrania). *Diagnosis*.—Its periodic character, which resembles that of an ague, and occurs with the same regularity at variable intervals of one day or more, or even of weeks or months. In this it differs from the two former species, and from common tic doloieux. *Cause*.—Exposure to cold and wet—marsh miasma. *Treatment*.—The same as for ague, viz. quinine or liq. arsenicalis. The general health must at the same time be attended to.

INTERNAL.—1. *Cephalalgia congestiva, or congestive headache*. This presents itself in three different states of constitution—the plethoric, the delicate and irritable, and the weak and leucophlegmatic. *Diagnosis*.—Obtuse pain affecting the whole of the head, especially the forehead and occiput, combined in the *plethoric* with the bloated countenance, the full red eye, the distention of the veins, the full pulse, and a dull and heavy expression of face; in the *delicate and irritable*, with flashes of light, floating specks before the eyes, noises in the ears, cold extremities, small, frequent, quick pulse; in the subjects of *anæmia*, with pale skin, lips, tongue, and gums, cold extremities, palpitation of the heart, violent throbbing of the carotid arteries, and small, frequent, quick pulse. In the two latter cases it is brought on in violent paroxysms, by sudden noises, mental emotions, or any violent muscular exertion. *Treatment*.—In the *plethoric*, depletion by bleeding, general and local, cautious regulation of the diet, and aperients frequently administered; in the *delicate and irritable*, by repose of mind, careful attention to the state of the stomach and bowels, and by small doses of narcotic medicines; in the subjects of *anæmia*, steel in full doses; or, where there is great debility, stimulants. Where there is *anæmia*, there steel may always be safely given; when much blood has been lost, stimulants may be given with equal safety.

2. *Cephalalgia dyspeptica vel sympathetica*.—*Diagnosis*.—Pain usually fixed, and seated in the left temple, or over the right eye, or on the top of the forehead. It commonly commences when the patient first rises in the morning, and in slight cases continues till after breakfast; in more severe ones, it begins as a diffuse heavy pain, and gradually becomes fixed in one spot, accompanied with

nausea, sickness, and vomiting. There is also confusion of thought, dimness and indistinctness of vision, and singing in the ears. Sometimes the fit is removed by free evacuation of ingesta, or frothy mucus, or bile, from the stomach. Its duration varies from some hours to three or four days, and in confirmed cases it returns at short intervals, and is attended with most severe suffering. Sometimes there is much flatulence present, and relief is only afforded by free eructation. *Cause*.—Derangement of the functions of the stomach and bowels. The bad habit of taking physic day by day, by which the tone of the entire alimentary canal is weakened. *Treatment*.—Gentle aperients in combination with alkalies, as rhubarb with soda, or magnesia, or the dinner pill. Regulation of the diet; proper exercise; emetics, where the cause is transient. In cases of obstinate sick headache, emetics of ipecacuanha may be administered every morning with the best effect. If the pernicious habit of taking physic have been formed, it should be broken through, for though strong aperients often give relief for the time, they always aggravate the disorder. If large quantities of bile are ejected from the stomach, (bilious headache,) small doses of calomel, or hyd. c. cretâ, administered three times a day, will be found useful. When the bowels are very irritable and act irregularly, the best purgative is a combination of the compound rhubarb pill, with extract of conium. When much flatulence is present, ginger or alum may be combined with the other medicines, or strong mint-water may be made the vehicle of saline aperients. Cold to the head sometimes acts as a palliative.

3. *Cephalalgia organica*.—*Diagnosis*.—Difficult when the pain is unattended by any morbid affection of the senses or moving powers. The pain is generally more fixed and deeper seated than other forms of headache, more affected by motion and change of posture, by heated rooms, noise, and mental application. If accompanied with disordered digestion or with sickness, it is not relieved by vomiting. Sometimes it is intermittent, and in such cases the diagnosis is more difficult still. The nature of the affection is at length made known by some affection of the senses, by paralysis, spasms, or convulsions. *Treatment*.—That of the disease of which it is the symptom. The state of the circulation through the brain must be carefully watched, and local and general blood-letting, purgatives, and counter-irritants, must be employed according to the existing symptoms; at the same time that strict attention is paid to the state of the general health. In obscure chronic affections of the brain, in which other remedies have failed, a course of mercury, carried to the extent of affecting the mouth, may, perhaps, suspend some chronic inflammation which is the cause of the existing symptoms.

Great caution is required in inquiring into the cause of headache, and in discriminating one form from another. On the closeness of this attention and the accuracy of the diagnosis, the treatment will

entirely depend. Sometimes, for instance, a patient will complain of nothing but headache, but on careful inquiry his real disease will be found to be tubercular phthisis.

Besides the causes of headache above enumerated, there are others too numerous to specify. An inflammatory headache and a metastatic headache might be added to the foregoing divisions, and many cases might be pointed out which do not come precisely under any of the above heads. Those forms of headache produced by the action of the narcotic and narcotico-acrid poisons belong to the class of congestive headache.

DISORDERS OF THE MIND.

MANIA	.	.	Furious Madness.
MELANCHOLIA	.	.	Melancholy.
HYPOCHONDRIASIS	.	.	Vapours—Low Spirits.
DELIRIUM TREMENS.	.	.	Drunkard's Delirium.

MANIA.—FURIOUS MADNESS.

SYMPTOMS.—Delirium without fever ; severe pains in the head ; noise in the ears ; redness of the face ; peculiar wildness of the countenance ; rolling and glistening of the eyes ; grinding of the teeth ; loud roarings ; violent exertions of strength ; absurd incoherent discourse ; unaccountable antipathy to certain persons, particularly to their nearest relatives and friends ; a dislike to such places and scenes as formerly afforded particular pleasure ; a diminution of the irritability of the body with respect to the morbid effects of cold, hunger, and watching ; together with a full strong pulse.

Maniacs have frequently lucid intervals ; hence called lunatics.

CAUSES.—Hereditary predisposition ; sanguineous temperament ; violent and stimulating emotions of the mind ; uncurbed and immoderate indulgence of any passion ; violent exercise ; frequent intoxication ; sedentary life ; abstruse study ; suppression of periodical and other evacuations ; excessive discharges ; parturition or lactation ; tumors compressing the brain ; preceding attacks of epilepsy, fever, &c.

DIAGNOSIS.—*From phrenitis.*—By the latter being accompanied with fever, the former not.

PROGNOSIS.—*Favourable.*—The mania arising in consequence of some other disease or from some temporary cause, as the occasional excitement of spirituous liquors ; the attacks being slight, and not frequent in their recurrence ; hæmorrhage ; diarrhœa ; scabby eruptions ; restored hæmorrhoidal or menstrual discharge ; supervening fever.

TREATMENT.—*Indications.*—I. To gain a perfect command over the maniac.

II. To divert the patient's mind from the existing train of thought.

III. To diminish the præternatural action of the brain.

The first indication is best effected by gentle and conciliating treatment; coercion, when necessary, must be tempered with proper mildness and humanity. Upon gaining the confidence of the maniac will in a great measure depend the success of the after-treatment.

The second indication is sometimes fulfilled by

Engaging the patient in some exercise or pursuit that will employ at once both the body and the mind; and thus divert the latter from pursuing one invariable train of thought; removing him from those objects with which he was formerly acquainted; frequent change of scene.

The third indication is fulfilled,

1. By bleeding; if he be of a plethoric habit, and the attack recent.

2. Purging; both the drastic and the cooling purgatives have been recommended—perhaps the former are preferable; hellebore, senna, jalap.

3. A spare low diet.

4. Emetics of sulphate of zinc, or of tartar-emetic.

5. Nauseating remedies.

6. Cold bath, and cold douche, during the paroxysms.

7. Sedatives, as conium, hyoscyamus, camphor, and digitalis; opium is generally prejudicial.

8. Counter-irritants; blisters, setons, or issues to the nape of the neck.

9. Where great debility is present from the first, or supervenes after the employment of active remedies, tonics and stimulants, as in debility from other causes.

10. In cases of scrofulous disease, syphilis, or chronic cutaneous eruptions, the remedies recommended in those states of the system.

Mania is but one of many disorders of the mind; but it is the one which the general practitioner is most likely to be called upon to treat. The other forms of mental unsoundness, viz. idiocy, imbecility, and dementia, fall under the care of those who devote themselves especially to the treatment of such disorders.

Idiotism consists in a defective developement of some part of the brain, either at birth or before the full evolution of the understanding. In these cases the whole of the functions are defective, the general sensibility is but partially established, the limbs are emaciated, or often paralysed or ill-formed, and the power of articulation is so defective, that the individual rather howls than speaks. There is no perceptible alteration of digestion, circulation, or respiration. Imbecility is but a form of this with a higher degree of intelligence.

Cretinism is a variety of idiotism, presenting the following phy-

sical characters: head rather large, forehead and occiput rather flattened, visage square, mouth very wide, ears thick and elongated, goitres of variable size and pendent towards the chest, thorax narrow and flat, genital organs much developed, height seldom above four feet. There is a deficiency of organization in the brains of idiots.

Dementia is a gradual diminution of the powers of the mind, with weakness or loss of memory, incoherence of ideas and actions, which have no determinate object. This disease most commonly occurs to persons advanced in life, and is not accompanied by fever, or any disturbance of the organic functions. It is caused by some affection of the brain, as chronic arachnitis, and is generally incurable. In many cases it follows an attack of acute mania; in others, it is produced by a sudden and violent mental shock.

MELANCHOLIA.—MELANCHOLY.

CHARACTER.—A partial chronic insanity, characterized by sadness, dejection of spirits, fondness for solitude, timidity, fickleness of temper, great watchfulness, flatulency, costiveness; delirium without fury, and unaccompanied by fever.—The mind pursues one certain object or train of thinking, which in general bears a near relation to the melancholic himself, or to his own affairs, creating the most groundless, yet anxious, fear, and generally accompanied with a desire of terminating his existence.

CAUSES.—Hereditary predisposition; powerful depressing passions of the mind; the melancholic temperament in an exquisite degree; anxiety; grief; love; excessive evacuations; intemperance in the use of spirituous liquors.

DIAGNOSIS.—*From hypochondriasis.*—By the dyspeptic symptoms being much less, or entirely absent; by the mental derangement being more considerable, and amounting to the melancholic delirium above described.

PROGNOSIS.—*Favourable.*—The disease arising from accidental circumstances, and being of short duration; supervening fever; diarrhœa; cutaneous eruption; the mind still capable of being diverted from its melancholy train of thought to other objects; sound sleep.

Unfavourable.—The disease being the effect of hereditary predisposition, or of the melancholy temperament exquisitely formed; its being of long standing; supervening epilepsy or palsy.

TREATMENT.—*Indication.*—To divert the attention of the mind from its accustomed object.

By presenting an interesting variety of objects, and subjects of attention; carefully guarding against the appearance of their being intentionally introduced.

By travelling; by resorting to places of public amusement; by the society of the gay and convivial; by exciting passions of a

nature opposite to those that have prevailed during the disorder ; rousing the courage and resolution of the timid ; and cheering the gloomy with merriment and pleasure.

By the introduction of sports and rural pastimes ; and likewise of such employment as consists in a moderate exercise of the faculties of the mind : thus the literary man may be amused with philosophical questions ; the farmer with discourses on agriculture ; and the sailor with naval affairs.

By music of the most exhilarating kind.

The melancholic may be conducted to the different places of summer resort, under the pretext of drinking the waters which they afford.

Melancholia is but one form of monomania, or the first degree of it. It rarely exists for any length of time without being combined with some hallucination.

The state of the bowels requires particular attention.

HYPOCHONDRIASIS.—VAPOURS—LOW SPIRITS.

SYMPTOMS.—Dyspepsia, sense of pain and heat in the hypochondria ; languor, listlessness, want of resolution and activity, disposition to seriousness, sadness and timidity as to future events ; an apprehension of the worst, and most unhappy state of them, and therefore upon slight grounds a dread of great evil. Particular attention to health ; and upon any unusual feeling, a fear of imminent danger, and even of death itself. In respect to all these feelings and apprehensions, the most obstinate belief and persuasion.

CAUSES.—*Predisposing.*—The melancholic temperament.

Exciting.—All the causes of dyspepsia ; painful impressions upon the mind ; distressing events.

DIAGNOSIS.—*From dyspepsia.*—By the affection of the mind being greater, that of the stomach less, than in idiopathic dyspepsia.

PROGNOSIS.—*Unfavourable.*—The melancholic temperament exquisitely formed, as indicated, previously to the disease, by the usual mental and corporeal characteristics, when, not unfrequently, it terminates in confirmed melancholia ; complication with other diseases, which are aggravated by a diminished energy of the brain and nervous system ; the long continuance of the disease often inducing scirrhus of the viscera, and various cachectic affections.

TREATMENT.—*Indications.*—I. To restore the energy of the brain and nervous system ; and to obviate the morbid association of ideas, by which the disease is characterized.

II. To remove the dyspepsia and other concomitant symptoms.

The first indication can only be accomplished,

By diverting the attention of the patient from his own feelings by change of scene ; engaging his attention by new and interesting objects ; cheerful society ; various amusements and rural sports ; moderate and regular exercise ; gaining his confidence ; condoling

with him rather than ridiculing his foibles; and persuading him of a gradual recovery from his ideal illness, by some innocent medicaments regularly administered. A cure may often be effected by humouring the patient's fancy.

The second, by,

1. The treatment laid down for the cure of dyspepsia.
2. Chalybeate mineral waters: Cheltenham, Brighton, and Tunbridge.
3. Tonics and antispasmodics; particularly Peruvian bark, quinine, preparations of iron, castor, camphor, valerian, assafoetida, opium.
4. Blisters and sinapisms.
5. Mercurial purges.
6. Mercury, even carried so far as to affect the mouth, has been attended with much success.
7. Warm and cold bathing.
8. Light nutritive diet; as common drink, wine and water, or wine and soda water, should be substituted for malt liquors.

The violent pains in the head and stomach, to which hypochondriacs are subject, may be relieved by æther, musk, and opium, separately or combined.

DELIRIUM TREMENS.

SYMPTOMS.—Total want of sleep; delirium, during which the patient recognises his friends or acquaintances; quivering and tremulous motion of the lips, hands, and muscles generally, and more particularly on making any effort either of speaking or of movement. There is incessant talking; the sufferer fancies that some great evil has befallen him; is suspicious of those about him, and is tormented with the most frightful images, from which he is constantly endeavouring to escape. The skin is cool and clammy, the pulse small and rapid, and there is no sleep, unless produced by narcotics, until the third day. In the advanced stage, the delirium may be replaced by coma, the tremor passes into the subsultus tendinum, and the evacuations become involuntary. The disease is very apt to recur.

POST MORTEM APPEARANCES.—Effusion of serum in the ventricles, at the base of the brain, and under the arachnoid.

RATIONALE.—All the symptoms of the disease prove it to be a nervous affection, a disorder of innervation, which is best and most effectually relieved by the exhibition of the habitual stimulus, with or without sedatives.

CAUSES.—*Predisposing.*—Habitual indulgence in spirituous liquors or opium; poisons belonging to the class of sedatives? mental exhaustion; age 40 to 50; the season of summer. *Exciting.*—Sudden abstinence; shock, physical or mental; severe wounds (delirium traumaticum).

DIAGNOSIS.—The history of the case, the nature of the delirium, and the trembling.

TREATMENT.—The free use of the sedative preparations of opium, morphia, black drop, &c., in combination with powerful stimuli. In cases of plethora, cautious depletion, followed by the same remedies.

There is another kind of delirium tremens, which generally follows a fit of drunkenness, and is complicated with congestion or inflammation in the brain, lungs, &c., the pulse is frequent, full, and hard, the countenance is flushed, and the skin hot. Moderate depletion is here necessary to subdue inflammatory action, and afterwards the habitual stimulus will be required, as the delirium will be aggravated by the bleeding alone. Two cases of the kind are related by Sir Astley Cooper in his lectures, of erysipelas of the scalp in drunkards, which defied depletion, and were cured by the exhibition of ardent spirit.

DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

MYELITIS—Inflammation of the substance of the Spinal Cord.

SPINAL MENINGITIS—Inflammation of the Membranes of the Cord.

HYDRORACHIS—**SPINA BIFIDA**—Effusions into the sheath of the spinal cord.

SPINAL IRRITATION.

The spinal marrow and its membranes are liable to the same diseases as the brain and its coverings: inflammation (myelitis), arachnitis, meningitis, ramollissement; or softening, concussion, and compression; effusions of blood, hydrorachis, tumors of the medulla spinalis and its tunics, and spinal irritation. To these may be added relaxation, incurvation, excurvation, and lateral inflection.

MYELITIS AND RAMOLLISSEMENT.

SYMPTOMS.—There is pain in the affected part, accompanied by a sensation of pricking and darting in the muscles of the back and extremities. There is no derangement of the intellectual faculties or of the senses, unless when the inflammation extends near the pons varolii, in which case there may be total loss of sense, with aphonia, trismus, paralysis of the whole body, retroversion of the head, embarrassed respiration, and involuntary elevation of one or both arms towards the head. Paralysis of sensation and voluntary motion, or numbness and impaired sensibility, with feebleness of the upper or lower extremities, or of both; or the nerves of sensation and voluntary motion are affected separately. The paralysis generally begins in the lower extremities and extends to the upper. Children are often affected with this disease in consequence of falls on the head or spine.

CAUSES.—Blows and falls; violent exertions; exposure to wet and cold. Caries of the vertebræ. The symptoms vary according to the part of the cord which is the seat of the disease.

When the cervical portion of the spine is affected, there is rigidity of the neck, permanent contractions or convulsions of the superior extremities, succeeded by paralysis with difficulty in swallowing, disturbed respiration, and a sensation of tightness in the epigastrium.

When the dorsal portion is affected, the body is sometimes agitated by continued convulsive motions; there are palpitations, fever, and difficult respiration.

When the lumbar portion is inflamed, there is paralysis of the inferior extremities; constipation and retention of urine, or involuntary evacuations; sometimes impotence, or inertia of the uterus.

In some cases the disease comes on insidiously, is unaccompanied by pain, and finally succeeded by paralysis of the bladder, rectum, and inferior extremities. The disease is sometimes confounded with lumbago, rheumatism, incipient spinal curvature, and neuralgia of the lower limbs.

SPINAL ARACHNITIS.

This disease is characterised by pain in the part affected, increased by motion, by percussion, and by pressure along the spine. The pain often extends to the back and limbs, which are painful to the touch,—(in myelitis there is usually loss of sensation.)

There are contractions of the limbs, and rigidity of the muscles, which may be constant or remittent, and often brought on by motion. The muscular contractions vary with the seat of the disease; sometimes there is trismus, at others torticollis, or partial or complete opisthotonos, or contractions of the limbs.

The progress of the disease is rapid, and generally proves fatal from the tenth to the fourteenth day.

Treatment.—Venæsection, leeches, cupping, refrigerant lotions, warm baths and drastic purgatives. When collapse supervenes, these measures are to be discontinued and the strength supported by diffusible stimuli, and by injections of cinchona, opium, and musk.

When the disease becomes chronic, and there is paralysis with shaking or stiffness of one or both limbs, blisters, setons, moxas, galvanism, and acupuncture may be used with advantage.

Tumors of the medulla spinalis and its membranes may be tuberculous, scirrhus, hydatid, &c.; their nature cannot be accurately determined during life.

SPINAL EFFUSIONS.

Serous effusions occur within the spinal canal, as well as in the

skull, and may be situated external to the dura matter, or within it, or beneath the arachnoid membrane, which invests the medullary cord.

Extravasations of blood may occupy the same situations, and are induced by falls, blows, slips, or other injuries of the spine, or by making violent efforts, as pulling on one's boots, drawing a cork, or raising a heavy load. It is also a fact that effusions of blood have been found in cases in which no accident had occurred, the symptoms being pain in the back, spasmodic contractions of the muscles, paralysis of the bladder, rectum, and lower extremities, convulsions, or coma, and death.

The membranes of the spinal cord may be thickened and indurated, like those of the brain, and from the same causes. In some cases there are fungous growths on the dura mater, which produce pressure and paralysis.

In fine, the substance of the spinal cord may become firmer than natural, after congestion or inflammation.

The treatment in all these cases is the same as for Myelitis—issues, setons, antimonial ointment, and other counter-irritants.

The spinal medulla is liable to concussion and compression like the brain, and these are induced by external injuries, whether inflicted on the back, or by falls on other parts of the body. The treatment is similar to that employed in the same diseases of the brain.

SPINAL IRRITATION.

SYMPTOMS.—Pain in the left side under the false ribs, or muscular pain of the most acute kind over the whole of the abdomen, embarrassed respiration, palpitation of the heart, intolerance of tight lacing on the chest or back, hysteria, nervousness, disordered bowels, constipation, flatulence, and deficient or depraved menstruation. There is indigestion, with flatulence, occasional tension of the abdomen, costiveness, lowness of spirits, irritability of temper, and extreme sensibility of the nervous system.

These disorders are often aggravated after marriage, but especially during lactation and pregnancy—the sufferer is constantly complaining of pains or unpleasant sensations of all parts below, and in time, above the affected vertebra.

On making pressure with the index and middle finger of the right hand on the vertebræ from the neck to the lumbar region, we invariably discover one or more points which are painful. In some cases it will be necessary to percuss each vertebra with the fingers, before we can detect the affected one. There are other instances in which we find one shoulder higher than the other, and more or less spinal curvature.

CAUSES.—This is a common disease in young females, and may arise from relaxation of the ligaments, or from some degree of

spinal excurvation, lateral inflection, or curvature or incurvation. Few girls or young women in cities are free from this complaint.

The frequency of spinal irritation in the female sex is caused by sedentary pursuits during childhood, and the baneful custom of tight lacing, and by want of active exercise. Another common cause is constipation, or painful menstruation; the original cause and the effect continuing to react upon and increase each other. Spinal irritation may exist in other diseases, as in spasmodic asthma, chorea, &c.

Treatment.—When there is pain on pressing any of the vertebræ, a few leeches or cupping ought to be employed, and then the antimonial ointment. The digestive function and general health should be improved, and particular attention paid to the state of the bowels and the establishment of healthy menstruation. Purgatives should be persevered in during the whole course of the disease.

In most cases where there is simple spinal irritation, without deformity, a cure will be effected by local depletion, counter-irritation, a course of aperient medicines, and attention to the general health.

HYDRORACHIS.—SPINA BIFIDA.

This disease is congenital, and consists in one or more tumors on the lumbar, dorsal, or cervical vertebræ, which communicate with the medulla spinalis. The tumor varies in size, is often transparent, and the colour of the skin may be natural, reddish, or livid. If pressure be made on the tumor it induces signs of compression of the brain. The limbs are imperfectly developed, and the rectum and bladder are often paralysed. The skin may be absent, and in this case the tumor is covered by the dura mater, pia mater, and arachnoid membrane; and the pia mater is congested and red.

In some cases, the lateral arches of the corresponding vertebræ are separated or wanting. The cavity of the arachnoid contains a fluid, which may be serous, transparent, sanguinolent or purulent; may communicate with the brain; or be merely enclosed in the pia mater. In other cases there is a division of the medulla, or it is entirely absent where the tumor is situated.

Treatment.—Moderate pressure has been employed to excite the absorbents to remove the effused fluid; but this is scarcely ever effected. Sir Astley Cooper used a small truss for the purpose. When this failed, he punctured the tumor repeatedly with a fine needle and again applied pressure. Subsequent experience has proved that both plans are ineffectual, and that the disease does not admit of cure.

DISORDERS OF THE NERVES OF SENSATION.

NEURALGIA.—NERVOUS PAIN.

PARALYSIS OF THE NERVES OF SENSATION.

NEURALGIA.—NERVOUS PAIN.

Pain is not only a symptom of almost all acute diseases, but also a distinct affection of the nerves themselves. To this latter the term neuralgia is applied. It may have its seat in any of the nerves of common sensation, and in some instances affects those of organic life. It is either idiopathic or sympathetic. The most common forms of idiopathic neuralgia are, *neuralgia faciei*, or tic-doloureux; and *sciatica*, or pain in the course of the sciatic nerve. The toothache is another form of this disease. Examples of sympathetic neuralgia are the pain in the shoulder so common in affections of the liver, and pains in the upper arm in certain cases of diseased heart. Gastrodynia, enterodynia, hysteralgia, are examples of pain in the organic nerves of the stomach, intestines, and uterus. Intermittent neuralgia of the face has been already mentioned under headache.

DIAGNOSIS.—From muscular pains: motion, and slight percussion by throwing the muscles into action produce pain; but the pain of neuralgia is neither affected by motion, nor relieved by rest. Pressure, also, produces no pain unless inflammation be present in the part affected. From inflammation, by the absence of constitutional symptoms.

CAUSES.—1. *Pressure* on the trunk of the affected nerve; as neuralgia of the verge of the anus from the pressure of fæces, neuralgia of the thigh and leg from the same cause, or from the enlarged uterus in the female. 2. Irritation of the root of the nerve, as in the case of a spicula of bone irritating the root of the fifth pair, producing incurable tic-doloureux. 3. Inflammation of the neurilema. 4. Distension of the hollow viscera by gas, as in colica-pictorum, and in severe flatulence. 5. Irritation of the cerebro-spinal axis.

Neuralgia faciei may be taken as the type of these affections. It occurs generally in middle-aged adults, and affects both sexes, consisting in most acute pain coming on at variable intervals, suffering considerable abatement and entirely disappearing without assignable cause for days, weeks, months, or even years together. The pain is at first confined to a limited spot, its most frequent seat being the right infra-orbital nerve. It is of the acute lancinating kind, compared to electric shocks, or it is a severe burning sensation. Sometimes the pain is the only symptom, but

more generally there is some determination of blood to the affected part, with an increase of secretion. If the eye is affected, there is a large secretion of tears; if the mouth and jaw, a copious flow of saliva. After it has continued some time, it is apt to involve other branches of the nerve first affected. Thus, if it begin beneath the orbit it spreads to the upper lip, thence to the upper and lower jaw, and at length it may mount over the orbit, extend over the entire scalp, and even for a considerable distance down the spine. The general health is very little affected; the patient, in spite of the most intense suffering, recovers his flesh and healthy aspect in a few days of intermission, and often attains a very advanced age. This form of neuralgia, is sometimes functional and disappears entirely, or it may depend on irritation of the root of the nerve within the cranium, or even on remote organic disease. In one case it has an evident connexion with diseased kidney. (G.)

TREATMENT.—This depends upon the cause. If there be pressure, it must be removed if possible; if irritation at the root of the nerve, depletion or counter-irritants as near as possible to the seat of the disease; if there be inflammation of the nerve itself, antiphlogistic measures; if there is debility, tonics and stimulants according to the degree of it; but if the health be good, care should be taken not to impair it, for debility always increases the suffering, and so does increased determination of blood to the part affected. If the jaw be the seat of the suffering, the patient should not be salivated; if blisters are applied, it should be at some part remote from the seat of the disease. The remedies in common use are narcotics and tonics in combination; a favourite medicine consists of quinine in two or three grain doses, with equal quantities of extract of conium, or with from half a grain to two grains of extract of stramonium. The carbonate of iron and the sulphate of zinc have also been given in full doses. Arsenic has been tried, narcotics too have been used, strychnia has been given, and creosote, and indeed every active remedy in the pharmacopœia. Patients have appeared to be benefited by all of them. Change of air and scene, and the use of mineral waters, have seemed to effect a cure. Amongst local applications, extract of belladonna and veratria-ointment are the most effectual. In a case of tic doreux of many years standing, which had spread from the infra-orbital nerve to the upper and lower jaw, over the scalp and down the spine, accompanied with the most excruciating suffering, after tonics and narcotics, bleeding, blistering, and salivation, had been tried in vain, and nothing afforded any relief, a stream of cold water poured over the head and allowed to trickle over the face and neck, procured refreshing sleep after the lapse of about five minutes, had the same effect on a repetition, and was followed by the first good night the patient had had for weeks. (G.)

The rational treatment in idiopathic cases appears to be this.

Weaken the patient as little as possible, avoid producing inflammation of the part affected, and combat the more severe paroxysms by a stream of cold water poured over the part, or by the application of ice. In cases of sympathetic neuralgia, attend to the general health, and remove all exciting causes of direct or remote irritation.

PARALYSIS OF THE NERVES OF SENSATION.

VARIETIES.—*Anæsthesia*, paralysis of the nerves of sensation; *amaurosis*, of the retina; *cophosis*, of the auditory nerve; *anosmia*, of the olfactory; *ageusia*, of the nerves of taste.

Anæsthesia, or loss of common sensation, may occur separately or combined with paralysis of the voluntary muscles; it may be universal or partial, confined to one side or extending to both, and it may affect any part of the body.

The TREATMENT must depend entirely on the pathological condition by which it is induced—if by pressure, the cause must be removed; if by deficient supply of blood, stimulants must be resorted to; if by cold, the circulation must be restored. It rarely presents itself for treatment as a separate malady.

DISEASES AFFECTING THE NERVES OF VOLUNTARY MOTION.

PARALYSIS	.	.	.	.	Palsy.
EPILEPSIA	.	.	.	.	Falling sickness.
CATALEPSIA	.	.	.	.	Catalepsy.
CHOREA	.	.	.	.	St. Vitus's dance.
HYSTERIA	.	.	.	.	Hysterics.
TETANUS	.	.	.	.	Locked jaw.
HYDROPHOBIA	.	.	.	.	Canine madness.

Other convulsive and spasmodic diseases.

PARALYSIS.—PALSY.

Species.—1. *General*. 2. *Partial*.—The partial includes (*a*) *Hemiplegia*, (*b*) *Paraplegia*, and *Stabismus*, *Ptoſis*, *Lagophthalmia*, *Aphonia*. Paralysis may also be divided into complete and incomplete; or named according to its cause, as paralysis venenata, from poisons; or from some other peculiarity, as paralysis agitans.

SYMPTOMS.—An abolition of voluntary motion, or sensation, or both, in certain parts of the body only; often combined with coma, and slow and soft pulse; preceded, when not the consequence of

apoplexy, by universal torpor; vertigo; sense of weight and pain in the head; loss of memory; sense of creeping, of numbness, of pricking, sometimes of heat, in the part afterwards to be paralysed.

CAUSES.—Compression of the brain, from whatever cause; impaired nervous energy, either in the part itself, or in its source, the sensorium commune; determination of blood to the head, by the suppression of usual evacuations; intense cold; over exertion; certain poisons, of which the most frequent is lead; compression of the nerves in their course; apoplexy, and all the causes inducing it; (see Apoplexy;) irritation of the primæ viæ; rheumatism; pressure of tumors on the brain, spinal marrow, or nerves.

DIAGNOSIS.—*From apoplexy.*—It is distinguished from apoplexy by the loss of sense and motion being partial only; by the absence of stertor; and of the infrequent pulse and respiration; and by other symptoms above mentioned.

PROGNOSIS.—*Favourable.*—Sense of pain and itching in the paralysed parts; returning sensation and motion; youth, and previous strength of constitution. A fever and diarrhœa have restored sensation to parts paralysed from causes acting upon the nerves only.

Unfavourable.—The parts being deprived of both motion and sensation; gradually wasting, and becoming dry and withered; convulsions; the paralysis of the left side is more dangerous than a similar affection of the right; and of the upper extremity than of the lower. When the consequence of apoplexy, the disease usually proves difficult of cure.

TREATMENT.—*Indication.*—To remove causes that are obvious, and thereby to restore sensation and motion to the paralysed parts.

If the accession of the fit be sudden, the patient of a plethoric habit, and the head much affected, bleeding from the jugular vein, and the treatment recommended for apoplexy. When palsy succeeds apoplexy, we should employ depletion, purgation, and the antiphlogistic regimen. If the paralysis continues after all symptoms of congestion or inflammation have been subdued, we may exhibit strychnine in the dose of one-twelfth of a grain twice a-day, increasing the quantity to the sixth, fourth, or even half of a grain. If any unpleasant symptom arises, the medicine must be immediately omitted. It produces twitchings in the paralytic limbs, and sometimes convulsions, and finally restores their action.

If the disease occur in a debilitated constitution, in a patient advanced in age, and where the head is little affected, the use of powerful stimuli will be proper; as, mustard-seed, horseradish, volatile alkaline salts, or spirits, guaiacum, electricity, æther, arnica flowers, rhus radicans, and toxicodendron. Strychnine, when there is no cerebral affection or constipation.

The mountain arnica, though so much praised by continental writers, is very seldom used in this country.

The external application to the paralysed part of stimulating liniments: as the linimentum ammoniæ fortius, the linimentum carbonatis ammoniæ, the linimentum camphoræ compositum, and the linimentum saponis compositum. Also,

The frequent and continued use of the flesh-brush.

Blisters, in the direction of the nerves.

Warm fomentations.

Urtication, or the irritating the limb with nettles.

Electric shocks passed through the parts, or in the direction of the nerves.

Regular exercise.

The warm and salt-water baths; champooing; vapour-baths, simple and medicated.

Bath waters.

If the cause of the paralysis be seated in the spinal cord or its membranes, it must be treated by remedies recommended in diseases of the spinal cord.

General paralysis.—Comes on either suddenly or gradually; if suddenly, from extensive injury or sudden effusion of blood on the cranial or cervical portions of the spinal marrow; if gradually, it begins in the toes or fingers, and thence extends over the entire body. In most cases the sensibility is unimpaired, more rarely both sensation and motion are lost. The functions of the intellect generally suffer at the same time, and occasionally all the faculties of the mind are paralysed.

Hemiplegia.—This is the most common form of paralysis, and occurs most frequently on the left side. It often occupies exactly one half of the body. In most cases it comes on suddenly, in others it precedes an apoplectic attack, in others again it follows it. Occasionally, like general paralysis, it makes its approaches gradually. The cause of the disease is, with rare exceptions, found on the opposite side of the brain to that affected.

Paraplegia, or paralysis of the lower half of the body or of both lower extremities, like other forms of paralysis, may occur either gradually or suddenly. Sometimes it is complicated with head symptoms, but more generally the symptoms are limited to the lower half of the spinal cord. Injuries to the spinal cord explain the majority of cases which occur suddenly; those of gradual occurrence are traceable to some chronic disease of the cord or of its membranes. Caries of the vertebræ and relaxation of the spinal ligaments is another cause. Sometimes there is loss of sensation, at others of motion and sensation. There are instances of both kinds, in which tickling the soles of the feet will cause contraction of the muscles, by reflex action. When paraplegia is complete, there is entire loss of sensibility and motion in the lower extremities, with paralysis of the bladder and rectum. The patient being confined to the horizontal position, the back and sacrum are apt to slough. The urine is generally highly ammoniacal, and is prone to

form calculous deposits. In these cases great attention must be paid to cleanliness, and the patient should, if possible, be provided with a water-bed.

The remaining forms of paralysis affect particular muscles or groups of muscles, and arise from injury limited to the root or trunk of the nerves distributed to them. *Strabismus* is caused by palsy of one or more of the muscles of the eye; *ptosis and lagophthalmia* by palsy of those of the eyelids (in the first the eye is permanently closed, in the second open); aphonia by paralysis of the muscles of the tongue. These forms of paralysis rarely occur alone, but are commonly found in combination with more extensive palsy of the face or body.

Paralysis of the face.—The motor nerves of the face being the portio dura and the third division of the fifth, and the sensitive nerves the first and second divisions of the latter nerve, it is easy to trace facial paralysis to its source. In perfect paralysis of the face the portio dura and motor branch of the fifth suffer jointly: when the latter is alone affected, the motions of the jaw on that side are paralysed, and in this case there is usually some loss of sensibility. As the disease is confined to the muscles employed in mastication, there is no distortion of feature. In palsy of the facial nerve, the expression of countenance is peculiar. The two sides of the face are not symmetrical; but the features are drawn to the sound side, so that the straight line passing through the eyebrows and mouth respectively would meet at an angle within a short distance of the sound side of the face. In other words, the sound side appears shorter and narrower than the paralysed side. The eye on the paralysed side is either partially closed or wide open, while that of the sound side is firmly closed. When the patient speaks, laughs, cries, sneezes, or coughs, the deformity is increased, the paralysed side remaining motionless, whilst the sound side is thrown into still stronger contortion. The cheek on the affected side is flaccid, and swells during strong expiration; the lips are paralysed, so that the saliva and food sometimes escape from the mouth on the affected side. The labial consonants, *b*, *p*, and *f*, are imperfectly sounded.

The paralysis which occurs in the insane has some peculiarities. It appears at a variable interval after alienation; appears first in the tongue, and affects the pronunciation, thence extending to the extremities, of which the lower are commonly first affected, then the superior extremities and trunk. The progress of the disease is gradual, but terminates at length in complete paralysis. At last, the functions of organic life suffer, there is palsy of the bladder and sphincter ani, of the muscles of deglutition, of the respiratory muscles, and death from asphyxia. The sensibility is little impaired. The common duration of this malady is four or five years.

Paralysis from metallic poisons.—*Mercury.*—This form is apt to

attack persons who make use of quicksilver in their occupations, as gilders, glass-platers, barometer-makers, &c. The paralysis usually begins in the arms, coming on, for the most part, gradually. There is a sense of weakness, with slight convulsive twitchings, followed by tremors. These symptoms gradually extend to the lower extremities, and at length to the entire body. All combined movements are imperfectly performed. The general health is at the same time impaired; the skin is dry, and of a brownish tint; there is restlessness, feverishness, and sometimes delirium, but no disorder of the respiration or of the digestion, and no colic. *Lead*.—This form of paralysis attacks plumbers and glaziers, oil-painters, enamel card makers, &c. The hands are generally first affected, and in some cases the forearm suffers. It begins by a feeling of weakness in the fingers, extending to the wrists, and rarely beyond them. There are at the same time shooting pains in the forearms, arms, and shoulders. The parts affected, after a time, waste from disease. It is generally preceded by colic, but may occur independently of it. *Arsenic*.—This poison, too, produces paralysis, which generally occurs in the extremities, and is the most frequent of its secondary effects.

Paralysis agitans.—The approach of this affection is gradual. There is weakness and trembling, usually commencing in the hands and arms, but sometimes in the head, and gradually extending over the whole body. At length the trembling becomes incessant; and when the patient attempts to walk, “he is thrown on the toes and fore part of the feet, and impelled unwillingly to adopt a running pace, being in danger of falling on his face at every step.” In a still more advanced stage, the shaking continues during sleep; the patient cannot carry food to the mouth; mastication and deglutition are performed with difficulty; the agitation at length becomes so violent, as to prevent sleep; the body is bent forward, with the chin upon the sternum; articulation is impaired or entirely lost; the urine and fæces pass involuntarily, and coma and slight delirium close the scene. In some cases the muscles of respiration are affected, and the breathing becomes extremely frequent. (In one case 73 in the minute, with a pulse of 72.—G.)

DIAGNOSIS.—The trembling continuing even when the limbs are supported, and the peculiar gait. (See Lib. Pr. Med., vol. ii. Art. Paralysis.—Dr. Bennett.)

EPILEPSIA.—EPILEPSY.—FALLING SICKNESS.

SYMPTOMS.—Sudden loss of sense and power of motion, so that, if the patient be standing, he immediately falls, or is thrown to the ground, with convulsions, frequently with a violent cry. During the fit there are strong convulsive motions of the limbs and trunk of the body, and spasms of the muscles of the face and eyes, producing various distortions of the countenance. The patient foams

at the mouth, the jaws are contracted with great force, so that if the tongue is protruded, it is apt to be severely injured; the under lip, too, is often bitten. The fæces, urine, and semen are sometimes expelled, and there is occasional rigidity of the penis. After a longer or shorter continuance of the convulsions, they cease altogether, and leave the patient motionless, still in a state of absolute insensibility, and under the appearance of a profound sleep. The fit is frequently preceded by pain in the head; lassitude; some disturbance of the senses; unquiet sleep; unusual dread; noise in the ears; palpitation of the heart; coldness of the joints; fluttering at the epigastrium; sensation of a cold air, the *aura epileptica*, arising in some part of the extremities, and gradually creeping upwards, until it reaches the head, when the patient is instantly deprived of his senses, and falls as above described.

CAUSES.—*Predisposing.*—Great irritability of the nervous system; hereditary predisposition.

Exciting.—Mechanical, chemical, or mental stimuli; especially the effects of joy and surprise; sudden fright; fits of passion, or any vehement emotion of the mind; sexual intercourse; plethora of the vessels of the head; worms; dentition; acute pain; excessive evacuations; suppression of accustomed discharges; tumors compressing the brain, or any part of the nervous system.

DIAGNOSIS.—*From convulsion.*—By its terminating in profound sleep: by the total abolition of the senses.

From apoplexy.—By the motions of the voluntary muscles in the one disease being increased, in the other, totally suspended.

From hysteria.—See Hysteria.

PROGNOSIS.—*Favourable.*—The disease being sympathetic, occurring before the age of puberty, and arising from causes easy of removal. In females being connected with some functional derangement of the uterine system; there being no hereditary predisposition. An intermittent fever, or cutaneous eruption, has sometimes effected a cure.

Unfavourable.—The reverse of the above. When the disease comes on after the age of puberty, when it has arisen from an hereditary predisposition, or by frequent repetition has become confirmed, the probability of cure is slight; but especially where the memory and judgment have become impaired.

TREATMENT.—*Indications.*—I. To abate the violence and shorten the duration of the paroxysm.

II. To prevent its recurrence.

In general, little else can be done during the paroxysm than to use the necessary precautions to prevent the patient injuring himself in the violence of the convulsions, and taking care there is no pressure on the vessels of the neck. By way of precaution, and to prevent the tongue from being bitten, a piece of soft wood or a pad of linen should be placed between the teeth. If there be symptoms of determination of blood to the head, or if the patient be of a

full plethoric habit, bleeding from the arm, the jugular vein, or the temporal artery, will be advisable.

If, on the contrary, the presence of debility is obvious, the most powerful antispasmodics; sinapisms to the lower extremities; anodyne and antispasmodic clysters.

The recurrence of the paroxysm is sometimes prevented.

1. By removing all causes of irritation, as constipation, intestinal worms, &c.

2. By avoiding the occasional or exciting causes, as over distention of the vessels of the head, however induced; fits of passion, or other violent emotions of the mind, &c.

3. If the paroxysm be preceded by the aura epileptica, it has been advised to apply blisters or caustic to the part from which the sensation arises: destroying the communication with the brain, by dividing the nerve, or by means of a ligature applied round the limb, has been resorted to, but with little success.

4. If the patient be of a plethoric habit, by occasional bleeding; abstemious diet; issues or setons in the neck; irritation in the course of the spine with antimonial ointment; frequent purges, &c.

5. If weak and irritable, by tonics; as cinchona, quinine, sulphate of zinc, oxyde of zinc, ammoniacal copper, sulphate of copper, nitrate of silver, mistletoe and oak-bark.

The viscus quercinus, or mistletoe, has been recommended by Dr. Frazier; and the common oak-bark, in doses of two drachms twice a day. This produced more benefit in a confirmed case than any other remedy.—*Mackintosh*.

6. By regular exercise.

7. By cold bathing.

8. By antispasmodics; as valerian, castor, musk, æther, oleum succini, opium, hyoscyamus, stramonium, acetate of lead, assa-fœtida, in large doses.

According to Dr. Brown, Dr. Reid of Dublin, and Mr. Earle, pressure on the carotids during the fit has cut it short, and finally cured the disease.

9. When the attack of the disease can be foreseen by certain well-known feelings of the patient, an emetic given an hour before its approach has been known to prevent the fit; a large dose of opium also, or other powerful antispasmodic, administered in the same manner.

10. By digitalis, particularly if there be an accelerated pulse, when it should be given in doses, gradually increased, until the pulse is influenced by it.

11. The rhus radicans, in the praise of which Dufresnoy and Hufeland have written, is said to have occasionally cured epilepsy: but we know nothing of it in this country.

12. By the cicutaria, which is said by Dufresnoy to be useful.

13. The carbonate of potass is recommended by Drs. Michaelis and Wiedemann.

14. By mercury, as an alterative.
15. By the nux vomica, which has often been successful.
16. By strychnine.
17. By the internal use of arsenic.
18. By drawing electric sparks from the head.
19. By oxygen gas, extolled by Dr. Girtanner.
20. The *gratiola officinalis*, praised by Dr. Sommer, in his treatise *De Virtute Gratiolæ*. Mugwort, in doses of fifteen grains, before the fit, was advised by Burdach and Hufeland.
21. By change of climate and mode of life.

Where no obvious cause of irritation can be found, the treatment is purely empirical. The balance of authority is in favour of tonics. In confirmed cases all remedies are useless.

The most important point of the treatment is to ascertain the exciting causes and avoid them. These differ in each case. Sometimes an indigestible meal; at others, a costive state of the bowels; at others, the appearance of the catamenial discharge. The attacks may sometimes be prevented by a cautious and steady attention to these exciting causes.

Catalepsy is an extremely rare disease, allied to those of the present section. Its essential features are, a fixing of the body in the position in which it happens to be at the moment of the seizure, or in which it may be placed during the fit, accompanied by total insensibility. The fit itself is rarely, if ever, fatal; but the intellectual faculties seem to suffer by its frequent repetition. In a case which came under my notice, a lad of about fourteen years of age was seized without any previous warning, and fixed like a statue in the attitude in which he happened to be at the moment; the fit rarely lasted more than one or two minutes, and when it ceased he resumed the sport in which he had been engaged with a slight air of surprise and embarrassment.—(G.) The *causes* of this disease are obscure, and little is known of its appropriate treatment. The general principles on which it should be conducted are the same as those of epilepsy. Existing irritation must be removed, and any occasional determination of blood to the head must be met by appropriate remedies.

CHOREA SANCTI VITI.—ST. VITUS'S DANCE.

SYMPTOMS.—The disease is marked by convulsive motions, somewhat varied in different persons, but generally affecting the leg and arm of one side only. The lower extremity is mostly first affected; there is a kind of weakness and lameness in one of the legs; and, though the limb be at rest, the foot is often agitated by involuntary motions, turning it alternately outwards and inwards. In walking, the affected leg is seldom lifted as usual, but is dragged along, as if the whole limb were paralytic; and when it is attempted to be lifted, that motion is unsteadily performed, the limb becoming irregularly and ludicrously agitated. The motions of the arm like-

wise are variously performed, or it is drawn by convulsive retractions in a direction contrary to that intended. In attempting to raise anything to the mouth, the patient often jerks it over his head. If the arm is held out, the fingers cannot be kept steady; the eyes and countenance are strangely distorted. The muscles are usually quiet during sleep, but there are exceptions to this rule.

CAUSES.—General weakness and irritability of the nervous system; occurring generally between the tenth and fifteenth years of age. It may continue for life, though this rarely happens. It occurs in adults of both sexes to the age of seventy. See Copland's *Dictionary of Practical Medicine*. It is induced by various irritations, as teething, worms, affections of the mind, fright, horror, anger. It is supposed to depend on irritation in the cerebellum, or spinal cord, and is one of the reflex actions.

PROGNOSIS.—It is rarely attended with danger, unless very violent in degree, when fever supervenes, and it often kills. It passes not unfrequently into epilepsy.

TREATMENT.—*Indication*.—1. To remove any cause of irritation. 2. To improve the general health.

I. As the most common cause of irritation is in the bowels, purgatives are the chief remedy—perhaps the only efficient ones.

II. The general health may be improved by tonics; especially the sulphate of zinc, or large doses of carbonate of iron; cod and tusk-liver oil, oil of turpentine, the shower-bath, purgatives, antispasmodics, emmenagogues, strychnine, quinine, and arsenic, have been praised as remedies.

Both bathing and electricity have been employed with benefit.

Where there is pain and tenderness in the spine, counter-irritants.

HYSTERIA.—HYSTERICIS.

SYMPTOMS.—The disorder attacks by paroxysms or fits, generally preceded by yawning, stretching, dejection of spirits, anxiety of mind, effusion of tears, alternate flushings and paleness, difficulty of breathing, sickness at the stomach, palpitation of the heart, profusion of limpid urine; generally an acute pain in the left side, about the flexure of the colon, with sense of distension, giving the idea of a ball or globe rolling itself about in the abdomen, and gradually advancing upwards until it gets into the stomach; thence removing to the throat, it occasions, by its pressure, the sensation of an extraneous body lodged there, which is called *globus hystericus*. The disease having arrived at its height, the patient appears threatened with suffocation, she becomes faint, and is affected with stupor and insensibility; whilst at the same time the trunk of the body is turned to and fro, the limbs variously agitated; wild and irregular actions take place, in alternate fits of laughter, crying, and screaming; incoherent expressions are uttered, a temporary delirium pre-

vails, and a frothy saliva is discharged from the mouth. The spasms at length abating, a quantity of gas is evacuated upwards, with frequent sighing and sobbing; and the patient recovers the exercise of sense and motion, without retaining any distinct recollection of what has taken place; feeling, however, a severe pain in her head, and a soreness over her whole body. During influenza with bronchitis, hysteria with delirium occurred daily at 3 o'clock when the bronchial affection ceased; the original disease returning when the hysteria disappeared. For singular illustrations of this disease, see Tate's work on Hysteria.

CAUSES.—*Predisposing.*—Female sex; generally the unmarried, and between the age of puberty and the thirty-fifth year; also attacks the more delicate of the male sex; peculiar irritability of the nervous system; studious and sedentary life; grief; anxiety of mind; bodily debility and mental excitement combined.

Exciting.—Constipation; excessive evacuations; suppression of the menses or lochia, or the neglect of usual discharges; violent emotions of the mind; flatulence; former diseases which have greatly impaired the tone of the primæ viæ; imitation or sympathy; tight-lacing or other impediments to the breathing.

Proximate.—Spinal irritation.

DIAGNOSIS.—*From hypochondriasis.*—Hysteria attacks the sanguine and plethoric; comes on in early life; its attacks are sudden, and accompanied with the globus hystericus; it is diminished by time. Hypochondriasis attacks the melancholic; comes on about the middle age; is gradual in its accession, and tedious in its progress; it increases as life advances.

From epilepsy.—By the preceding symptoms, especially the profusion of limpid urine; by the globus hystericus; by the convulsive motions being subject to control by a strong effort of attention, whilst in epilepsy they are altogether involuntary; by the laughing, crying, and other symptoms above mentioned.

PROGNOSIS.—Hysteria is seldom attended with danger, unless in a very impaired constitution, or in cases where the fits are extremely violent; when it sometimes passes into epilepsy, especially if there be a predisposition to that disease.

TREATMENT.—*Indications.*—I. To allay the spasmodic symptoms which constitute the fit.

II. To strengthen the nervous system during the intermissions of the paroxysms.

The first indication is fulfilled by,

1. Stimuli applied to the nose; as the liquor carbonatis ammoniæ, spiritus ammoniæ aromaticus, spiritus ammoniæ succinatus, liquor volatilis cornu cervi, burnt feathers; rubbing the temples with æther; dashing cold water over the face and extremities. Antispasmodics, internally, if the patient can swallow; especially camphor, æther, ammonia, castor, assafœtida, opium, valerian; large doses of assafœtida. In general nothing more is necessary than to

dash cold water repeatedly into the face ; to rouse the patient by speaking to her in a loud tone of voice, and to unloose the stays.

The persevering use of cold water as a shock, not only serves to remove the existing attack, but often effects a cure, after antispasmodics have been used in vain. In a male who had had repeated attacks of hysteria in a marked form, and who had taken the strongest remedies without effect, this simple means speedily effected a cure. I have seen a prompt and a permanent cure follow the disuse of tight-lacing. (G.)

The second indication will be effected by,

1. Regular evacuations from the primæ viæ.
2. By tonics ; Peruvian bark, bitters, chalybeates, &c.
3. The occasional use of antispasmodics and stimulants.
4. Regular exercise on horseback, with variety of scene.
5. Cold bathing in common water or the sea.
6. Mineral waters ; especially those of Cheltenham and similar springs. Change of life by marriage.
7. The occasional spasms or cramps, to which hysteric women are subject, may be removed by the pediluvium, the warm-bath, and by powerful antispasmodics, particularly opium, musk, æther, and camphor.
8. Cardialgia is relieved by an alkali ; the liquor potassæ ; liquor carbonatis ammoniæ ; soda-water ; the carbonates of that alkali, &c.
9. By bleeding ; if the patient be young and plethoric, and the attack be recent ; but in weak and debilitated constitutions, or when the disease is of long standing, it is inadmissible.
10. Cupping or leeching the part of the spine which is tender on pressure or percussion, and afterwards rubbing it with antimonial ointment, until a copious eruption appears. We should pustulate about four inches of the spine at first, and continue the application to the same extent, until the whole is affected.

TETANUS.—RIGID SPASM.—LOCKED-JAW.

SYMPTOMS.—Sense of stiffness in the back part of the neck, rendering the motion of the head difficult and painful ; difficulty of swallowing ; pain, often violent, referred to the sternum, and thence shooting to the back ; spasm of the muscles of the neck, pulling the head strongly backwards ; rigidity of the lower jaw, which increasing, the teeth become so closely set together, as not to admit of the smallest opening, when the affection is called *Trismus* or *Locked Jaw*.

If the disease proceed further, a greater number of muscles become affected, as those of the spine, bending the trunk of the body forcibly backwards ; in this state the disease is termed *Opisthotonos* ; or forwards, when it constitutes the *Emprosthotonos* ; or laterally, *Pleurosthotonos*.

At length every organ of voluntary motion partakes of the disease; the extremities are rigidly extended; the abdominal muscles are strongly retracted; hence costiveness and suppression of urine are generally produced; the eyes are immoveable in their sockets; the tongue is often protruded beyond the teeth, or pulled back into the fauces; the forehead is drawn up into furrows; the cheeks backwards towards the ears; and the whole countenance exhibits the most shocking distortion.—The stiffened parts are affected with violent contractions, which occasion the most excruciating pain. The pulse is accelerated during the paroxysms, and the heat of the surface is increased (in one case as high as 110°) and there is profuse sweat. A remission of these symptoms occasionally takes place every ten or fifteen minutes, but they are renewed, with aggravated torture, from the slightest causes, even the least motion of the patient, or the touch of an attendant. In fatal cases the symptoms rapidly increase in severity; there is urgent dyspnœa, with an agonising sense of suffocation; a cold clammy sweat; a small and imperceptible pulse; froth or bloody mucus at the mouth; the countenance becomes livid; delirium sometimes supervenes, and the patient dies exhausted, or suffocated by the rigid spasm of the muscles of respiration.

The *duration* of the disease varies. One case of acute tetanus is on record which proved fatal in a quarter of an hour; the common duration of fatal cases is from four to eight days. In cases of recovery the duration varies from a week to two or three months.

Latent Period.—From a few minutes to ten weeks. Most common period, from the fourth to the fourteenth day.

CAUSES.—Remote.—The male sex; robust and vigorous constitution; warmth of climate; the period of infancy.

Exciting.—Vicissitudes of temperature; exposure to cold, united with moisture; or to excessive heat; great fatigue; injuries of nerves or tendons, by puncture or laceration; the presence of irritating substances in the stomach or alimentary canal; cessation of habitual discharges; irritation of the extremities of the nerves; affections of the mind; strychnia.

ANATOMICAL CHARACTERS.—Not constant. The most common are alterations in the spinal cord and its membranes. Traces of injury to the nerves in cases of traumatic tetanus. The muscles often ruptured and gorged with blood.

RATIONALE.—In the majority of cases, local irritation affecting the incident nerves, and producing reflex contractions of the muscles.

Dr. O'Beirne read an elaborate paper before the Medical Section of the British Association at Bristol, August 22, 1836, in which he maintained, "that the seat of tetanus was in the substance of the anterior column of the spinal marrow; that the disease was purely functional, and consists in either an accumulated or a peculiarly intense condition of the motific principle residing in the anterior

spinal columns, or pyramids, and their prolongation to the optic thalami and striated bodies." He considers that the origin of the pneumo-gastric nerves are affected in emprosthotonos. He only recognises opisthotonos and emprosthotonos, and divides these into peracute, acute, subacute, and chronic. According to him, certain unknown electrical states of the atmosphere are the most general and operative causes. He says, the disease may continue from three to eight weeks, and in one case the tetanic expression of the countenance remained for fourteen years. The only morbid appearances in several cases of opisthotonos were great distention of the cæcum and colon, with rigid contraction of the rectum; and in cases of emprosthotonos, either the heart or lungs, or both, were always found more or less diseased. (*London Medical and Surgical Journal*, Sept. 10th, 1836.)

PROGNOSIS.—Will ever be most unfavourable; more so when the disease arises from the injury of nerves than when proceeding from cold; when it comes on suddenly, and quickly advances to a violent degree, than when slow in its progress; when the spasmodic contractions quickly succeed each other, and are excited by very slight causes, than when there is a considerable interval. Survival beyond the fourth day is a favourable circumstance.

Dr. O'Beirne succeeded in restoring eleven out of twenty patients to perfect health. Six of the remaining patients laboured under organic disease of either the heart or lungs, for a long period previous to the attack of tetanus. This is the greatest amount of success hitherto obtained, "and the uncomplicated disease is no longer to be considered either incurable or mysterious." Mr. Walker, a veterinary surgeon, of Dublin, succeeded in curing seventy-three horses affected with tetanus, by Dr. O'Beirne's treatment in man. (Op. Cit.) See Treatment.

TREATMENT.—*Indications.*—I. To remove obvious causes.

II. To allay the inordinate action of the brain and nervous system.

III. To weaken the muscular system.

IV. When much debility is present, to support the strength.

When the disease is the consequence of a puncture or small wound, it has been supposed to arise from the partial division of a nerve. In this case a free dilatation of the wound has been recommended, and tried with success. When the disease can be traced to disordered bowels, from worms or constipation, brisk purgatives must be promptly administered and frequently repeated. It is in these cases that Dr. O'Beirne's rectum tube may become of essential service. Glysters administered in the ordinary way often fail.

The second indication has been fulfilled by narcotics in large doses. Opium, morphia, hydrocyanic acid, digitalis, stramonium, belladonna, hyoscyamus, conium, musk, camphor,—all have been given in enormous doses with very doubtful advantage.

The third indication, that of weakening the muscular system so

as to render the violent spasms impossible, may be effected by bleeding, tartar-emetic, tobacco, the warm vapour-bath, aided by drastic purges, and by cold applied suddenly, as the cold-bath or the douche. All these remedies have been strongly recommended, and seem to have been used with advantage. The tobacco enema has met with great success in the hands of Dr. O'Beirne. The injection consisted of an infusion of one scruple of tobacco leaves in eight ounces of water. This remedy must be used with great caution, and its effects carefully watched. The same caution is necessary in the use of the *douche*. The best mode of applying it is to place the patient in a warm-bath, or to wrap him in hot blankets, and then to pour cold water on the head, at first from a moderate height, and in a stream, and if the patient bears this well, from a greater height and in a fuller stream. The sudden shock has more than once proved fatal. The hand should be kept on the pulse during the operation, and its effect on the circulation should be carefully noted.

The fourth indication, that of supporting the strength when there is great debility, is fulfilled by tonics and stimulants in the largest doses. Quinine, carbonate of iron, and sulphate of zinc, are the principal tonic remedies: wine, brandy, and ammonia, the chief stimulants.

Mercury has been administered in large doses, so as to produce salivation, but it has only served to increase the sufferings of the patient.

A remedy which promises to be of great value in the treatment of this and other convulsive diseases, has been lately introduced to the notice of the profession by Dr. O'Shaughnessy. It is the Indian hemp, in doses of two or three grains given every second or third hour. In ten out of twelve cases of *traumatic* tetanus, treated by himself or others, a cure was effected. (See Brit. and For. Med. Rev. July 1840, p. 225.) If future experience bears out that of Dr. O'Shaughnessy, the profession will have gained an invaluable addition to the pharmacopœia.

To sum up the treatment.—In cases of traumatic tetanus, the wound should be enlarged, or a clean division of the nerve made at some point between the wound and the brain. This can do no harm, and may be attended with benefit. The remedies administered must depend on the state of the patient. If there is great strength of body and vigour of circulation, bleeding and depressants must be used, of which the most powerful is tobacco; if, on the contrary, there is great debility, we must resort to tonics and stimulants. All remedies require to be given in very large doses. The application of cold in the form of shock, may be employed in all cases, provided due precautions are taken to maintain the temperature of the rest of the surface, and not to employ too strong a shock at first. The Indian hemp promises to be of great service either alone or in combination with the other remedies. The bow-

els must be relieved as promptly as possible by purgative enemata. When extreme debility has supervened, nourishment may be administered in this way. Ice or a mixture of pounded ice and common salt, enclosed in a bladder and applied to the whole length of the spine, may be tried with good prospect of advantage.

HYDROPHOBIA.

SYMPTOMS.—At an uncertain time after a bite from a mad animal, mostly a dog or cat, sometimes not until several months have elapsed, pain or uneasiness is felt in the seat of the wound, followed, in many cases, by pains darting from it along the course of the nerves. These local symptoms are not constantly present. After a short time, wandering pains are felt in different parts of the body, restlessness, heaviness, disturbed sleep, with frightful dreams, sudden startings, and spasmodic contractions, sighing, great anxiety, and dejection of spirits.

These symptoms increase; in some cases the bitten part becomes inflamed or painful; pains now attack the throat, and a sensation of contraction or suffocation occasionally takes place, with a feeling of violent pressure at the epigastrium. An extreme aversion is felt to the act of swallowing, and this is most marked in the case of water or other liquids; this arises to such a degree, that the moment any fluid is brought near the patient, or when the noise of the fluid is heard pouring out of any vessel, it occasions him to start with great dread and horror, and the attempt at deglutition is hurried, accompanied with sobbing or deep catching sighs, and followed by a convulsive paroxysm.

Bilious vomitings sometimes take place; a considerable degree of fever follows, with dry and rough tongue; the voice becomes hoarse, the patient is constantly spitting a viscid tenacious saliva, and is tormented by urgent thirst; mucous râle is sometimes present in the lungs. There is a degree of irritability beyond description; the countenance expresses intense anxiety, alarm, and suspicion; the eyebrows are contracted, the eyes wild, staring, and glassy; there is intolerance of light and sound; the sufferer often screams violently, and talks in a loud, important, and authoritative tone; spits out the viscid saliva between his closed teeth, with loud and noisy strainings, not unlike the barking of a dog. In spite of those severe sufferings, the mind often remains unaffected to the last, but in other cases the patient lapses into wild delirium, in which he talks incessantly and incoherently, and is in a state of the most distressing restlessness; the slightest motion, or sudden change of position, a breath of air, a ray of light, a polished surface, or the slightest noise, will excite a sensation of suffocation and convulsions; delirium in some instances takes place, convulsions now become frequent, and the patient dies exhausted or asphyxiated.

Duration.—Generally from two to three days. In one case thirty-six hours, in rare instances eight or nine days.

Latent Period.—From the second or third day to some months, or even years. The most common period from twenty to forty days.

Prognosis.—Fatal; recovery possible?

Anatomical Characters.—Not constant. Slight traces of inflammation in the spinal marrow and its membranes. Inflammation of the fauces and air-passages with increased secretion.

Rationale.—Intense excitability of the nervous system, with local inflammation of the fauces acting upon the spinal marrow through the incident nerves, giving rise to a reflex influence, and being the immediate cause of the spasmodic action of the muscles?

TREATMENT.—*Indications.*—I. To prevent the absorption of the poison.

II. To remove the local irritation.

III. To diminish the excitability of the nervous system.

The first indication is fulfilled by the prompt excision of the wound, which should be allowed to bleed freely, and the subsequent application of caustic. If this cannot be done at once, a ligature should be applied above the wound, if it be on an extremity, and the virus should be withdrawn by suction.

The second indication has never been effectually fulfilled in any other way than by the use of ice taken internally.

The third indication may be fulfilled by powerful doses of narcotic remedies. Experience, however, proves that even the largest doses have little or no effect in controlling the patient's sufferings. Is not the application of cold to the spine and head the best remedy? or in case the peculiar local affection have passed away, and the dread of swallowing with it, the cautious and judicious application of the *douche* with the precautions recommended in the cure of tetanus. See Tetanus.

The plan here suggested is on the authority of a very remarkable case admitted into King's College Hospital, under Dr. Todd. The patient, a boy of seven years of age, labouring under hydrophobia in its most marked form, and refusing, with characteristic horror and impatience, everything previously offered him, whether in a liquid or solid form; and who had taken ten drops of hydrocyanic acid, repeated at short intervals, and at length twenty drops at one dose, without apparent effect; after the most severe convulsive paroxysm which had yet seized him, was offered a fragment of rough ice. This he swallowed with avidity. Fresh pieces were constantly put into his mouth, which he seized and crunched between his teeth with remarkable eagerness, swallowing them with the greatest ease. In less than half an hour, he had taken, by a rough estimate, no less than a pound and a-half of rough ice. At the same time that the ice was given internally, a bladder containing a mixture of roughly powdered ice and common

salt was applied to the whole length of the spine and around the throat. Under the external and internal application of cold all the symptoms of hydrophobia, referable to the throat and chest, with the exception of occasional hawkings, had passed away; the viscid mucus no longer flowed from the mouth, the mucous râle disappeared from the chest, and nothing remained but extreme restlessness, violent excitement, and incoherence. The patient sat up in bed with a large fragment of rough ice in each hand, talking incessantly in a loud voice, addressing a thousand incoherent questions to his mother regarding members of his family, and showing an aimless eagerness. The intense excitement continuing, and all the peculiar symptoms of hydrophobia having subsided, the cold *douche* was, in Dr. Todd's absence, applied by my directions, but the system did not rally from the shock. (See *Lancet*, January 22, 1842, for a longer report of the case.)

I am inclined to attribute more benefit to the internal than to the external use of ice in this case, but the joint administration seems to be the most rational treatment yet recommended. (G.)

If it is thought advisable to use any narcotic at the same time with the ice, the Indian hemp, recommended by Dr. O'Shaughnessy (see Tetanus) appears to be the best. Stimulants, and external warmth to other parts of the body, should be combined with the local application of cold.

CHAPTER VIII.

DISEASES OF THE CIRCULATING SYSTEM.

1. FUNCTIONAL OR NERVOUS AFFECTIONS.
2. ORGANIC DISEASES.

1. *Functional or Nervous Affections.*

Palpitation.
Syncope.
Angina Pectoris.
Neuralgia of the Heart.

PALPITATION.

The term *palpitation*, or *nervous palpitation* of the heart, is given to frequent, strong, and tumultuous movements of the

heart, occurring in individuals who have no appreciable, material, or organic lesion of this organ. These movements may be transient or momentary, or they may continue for a long time. They sometimes augment the force or impulse of the heart, and enable the practitioner to see and hear them at some distance from the sufferer; and the patients themselves sometimes hear them when they repose on the left side. Palpitations are sometimes accompanied by a slight and transient bruit de soufflet, which disappears as soon as the heart becomes quiet. They are also attended by a feeling of sinking and anxiety difficult to describe, which patients refer to the region of the heart or pit of the stomach, and often designate "a sinking at the heart." In some cases there is a tendency to fainting fits or syncope, and a pulsation at the pit of the stomach, which has been mistaken for aneurism.

CAUSES.—*Predisposing.*—The nervous temperament; the female sex; debility.

Persons of a nervous temperament, and those of both sexes who are subject to hysteria, hypochondriasis, melancholy, epilepsy, and general nervous disorders, are very liable to palpitations.

Exciting.—Strong mental emotions, joy, grief, anger, sadness, fear, anxiety, &c.; excessive intellectual labour, violent exercise, whether active or passive. Debility, during the convalescence of fevers or other acute diseases, or that caused by chronic diseases; severe loss of blood by any kind of hæmorrhage, inordinate natural discharges, abuse or long use of purgatives, spare or unwholesome diet; the abuse of spirituous, vinous, or fermented liquors; want of sleep, long-continued anxiety and distress, close confinement, intense study, dissipation, and debauchery, excess of venereal pleasures, and more particularly onanism, as well as excessive sexual intercourse, are causes of palpitations and irregularities of the actions of the heart. Persons subject to anæmia, from loss of blood by abortion, or from any other cause, or to chlorosis, which is very analogous to anæmia, are also very liable to nervous palpitations of the heart.

Chlorotic girls are often supposed to labour under organic diseases of the heart, when there is only functional or nervous disturbance of the organ. They complain of palpitations, pain in the region of the heart, headache, difficulty of breathing, pain in the left side, &c.; they are bled, leeches, cupped, and blistered, when the opposite treatment ought to be employed, as tonics, such as quina, chalybeates, iodide of iron, &c. Such persons may have a transient bruit de soufflet, or bellow's sound of the heart, and a musical sound in the crural, subclavian, and carotid arteries, which is termed *bruit de diable*, from its resemblance to the whizzing of a double top, used as a toy in France, and termed *diable*. In other cases palpitations are ascribed to organic diseases of the heart. Persons of a nervous temperament and full habit are also very subject to palpitations. They are affected on going up stairs,

or ascending a hill, on carrying or lifting any weighty substance, or using any exertion. They are most affected in cold, moist, or foggy weather. They experience pain or numbness in some part of the left arm, throbbing in the head, fulness in the neck, sense of strangulation in the throat, fluttering of the heart, a sense of pressure in the epipastrium. Sometimes the motion of the heart is confined to a rolling or thumping.

Persons who suffer from spinal irritation are also very liable to palpitation, and the pulse in such cases may exceed 160 in the minute. There are also pains extending from the spine to the abdominal and thoracic organs, to the neck, shoulders, head, limbs, and, by nervous sympathy, to every part of the body. The respiration is difficult, or easily rendered so, on any slight exertion or mental emotion; and the pressure of the stays on the chest, round the waist, or lower part of the spine, is intolerable. Pressure on the affected part of the spine has suddenly induced pain in the chest, cough, and palpitation. The disease is very common in large towns, in girls and young women, from the age of fifteen to twenty-five years. Lastly, nervous palpitations are very common at the cessation of the menstrual function, and to women labouring under diseases of the womb, ovaries, breasts, or any chronic complaint. They may be slight, transient, and intermittent, like all other nervous disorders; and they recur more frequently in proportion as the heart becomes more irritable; but they do not produce any serious alteration of the health, unless they continue for a long time, when they may be followed by hypertrophy of the heart. They are most troublesome after vivid mental emotions and muscular exertion, though they are sometimes most distressing when the body is in a state of repose, as during the first part of the night, when they often prevent sleep for several hours. They are also occasionally accompanied by a sensation of internal agitation or fluttering in the head, chest, or abdomen, and there is often a copious and frequent evacuation of urine, when the patient is hysterical. They are least troublesome when the person is in the open air and taking exercise; a fact attested by most nervous women. Another cause of palpitation is dyspepsia, and this is a cause also of intermittent pulse. In some patients flatulence is always followed by palpitation.

DIAGNOSIS.—The condition of the general health, the absence of the physical signs of organic disease; the peculiarly distinct character of the sounds of the heart; the absence of inequality and irregularity of the pulse (except in rare cases of dyspepsia); the entire freedom which is enjoyed at intervals; the great frequency of the pulse when the finger is first placed upon it, and the gradual diminution which follows as the patient's apprehension disappears. The diagnosis is, however, not free from difficulty, and may in some cases require repeated examination, before a decision can be formed. That this difficulty is often experienced will appear

from the observation of Dr. Baillie: "There are in truth few phenomena which puzzle, perplex, and lead into error the inexperienced (and sometimes the experienced) practitioner, so much as inordinate action of the heart. He sees, or thinks he sees, some terrible cause for this tumult in the central organ of the circulation, and frames his portentous diagnosis and prognosis accordingly. In the pride of his penetration, he renders miserable for a time the friends, and by his direful countenance damps the spirits of his patient. But ultimate recovery *not seldom* disappoints his fears, and the physician is mortified at his own success."

TREATMENT.—In plethoric individuals, general and local bleeding from the region of the heart, by leeching or cupping; followed by tartarized antimony, digitalis, or hydrocyanic acid; counter-irritation by antimony or blisters; or an anodyne plaster, over the region of the heart, as one of belladonna, opium, hyoscyamus, or conium. Low diet, repose, and quietude of mind and body; a strict attention to the state of the stomach and bowels. In delicate, nervous, or chlorotic persons, tonics, chalybeates, warm or cold-baths, shower-baths, change of air, a nourishing diet, improvement of the digestion and general health, with moderate exercise. Blood-letting is injurious, and often productive of the worst consequences. Chlorotic girls complain of headache, palpitations of the heart, and agitations in many or most parts of the body; and these symptoms will be aggravated by bleeding, purging, low diet, &c. In such cases there is anæmia, or, an universal pallor of the whole surface of the body, from a want of red blood, which is not to be supplied by depressing measures.

In nervous palpitations from mental emotions, tranquillity of mind is indispensable, and moral means alone can remedy moral palpitations. It is useful to observe, that nervous palpitations are often aggravated by the fear of organic disease of the heart; but if the medical man can succeed in convincing his patient of his error, he will often succeed in effecting a cure.

SYNCOPE.—FAINTING.

SYMPTOMS.—A person about to be attacked with syncope, experiences an indescribable distress, or feeling of faintness; the eyes become dim, and covered with a kind of film; there is a sense of singing or buzzing in the ears, the countenance and lips are pale, the mind fails, the body is covered with a cold perspiration, and the patient, if unsupported, falls to the ground. Sometimes the loss of sense is incomplete, when the patient turns cold and pale, yet the pulse continues to beat, or rather to tremble, and respiration is just perceptible; at others not the smallest signs of life can be perceived; the face has a death-like paleness, the extremities are cold, the eyes shut, the mouth sometimes shut and sometimes open, the limbs flaccid, and the strength quite gone.

A recovery is announced by deep and heavy sighs; and is frequently accompanied with vomiting. It sometimes terminates in epilepsy and convulsions.

DIAGNOSIS.—Syncope does not continue, in general, longer than a few seconds; but, in some cases, it persists for several minutes. It is not to be confounded with that cataleptic or hysterical species characterized by want of intelligence, which may continue for several hours or days, because the complete absence of the beatings of the heart could not continue so long a time without causing real death.

CAUSES.—*Predisposing.*—Nervous irritability and delicacy of constitution; debility however induced; profuse evacuations, especially of blood; violent passions of the mind; surfeits; excessive pain; organic diseases of the heart or large vessels; plethora.

Exciting.—Mental emotion, such as joy and grief, love and hatred, &c. Syncope may be the effect of severe physical pain in any part of the body, or of vivid mental emotions, of sensations produced by the sight of certain objects, by certain sounds, odours, &c. Certain poisons, as narcotics, hydrocyanic acid, septic miasms, or odours, and loss of blood by depletion or hæmorrhage, also induce fainting. Lastly, obstacles to the circulation of the blood may also suspend the action of the heart, and cause syncope.

TREATMENT.—When syncope is purely nervous, as in nervous or hysterical women, there is seldom any danger. The sufferer ought to be placed in the recumbent position, and fresh air should be admitted. Cold water sprinkled on the face and neck, ammonia, harts-horn, burnt feathers, æther, eau de Cologne, vinegar, and other means in popular use, will be sufficient to restore animation.

The other indication will be to remove the exciting cause, and to improve the general health by mild aperients, mercurial alteratives, tonics, &c.

When fainting fits are produced by organic affections of the heart, or neighbouring viscera, all that can be done is to remove symptoms of fainting, and endeavour to palliate the primary disease.

ANGINA PECTORIS; OR SYNCOPE ANGINOSA.

SYMPTOMS.—Upon exercise, especially when walking up an ascent, and after a full meal, a sudden and violent pain across the chest, extending down the arm as far as the insertion of the deltoid muscle, accompanied with a sense of stricture, so acute as to threaten immediate destruction. The patient is instantly obliged to stand still, and the moment he does so all the symptoms vanish. After repeated attacks of the disease, it is excited by slighter causes, and the paroxysms are more violent and of longer duration. It often occurs on the patient's waking from his first sleep. The pulse sinks, and becomes weak and irregular; the countenance

pale; cold sweats; constant cough; expectoration of viscid mucus: the patient is, at times, incapable of lying down; at length, a fit more violent than usual puts an end to his miserable existence.

CAUSES.—Ossification of the coronary arteries of the heart; ossification of the valves of the heart; morbid accumulation of fat; incapacity of action in the heart, excited by every thing which hurries the circulation, and accelerates the passage of the blood to the diseased organ, as violent exertion, certain passions of the mind, sneezing, coughing, straining at stool, &c. It is often connected with flatulence, which forms a very troublesome accompaniment. It is most common to gouty, rheumatic, studious and sedentary persons, and generally occurs after the age of fifty, though Dr. Copland has seen it at the age of thirty-four.

TREATMENT.—*Indications.*—I. In the paroxysm, to alleviate the distressing symptoms above described.

II. In the interval to prevent the return of the disease.

The symptoms are sometimes relieved,

1. By bleeding. Dr. Parry recommends the patient to be placed in the recumbent position, and a small quantity only of blood to be drawn away.

2. By antispasmodics: spiritus ætheris sulphurici compositus; opium.

3. Emetics were administered by Dr. Percival, and are obviously indicated when the disease is connected with, or dependent on, dyspepsia.

4. Carminatives; as cordial confection, cardamoms, ginger, pepper, and the like. These are useful when there is much flatulence.

5. Blisters, antimonial ointment with croton oil, or hot turpentine fomentation over the cardiac region.

The return of the paroxysm is to be prevented,

1. By removing all the existing causes.

2. Diminishing plethora by abstemious living, and vegetable diet.

3. Abstinence from every thing heating; as spices, wines, and all fermented liquors.

4. Guarding against vehement emotions of the mind, and all known exciting causes.

Issues; setons; blisters to the chest; nitrate of mercury; arseniate of potass and sulphate of zinc, in some cases, are said to have been useful. All the symptoms of this disease may be caused by dyspepsia, and cease when the latter affection is removed.

NEURALGIA OF THE HEART.

This disease differs from angina pectoris, in consisting of a darting pain in the region of the heart, without any affection of the respiration; and, in most cases, without any alteration in the heart's

beat. It is purely nervous, and probably dependent upon dyspepsia, especially when it is combined with flatulence. It has been attributed in some cases, and with apparent reason, to the excessive indulgence in strong tea. The *treatment* must be regulated by the general state of the patient's health, and by the ascertained cause of the individual paroxysms. Benefit is often derived from the application of a belladonna plaster to the region of the heart. Neuralgic pains in the heart are transmitted from the nerves of the organ to the phrenic, intercostal, pneumo-gastric, brachial, and cerebral plexuses, &c., and not only cause derangement of function in all the parts supplied by these nerves, but by sympathy in all parts of the body. It is most probable that certain cases of nervous asthma, and angina pectoris are simply neuralgic affections; and these are generally relieved by powerful sedatives and antispasmodics, as in cases of nervous palpitations.

Spasm of the Heart is described by Laennec, though considered an imaginary disorder by Bouillaud, who states that there is no positive fact to attest its existence. But there is no reason why the heart should not suffer from spasm as well as all other muscular organs.

IRREGULARITIES AND INTERMITTENCES OF THE PULSATIONS OF THE HEART.

Irregularities and intermittences of the pulsations of the heart often arise from the causes which produce nervous palpitations, and will be relieved by the same remedies. They may also depend on organic diseases of the heart. It is worthy of notice, that the pulse at the wrist and heart may be irregular or intermittent during health, become regular during acute disease, and return to its former condition during convalescence or recovery. Irregular and intermittent pulse is often traceable to dyspepsia, and to attacks of flatulence.

Pulsation in the epigastrium, like palpitation, is dependent upon nervous causes, and like it occurs in paroxysms, and in dyspeptic persons. Sometimes the pulsation is communicated to an intestine distended with gas or fæces, and in this case it is apt to simulate aneurism. It is frequently removed by a brisk purgative, or by a course of aperient medicines.

STRUCTURAL DISEASES OF THE HEART.

PERICARDITIS.
ENDOCARDITIS.
CARDITIS.
HYPERTROPHY.
ATROPHY.
DILATATION.

PERICARDITIS.

SPECIES.—1. ACUTE. 2. CHRONIC.

ACUTE PERICARDITIS.

SYMPTOMS.—After rigors, which are sometimes extremely severe, pain, more or less acute, under the left nipple and towards the inferior extremity of the sternum, occupying a part or the whole of the præcordial region, radiating towards the left axilla and arm, and extending towards the left side. The pain may be pungent, and lancinating, like that of pleurisy, and increased by the respiratory movements, by cough, and by pressure in the epigastric region; it prevents the patient from raising the left side, or from lying upon it; and some patients place the hand upon the painful region during inspiration, or coughing.

There are, however, cases of pericarditis in which the pain is dull, or so slight that no complaint is made of it. Some patients do not complain of any pain, but merely of a feeling of oppression. In cases in which the pericarditis is complicated with very acute pleuritis, or severe acute articular rheumatism, the pain of pericarditis is often masked and obscured by that of either of the diseases just mentioned. When pain is present it is increased, when absent often produced, by deep pressure in the intercostal spaces over the region of the heart. Rheumatismal pericarditis is often indolent and attended with little pain, if pleurisy does not exist at the same time. In this last complication there is pain, more especially when the left pleura is affected; and this is never so severe and pungent as when the pleurisy is situated in the left portion of the diaphragmatic pleura.

The pulsations of the heart are stronger and more frequent than normal, sometimes regular, at others irregular, unequal, and intermittent; there are violent palpitations distinguishable on placing the hand over the heart, and sometimes on inspection, while in other cases the hand does not detect them. The last phenomenon occurs when there is effusion into the pericardium; in which case the pulsations of the heart are more feeble than natural.

In addition to these symptoms, referable to the heart itself, there is pyrexia more or less violent; a frequent, full, hard, regular, and *jarring* pulse, or a small, unequal, irregular, and very rapid one; the skin is often bathed in sweat, or it is very dry and hot; in other cases it is cold on the extremities, and covered with a cold perspiration. There is also dyspnœa, an insupportable sense of oppression, restlessness, jactitation, and an urgent want of fresh air; the countenance is pale, sharpened, and marked with the greatest

anxiety, and an expression of undefinable terror. Sometimes there are spasmodic or convulsive attacks, and even the sardonic grin; respiration is interrupted by sighs, sobs, and hiccups; there is in some cases a slight and momentary, or a severe delirium, and if the patient sleep, he awakes with fearful dreams; in other cases there is complete insomnolence, in others general convulsions. The anxiety and agony are sometimes so great and insupportable, that the slightest motion occasions an apprehension of sudden death. When the disease proves fatal, all the symptoms increase in severity, the breathing becomes more and more laborious, the countenance is livid, the eye glassy, and the patient expires amidst dreadful sufferings.

TERMINATIONS.—1. In complete recovery. 2. In chronic pericarditis. 3. In death.

ANATOMICAL CHARACTERS.—The thickness, transparence, and consistence of the pericardium present, in general, no appreciable change. In some it appears a little thicker and less transparent than in health. When the effusion is very slight, the pericardium is less polished and less soft to the touch than in the normal state, and sometimes it is altogether dry, glossy, and as if gluey to the touch.

The pericardium is easily detached from the heart, and after its separation, we find an injection and redness more or less marked, and sometimes a sanguineous infiltration in the subjacent cellular tissue.

The sac of the pericardium contains an unusual quantity of serum, mixed with shreds of coagulable lymph, or it is filled with pus, or the surface of the membrane is covered with plastic lymph, and in some cases there are adhesions between the two surfaces. Pericarditis is often complicated with endocarditis.

DIAGNOSIS.—Difficult in certain cases, and apt to be confounded with pleuritis, pneumonia, or even simple fever. When the symptoms above described are strongly marked, it is difficult to confound it with any other disease. In any case the *physical* signs will assist materially in the diagnosis. *Percussion* gives little or no assistance in acute and recent cases, unless there is extensive effusion. *Auscultation*.—As early as the second or third day, a faint *rubbing* or rustling sound, (*bruit de frottement*) compared to the rumpling of silk, paper, or parchment, is heard with both sounds of the heart. This sound is commonly first heard a little to the left of the mesial line, and about the centre of the sternum; thence it gradually extends to the entire surface of the heart. This rubbing sound, where the secretion of lymph is of a more consistent character, closely resembles the cracking sound of new leather (*bruit de cuir*). As the secretion into the sac of the pericardium increases, the sounds disappear, the beat of the heart is less distinctly heard and appears to be more distant. (See Hydro-pericardium.)

PROGNOSIS.—Where the disease is complicated with endo-carditis, the physical signs of that disease. (See Endo-carditis.)

CAUSES.—*Predisposing.*—Hereditary predisposition; plethoric habit of body; age from 10 to 30. *Exciting.*—Cold, and the extension or metastasis of acute articular rheumatism.

PROGNOSIS.—Pericarditis is a most dangerous disease when overlooked, mistaken, or mismanaged. The majority of cases yield to copious depletion.

TREATMENT.—Like all other inflammations, acute pericarditis requires general and local bleeding, repose, low diet, refrigerants, purgatives, and counter-irritation. The urgency and danger of the disease demand free emissions of blood from a large orifice in the vein, repeated several times in the space of three, four, or five days. It need scarcely be observed, that the depletions, both general and topical, ought to be proportioned to the intensity of the disease, to the age, strength, temperament, and sex of the patient, and to the existing complications. As a general rule, in a patient in the prime of life, affected with intense pericarditis, three or four bleedings from the arm, always from a free orifice in the vein, carried to the extent of decidedly depressing the action of the heart, or to the approach of faintness, and seconded by the application of from twenty to thirty leeches, or cupping reiterated two or three times, will, during the first three or four days, suffice to cure the disease.

“Few pericardites,” says M. Bouillaud, “will resist this plan of treatment, if attacked in their commencement.” But when the disease persists after the preceding plan of treatment, different revulsives, such as the application of warm turpentine, blisters, anti-monial ointment, croton oil, moxas, setons, and mercurial frictions, are to be employed.

During the use of the preceding remedies, the diet should be the lowest possible, and warm-baths may be employed, as they favour the action of the remedial agents.

CHRONIC PERICARDITIS.

SYMPTOMS.—Slight pain or uneasiness in the region of the heart; low fever, with or without evening exacerbation; sense of oppression; debility; lividity and œdema of the face, and swelling of the ankles; with the physical signs of effusion into the pericardium. (See Hydro-pericardium.)

CAUSES.—The disease is generally a sequela of the acute form of the disease; more rarely it is brought on by a blow, or it is the consequence of acute rheumatism.

TREATMENT.—Local depletion by cupping; blisters to the region of the heart; calomel and opium; or, where the disease is the consequence of rheumatism, colchicum. Diuretics, to increase the secretion of the urine, and to remove the dropsical effusions.

Important structural changes often remain when the symptoms

of pericarditis, whether acute or chronic, have been removed. The pericardium may be thickened and hypertrophied, and the subjacent capillary vessels may become enlarged. There may be serosity or pus in the pericardium, or the plastic matter may be replaced by general or partial cellular adhesions, or bands which unite the layers of the pericardium to each other, or to the heart. The false membranes are cellulo-fibrous, or fibrous, and are opaline, whitish, or milky, and may cover the heart and large vessels, especially the aorta near the pericardium. The false membranes may also become fibro-cartilaginous, or osseous, and cover the heart as with an osseous shell. In other cases, the two layers of the pericardium become adherent over the whole surface of the heart.

Sometimes, in place of adhesions and false membranes, the pericardium presents granulations and small vegetations of different forms. The effused fluid, or the thick, false membranes sometimes compress the heart so as to occasion atrophy. M. Bouillaud has recorded cases, in which false membranes so compressed the heart as to reduce it to half its size, and in which it was found atrophied, similar to a lung that had been a long time compressed by a pleuritic effusion.

In chronic pericarditis, there is nothing more common than to find in the internal sero-fibrous tissue of the heart, the same alterations as in the external sero-fibrous tissue.

The muscular tissue of the heart may, like the serous, fibrous, and cellular tissue of the same organ, become thickened and hypertrophied, indurated or softened, from the extension of the inflammation from the pericardium. (See Carditis.) Laennec observed that in chronic pericarditis the muscular tissue of the heart sometimes became decoloured and whitish, as if it had been macerated for some days in water. This occurred, in the opinion of Bouillaud, in those cases in which there was an effusion of pure serum alone, as in hydro-pericardia, properly so called. In such cases, the surface of the heart is continually bathed and macerated in the effused fluid, it becomes whitish, and acquires a pale or lactescent tint, which rarely extends to the muscular substance of the heart; it is arrested in the first layers, and sometimes only occupies the serous and subjacent cellular tissue.

These changes,—the effusion of coagulable lymph on the surface of the pericardium, the more dense formations just described, the adhesion of the surfaces of the pericardium, and the effusions into its sacs,—may be detected by very careful stethoscopic examination. The new leather sound (*bruit de cuir*) already mentioned, is generally characteristic of recent effusion, and disappears as the sac of the pleura becomes distended, or when adhesions are formed. The denser deposits on the surface of the pericardium are indicated by harsher and louder sounds, corresponding to the apex or base of the heart, and commonly synchronous with both sounds

of the heart. Partial adhesions of the two layers of the pericardium are sometimes productive of no unusual sounds, at others of some modification of the friction sounds. Extensive adhesions of the two layers of the pericardium generally lead to irregular action of the organ, and are accompanied by a well-marked retraction of the epigastrium and hollowing of the intercostal spaces with each systole of the heart. When the heart is thus obstructed in its movements, the beat continues to be perceptible in the same spot, in all positions of the body, and in all states of the respiration. For the physical signs of extensive effusion in the sac of the pericardium, see Hydro-pericardium.

ENDO-CARDITIS.

SYMPTOMS.—General feeling of uneasiness, anxiety, and oppression at the præcordia, with a tendency to syncope. No pain, unless the disease is complicated with pericarditis or pleuritis. In the more severe cases, there is well-marked fever, hot and dry skin, thirst, and restlessness. There is violent and irregular action of the heart, with a *small*, feeble, and often intermitting pulse; extreme anxiety; jactitation; cold sweats; pale and shrunken features, expressive of extreme alarm; dyspnœa, faintness, or actual syncope; lividity of the lips and cheek, slight swelling of the hands and feet, and short convulsive or epileptic seizures.

ANATOMICAL CHARACTERS.—1. Redness of the internal membrane or endocardium, which may be slight and evanescent soon after death, as in the pericardium, or intense, or brownish, or violaceous. It may be local or general, and may be found in any part of the lining membrane of the heart. It is often confined to the valves alone. The redness is not caused by capillary injection, but by a kind of sanguine tinting of the internal membrane of the heart. It does not ordinarily penetrate under this tissue, is not removed by ablution, but does not resist maceration when sufficiently prolonged. It is generally accompanied by some thickening, infiltration and softening of the membrane.

2. Effusion of coagulable lymph, in the form of white, elastic, glutinous masses, adherent to the parietes of the heart, and entwined round the valvular tendons and fleshy columns. These are semi-organized, are analogous to the buffy coat of the blood, and some of them contain red lines which are nothing else than the rudiments of vessels.

These concretions vary in size and configuration, and are generally prolonged into the large vessels. In similar circumstances they are longer and more abundant in the right than in the left cavities of the heart. They are generally adherent to the free borders of the valves, on which traces of them are found after repeated ablutions. It is very probable that these fibrinous masses may be organized and transformed into vegetations and granulations.

When endocarditis does not speedily terminate by resolution, and when it is protracted for fifteen, twenty, or thirty days, or even longer, the inflamed tissues become more or less thickened, and the plastic part of the anormal products, secreted by these tissues, passes from the amorphous state, to that of organization. In such cases we find, according to the circumstances of position, of configuration, and of composition of the organisable matter, either vegetations or granulations, cellulo-fibrous adhesions, fibrous or sero-fibrous layers, &c.

Vegetations or granulations are generally situated on the free borders of the valves, and very frequently on the internal surface of the cavities, and especially of the auricles. They vary in size and form, from the size of a millet seed to that of a grain of hemp-seed, or of a small pea. They may be distinct or confluent and resemble a cauliflower, or they may be round, spherical, elongated, cylindrical, or flattened, and their surfaces may be smooth, polished, unequal, or rugous.

Vegetations of the valves, or of the internal parietes of the heart, are very often accompanied by fibro-cartilaginous or calcareous indurations of the valves. When these vegetations are numerous, confluent, and grouped so as to resemble a cauliflower, they prevent the action of the valves, and more or less contract the orifices to which these are adapted, impede the circulation of the blood through the affected side of the heart, and lay the foundations of many diseases of the organ. The adhesions occur, for the most part, at those points where the obstacles are in the slightest degree. Thus they are most common at those parts of the valves which are most immobile, and on the corresponding parts of the ventricles. These adhesions considerably derange the circulation of the blood by preventing the valves from completely closing the orifices to which they are adapted. The opposite borders of the valves may adhere to each other. Again, the whole or a part of one cavity and of different cavities of the heart may be lined by a false or adventitious membrane in a single or in separate layers.

In other cases there may be spots or patches on the endocardium, such as are sometimes formed on the pericardium. (See Pericarditis.) In a great number of cases the lining membrane of the heart is thickened by false membranes. It becomes hypertrophied, loses its transparency, its surface becomes less polished, less villous, unequal, and covered with rugosities. The hypertrophic thickening extends to the fibrous and sub-endocardic cellular tissue. The tricuspid valve is particularly subject to this consecutive hypertrophy, and to a contraction of the auriculo-ventricular aperture.

3. We have next to consider the third period of endocarditis, in which cartilaginous, calcareous, and osseous indurations occur in different parts of the heart, and of the valves in particular, with or without contractions of the orifices of the heart.

These morbid growths may vary from the size of a lentil to that of a finger nail, or even larger; and the valves may become completely cartilaginous or osseous in their fibrous zone and extremities or points of the valves; and the structure may be only partially affected, while the other parts may be hypertrophied.

The osseous or calcareous incrustations of the valves assume various shapes. They are sometimes arched, circular, elongated similar to stalactites, of a pyramidal or irregular form, or round, the size of a pigeon's or pullet's egg. They are rough and unequal on their external surface, and may form on the surface or in the substance of the valves, or may be prolonged into the substance of the heart itself. These growths more or less impede the functions of the valves, and prevent them from closing the orifices to which they are adapted. The effect of this will be, that the fasciculi, or bundles which form the valves, may be perforated, lacerated, thickened, or indurated; and in one case one of the aortic valves was almost entirely detached, and it hung and floated into the cavity of the aorta. In a great number of cases the indurated, ossified, or petrified valves unite, except in the centre, where there is an irregular, oval, or elliptic aperture or transverse bands. These changes are more frequent in the left, or arterial valves, than in the right, or venous. The morbid changes now described in the valves of the heart are productive of numerous disorders and diseases of the heart itself, and serious derangements of the general health.

PHYSICAL SIGNS.—The præcordial region is shaken in simple endocarditis by the violence of the pulsations of the heart, which are felt with the hand; and these extend beyond their normal limits. This is accompanied in some cases by a vibratory purring.

Percussion affords a dull sound in the region of the heart in a surface from four to sixteen square inches, and to distinguish it from that of hydro-pericardium, it is sufficient to remark, that it corresponds, in endocarditis, with the superficial, visible, and tangible pulsations of the heart; whilst in considerable effusion, the beatings of the heart are deep-seated, remote from the thoracic surface, and scarcely or not at all sensible to the sight or touch when the patient is lying on the back.

Auscultation enables us to perceive a bruit de soufflet, which masks one or both of the normal sounds of the heart. This bruit is stronger in proportion as the pulsations of the heart are more violent and precipitate, and is probably increased by fibrinous concretions or false membranes, on the valves of the heart; and when these are so great as to impede the action of the valves, the bruit may perhaps be absent. We also hear a metallic ringing sound isochronous with the systole of the ventricle, when the pulsations of the heart are more violent. In many cases, the beatings of the heart may be appreciated by the sight and touch. The pulse is from 140 to 160; is irregular, unequal, and intermittent, and in

some cases is not synchronous with the beatings of the heart. This is easily explained by recollecting that more or less considerable masses of fibrinous concretions in the cavities of the heart, and inflammatory engorgement of the valves, or defects in the auriculo-ventricular orifices, which impede the flow of blood through the heart, must render its pulsations violent, oppose the projection of a large column of blood into the arterial system, and cause a small, feeble pulse.

Physical Signs of Contraction of the Orifices of the Heart.

Auscultation supplies the most positive proof of contraction of the orifices and induration of the valves of the heart. The most certain signs afforded by this means of diagnosis are the bruits or sounds, termed bruit de soufflet, (bellows sound,) bruit de râpe, (rasp or file sound,) bruit de scie, (sound made by a saw.) When these are constant, and heard at all times, there cannot be any doubt entertained of induration of the valves, and contractions of the orifices of the heart. Sometimes these sounds are double; but more generally they accompany one sound only.

There is no fixed pain usually attendant on diseases of the valves of the heart. Some patients complain of a sense of weight, tightness, and oppression in the region of the affected organ, and also at the epigastrium, or pit of the stomach. They are subject to faintness, palpitations, and even sometimes to syncope. These symptoms are greatly increased by active exertion, walking up an elevated position, as a staircase, ladder, hill, &c.; and under vivid mental emotions, as anger, fear, fright, &c. The pulse may vary from 140 to 160, or even exceed this latter number.

In fine, when a patient has constant bruit de soufflet, de râpe, or de scie, or the bellows, rasp, or saw sound, in the precordial region, and when a vibratory motion, and tumultuous, irregular, or intermittent pulsations or palpitations of the heart exist at the same time, and these and the symptoms already enumerated have existed for weeks, months, or years, there is little if any doubt—indeed, it is almost, if not quite certain, that the individual so affected labours under induration of the valves, with contraction of one or more orifices of the heart. The effect which these alterations in the structure of the heart produce upon the more important functions of the body deserve attentive consideration.

Influence on the arterial and venous circulation.—Notwithstanding the irregular, unequal, intermittent and violent beatings of the heart, the pulse is small, hard, and vibrating, more especially when the left ventricle is hypertrophied with contraction, and it is sometimes accompanied by a vibratory or quivering motion in the arteries near the heart.

When there is contraction of the orifices of the heart, with induration of the valves, there is a greater or less obstacle to the

venous circulation. All the external veins, and those near the heart, as the jugulars, for example, are dilated, according to the degree and duration of the disease. These veins become varicose and greatly enlarged, in some cases, on the sides of the neck and above the clavicles; whilst, at the same time, the anastomosing veins on the parietes of the chest and abdomen, which are scarcely perceptible in the normal state, become augmented in size. The jugular veins, in such cases, sometimes pulsate synchronously with the heart and pulse; but this must not be confounded with the expansion of these veins during each expiration, or with their elevation caused by the beatings of the carotids. The venous pulse of the jugulars is the effect of the reflux of a certain quantity of blood into the right auricle and large venous trunks during the contraction of the right ventricle. This reflux occurs when the indurated tricuspid valve does not close during the systole, and when the right auriculo-ventricular orifice is so dilated that the tricuspid valve, whether normal or not, cannot close hermetically at the moment of the ventricular contraction.

The lividity and violaceous tint of the face and lips are caused by an obstacle to the return of the venous blood; and to this are also to be attributed the congestion of the hands, lungs, liver, brain, mucous, cellular, and serous membranes, serous effusions, as ascites, hydrothorax, anasarca, and also the different passive hæmorrhages. Other diseases of the organs now mentioned are often caused by obstruction to the passage of the venous blood through the right cavities of the heart. The same mechanical cause often predisposes to apoplexy and paralysis.

Influence on the respiration.—Slight dyspnœa, or shortness of breath after exercise or ascending an elevated situation, is the first derangement of the respiration; but when the disease advances, the term asthma is generally and erroneously employed. In extreme cases, the patient cannot respire unless sitting up in bed, (orthopnœa,) and dreads suffocation on lying down.

Influence on the cerebral functions.—There is marked anxiety, fear, and despair marked on the countenance; the eyes are prominent, haggard, and staring, the eyelids are depressed, the nostrils dilated, and the mouth almost constantly open to express extreme suffering, and to assist the impeded function of respiration.

When the disease of the heart has arrived at the last degree of intensity, the symptoms already enumerated are greatly augmented; the respiration becomes so laborious and difficult that the sufferer cannot remain in the horizontal posture, he is obliged to sit up and be supported with pillows; the inferior extremities are pendent, the superior fixed on the bed to afford a point of support to the inspiratory muscles, the body is strongly bent forward, the patient is in a state of constant restlessness, he calls for fresh air in the most plaintive tone, and with an expiring, interrupted voice often accuses the impotence of medicine, and ardently implores

for death. He can seldom procure sleep, and if he has any, it is more or less interrupted; his dreams are unpleasant, and he awakes apparently frightened, with an aggravation of his laborious respiration.

“In some cases,” says M. Bouillaud, “after the efforts of which the instinct of preservation is capable, the respiratory muscles themselves finally lose their power, and are plunged into the same state as all the rest. The patient has not the power to sustain himself against his sufferings, his head rolls upon his pillow, his body yields to its weight, falls upon its most dependent parts, and slips down the bed. A sub-apoplectic drowsiness, a kind of sleep which nature grants to his last moments, comes on; he no longer knows those about him, his voice fails, his breath becomes cold, his eyes become fixed and glassy, his countenance relaxes, he expires, too happy if sudden death had spared him such a degree of suffering.” This is a frightful but faithful picture.

Diagnosis of Contractions of the different Orifices of the Heart.—Many difficulties are in the way of our exact diagnosis. The following hints may be useful. The left side of the heart is much more frequently affected than the right. Diseases of the right side affect the venous pulse, that is to say, the regurgitation into the jugular veins; those of the left affect chiefly the arterial pulse, giving rise to irregularity and inequality. The sounds produced by the semilunar valves are distinctly heard not only over the site of the valves themselves, but also in the course of the artery, whilst they diminish in intensity from the base to the apex of the heart, where they become inaudible. The sounds produced by diseases of the auriculo-ventricular valves are heard most distinctly about an inch above the apex of the heart, and become less distinct in the tract of the large vessels. The sounds have a louder and sharper tone in disease of the aortic than in that of the auricular valves. In each valve there are two causes of abnormal sound—the direct flow of blood and the regurgitation; the first is synchronous with the systole of the ventricles and with the pulse; the second, with the diastole of the ventricles.

The following are the distinctions laid down by the best authorities:—

Aortic valves.—Murmur loudest at the middle of the sternum, but distinct in the course of the large arteries, accompanying the pulse, if it depend upon the onward current, but following it if caused by regurgitation; the sound superficial and of a peculiar whizzing character; the pulse *thrilling*, but often full and regular. *Mitral valves.*—Murmur loudest opposite the left margin of the sternum, between the third and fourth ribs; more hollow and distant in its character; generally accompanied by distinct purring tremor; the murmur most frequently synchronous with the second sound of the heart, caused by regurgitation, and accompanied by a feeble and irregular pulse. *Pulmonic valves.*—Very rarely dis-

eased; murmur more superficial than in the case of the aorta, but heard in nearly the same situation. *Tricuspid valve*.—Very rarely diseased; murmur most distinct a little to the right of the mesial line, and about the centre of the sternum. When the disease is confined to this valve, the arterial pulse would be little, if at all, affected, whilst the venous pulse is strongly marked. Generally speaking, the mitral valve is affected at the same time. When the aortic and mitral valves are both diseased, the signs proper to both affections are combined. Diseases of the aorta itself beyond the valves will give rise to the same sound as disease of the valves themselves; and if the valves at the same time are diseased, a double murmur will be present; the first produced by the diseased coats of the vessel, and the second by regurgitation through the valves.

Development and causes of Endocarditis.—Endocarditis may be idiopathic or symptomatic, acute or chronic.

The causes of the first form are the same as those of pericarditis, already enumerated. The symptomatic species often succeeds pleuro-pneumonia, phlebitis, arthritis, and articular rheumatism. The structure and functions of the parts of the heart which are inflamed by the influence of the causes that produce articular rheumatism, have a great analogy with parts of the articulations which are the seat of the last-named disease. The cavities of the pericardium and endocardium represent, as it were, articular cavities, and it is not surprising that their inflammations so often exist with those of the articular cavities, properly so called. (Bouillaud.) It is true, however, that during acute rheumatism, metastasis may occur, and the disease be transferred to the heart or its coverings, forming pericarditis, endocarditis, and carditis. Nothing is more common than the complication of acute rheumatism with pericarditis or endocarditis, or both; and these diseases progress simultaneously.

In the opinion of M. Bouillaud there is nothing specific in acute articular rheumatism, nor consequently in rheumatismal endo-pericarditis, so far as their exciting cause is concerned. This special but not specific cause consists in great atmospheric vicissitudes, and particularly in the greater or less prolonged exposure to cold, whether dry or humid, the body having been previously very much heated, almost to perspiration.

Reflection upon this fact, will lead to the conclusion, that in acute rheumatism there is often inflammation of the fibro-serous and muscular tissues of the heart, and of serous membranes in other parts of the body. It also convinces the physician of the indispensable necessity of rigorous antiphlogistic measures in acute rheumatism, and especially when there is pain in the chest, and particularly in the region of the heart, or in the pleura, accompanied by impeded or difficult respiration, and other signs of inflammation in the chest.

Metastasis of gout is also a cause of endocarditis or pericarditis and of other diseases of the heart.

Progress, duration, complications, and prognosis of Endocarditis.—Endocarditis, like pericarditis, may be per-acute, acute, sub-acute, and chronic. The nature and intensity of the causes of the disease, the idiosyncrasy of the patient, and the mode of treatment, will modify the progress of endocarditis. M. Bouillaud has observed, that the most acute endocardites were caused by exposure to cold, when the body was heated by exercise or wine in sanguineo-lymphatic temperaments.

In order to determine accurately the duration of endocarditis, it is necessary to appreciate a great many circumstances, as the degree and extent of the disease, the state of simplicity or complication, the age and strength of the patients, and the therapeutic remedies employed.

It is difficult to form an accurate prognosis. Acute endocarditis generally terminates fatally in a few days, in consequence of concretions in the cavities of the heart.

The duration of the chronic state is indefinite; and we have to bear in mind the morbid changes that occur, which have been already noticed.

The complications of endocarditis are similar to those of pericarditis. There is, however, a form of the disease caused by intense phlebitis, which is generally fatal.

As a general proposition, it may be maintained, that endocarditis is a very formidable disease, but generally terminates favourably if treated by vigorous antiphlogistic measures. But the results of this inflammation are generally incurable.

Treatment of Endocarditis.—The treatment of endocarditis is similar to that of pericarditis, already described, and must be most energetic. It consists in repeated depletions, general and local, nauseating doses of tartarized antimony, digitalis, colchicum, &c.; counter-irritants, as blisters, warm turpentine, tartarized antimony, with a few drops of croton oil; with purgatives, sudorifics, &c. But a more copious depletion, and more active measures, are necessary in endocarditis than in pericarditis. It is of the utmost importance to prevent by prompt treatment those chronic diseases of the valves, which lay the foundation for other serious diseases. M. Bouillaud advises eight, ten, or fifteen grains of the powder of digitalis daily; a remedy seldom depended upon by British practitioners, or given in such doses. It is very remarkable that this able and experienced author does not advise tartarized antimony in the treatment of endocarditis or pericarditis.

When endocarditis becomes chronic without organic disease, alleviation or a cure is often effected by small and repeated depletions, revulsives, counter-irritants, baths, absolute repose, digitalis, tartarized antimony, and the lowest regimen. In these cases issues, setons, repeated blisters, dressed with savine cerate, or blistering ointment diluted with lard or spermaceti ointment, or antimonial ointment with croton oil, may be used with advantage.

In cases of induration and thickening of the internal membrane of the heart, and especially of the valves, with contraction of the orifices, or adhesions, we cannot expect to effect a cure. We must adopt the palliative method, repeated small bleedings, at greater or less intervals, repose, low diet, digitalis, and when serous effusions manifest themselves, diuretics, and hydrogogue purgatives. In these chronic cases the iodide of potassium, either alone, or in combination with the other remedies here recommended, will be found of great service.

This form of disease is often complicated with hypertrophy and dilatation of the heart, which are constant results of chronic endocarditis, and will be noticed hereafter.

CARDITIS.

Carditis, or inflammation of the substance of the heart, rarely occurs as a distinct affection, and the post mortem appearances which characterise its previous existence, have always been found combined with pericarditis or endocarditis, or both. This, however, does not prove that the muscular tissue of the heart may not be separately affected, for it may be diseased, and yet not necessarily prove fatal. If articular rheumatism, affecting the fibrous tissues of the joints, may attack the fibrous tissues of the heart, there is the strongest reason from analogy to believe that muscular rheumatism, attacking the muscular fibre alone, may affect the heart in common with other muscles. Such a disease would probably be characterised by simple palpitation, with strong and abrupt contractions of the organ, a very frequent, full, and bounding pulse, and a dull, heavy sensation in the region of the heart, with paroxysms of severe darting or shooting pain in the heart itself, and extending to the shoulders and down to the arm—dyspnœa. These symptoms would accompany or follow muscular rheumatism in other parts of the body. I have known such symptoms supervene on a severe attack of muscular rheumatism without any indication of inflammation in the pericardium or endocardium. The treatment in such cases would be that of muscular rheumatism, with counter-irritation to the region of the heart, and in the most severe cases general or local depletion.—(G.)

The disease usually described under the name of carditis, shows itself after death by various kinds and degrees of disorganization, as, ramollissement, suppuration, ulceration, perforation of the cardiac parietes, and induration. Gangrene of the heart has not as yet been described, though the possibility of its occurrence cannot be doubted.

M. Bouillaud gives the histories of eight cases of carditis, terminated by ramollissement and suppuration. The first case was that of a man aged sixty-seven years, who complained of pain in the left side of the chest, dyspnœa, feeble, irregular, and inter-

mittent pulse; delirium. Death took place on the seventh day from the invasion of the pain in the side. There was purulent effusion in the left pleura and in the pericardium. The heart was soft and flaccid, easily reduced to a kind of thin pulp by the slightest pressure, with infiltration of a greasy matter between the fleshy fibres, and the developement of a very evident blush of vascularity.

The second case was that of a man aged twenty-seven years, who had partial effusion into the chest, slight fever, dyspnœa, and infiltration of the lower extremities. Death occurred two or three months after the effusion. There were adhesions in both sides of the chest, an albuminous exudation on the pericardium, and a brownish ramollissement of the tissue of the heart.

The third case was that of a woman aged thirty-six years. Her symptoms were those of organic disease of the heart, which succeeded three attacks of acute articular rheumatism. She was seized with symptoms of acute carditis with dyspnœa, lipothymia, &c. She died in seven days from the access of the attack. The heart was voluminous, soft, and flaccid, with three or four abscesses in its substance, with a blackish redness, and a sanious pus in the substance of the auricular appendage. There was cartilaginous thickness of the mitral valve, with contraction of the left auriculo-ventricular orifice.

The fourth case was that of a man aged fifty-eight years, who laboured under rheumatism complicated with carditis. Death was sudden. There were purulent deposits on the parietes, pillars, and partitions of the heart.

The fifth case was described by Dr. Latham. The patient died of carditis. All the heart was of a brownish red colour, its substance was softened here and there, and when the ventricles were incised, innumerable drops of pus were observed on the muscular fibres.

The sixth case was that of a young man aged nineteen years. His disease was severe variola succeeded by abscess, and probably by phlebitis. He died on the fifty-fifth day. There was an encysted abscess, the size of a filbert, in the tissue of the heart.

These cases presented the symptoms common to pleuritis, bronchitis, pneumonia, and other diseases of the lungs; and would be mistaken by all practitioners unacquainted with auscultation and percussion.

M. Bouillaud gives the histories of four cases of carditis, succeeded by *ulceration, perforation, and rupture of the parietes of the heart, and of the inter-ventricular and inter-auricular partitions of the valves, tendons, and fleshy columns.*

The first case was that of a delicate man aged seventy-nine years, who had been a long time subject to frequent fits of syncope and great irritability of temper. He died suddenly, and there were ulceration and rupture of the left auricle.

The second was that of a child aged twelve years and a half. Here were signs of organic disease of the heart with obstruction to the circulation for five months and a half; the respiration was difficult, and death was caused by suffocation. The morbid appearances were hypertrophy and dilation of the heart, perforation of the inter-ventricular septum at the origin of the pulmonary artery, erosion and destruction of one of the valves of the aortic orifice.

The symptoms during life were, swelling of the face, violaceous colour of the lips, infiltration of the superior and inferior extremities, dyspnœa, and a very remarkable sound in the heart; the pulse was regular, but small, feeble, and very easily compressed. There were frequent fits of palpitation, during which a sense of suffocation was imminent. The patient could not remain in the horizontal position; he was obliged to sit and bend the body forward.

The third case mentioned by M. Bouillaud was that of a young man aged twenty-four years. He had none of the symptoms of aneurism of the heart or of the blue disease. He died of a febrile complaint at the end of six weeks. There were perforations of the septum of the heart, with communications of the four cavities between each other.

The fourth case was that of a young woman, aged twenty-two years, who died of phthisis. There was rupture of a fleshy column of the right ventricle, and there was a whitish clot, as if containing purulent matter.

Similar cases of ulceration and perforation of the heart were described by Benevenius, Dulaurens, Riviere, Borrichius, Bonnet, Senac, Morgagni, Peyer, Graetz, Corvisart, Laennec, and others.

Observations on Ulcerative Carditis, with the formation of an Aneurismal Cyst, or Aneurismal Tumor of the Heart.

Walter, Baillie, Zannini, Breschet, Berrard, Cruveilhier, Dance, Reynaud, Petigny, and Choisy have observed examples of the disease now mentioned; and M. Bouillaud has narrated the histories of four cases observed by him. The symptoms were inexpressible agony and anxiety, respiration very laborious and interrupted, though the chest resounded well in its whole extent. One patient complained of violent pain in the region of the stomach and liver. The pulse was small, contracted, feeble, and frequent. There was a tumor almost as large as the heart itself at the superior and lateral part of the left ventricle, containing dense sanguineous concretions, and communicating by a large opening with the cavity of the ventricle. The pericardium adhered to the external surface of the tumor. The heart of Talma, the celebrated tragedian, afforded an example of the disease under notice.

There was a communication between the inferior part of the left ventricle and an aneurismal pouch. Three other cases are detailed by M. Bouillaud.

Observations on Carditis terminated by Induration.

Induration rarely occurs after simple carditis, but is generally observed after pericarditis and endocarditis. M. Bouillaud never met with it, unless connected with the two diseases last mentioned.

Albertini observed a case of ossification of one of the auricles. Corvisart observed the substance as hard as strong leather, and the apex of the heart cartilaginous. Burns found the tissue of the ventricles perfectly ossified, so as to resemble the bones of the cranium. Renauldin reported a case to Corvisart of petrification of the heart; and M. Broussais found the organ indurated and like a cocoa nut. M. Bouillaud met with cases in which the fleshy columns and substance of the heart were fibro-cartilaginous in patients from the age of thirty to fifty years. Cartilaginous, osseous, and calcareous productions are sometimes observed in early life, and are preceded by inflammation. It appears probable, that the perpetual friction to which the valves and the arterial parietes are subjected, may account for the developement of cartilaginous, osseous, or calcareous indurations of these parts. Every one knows that pressure and friction on certain parts, as the hands and feet, will cause different kinds of indurations; and this explanation is much more satisfactory than the vague notion that old age produces ossifications or indurations.

DIAGNOSIS OF CARDITIS.

It is impossible to distinguish carditis during life, as it is always found complicated with pericarditis and endocarditis. There is no sign pathognomic of carditis alone. Inflammatory ramollissement of the heart has been observed in persons affected with essential or idiopathic fevers, a circumstance which perhaps accounts for the extraordinary frequency of the pulse which often exists during the convalescence from these fevers. Inflammation of the endocardium, however, would be sufficient to produce the phenomena.

There are no positive diagnostics, then, of simple ulcerations or abscesses of the heart, nor of perforation of the organ, unless the sudden death of the patient. Even this event does not invariably happen.

A perforation may occur in the inter-ventricular or inter-auricular septum, not only without causing death, but even without inducing any violent symptom. In no case, in eighteen, of false consecutive aneurism of the heart, was the disease detected during life. It is, therefore, extremely difficult, even by auscultation and percussion, to establish the diagnosis.

The *causes* and *treatment* of acute and chronic carditis, are precisely the same as of pericarditis and endocarditis.

Inflammation of the cellular tissue of the heart has not been described by any author on the diseases of the centre of the circulation. M. Bouillaud is disposed to think, that the encephaloid cancer of the heart, is nothing but a diseased secretion of the tissue just mentioned.

Cancer and Tubercles of the Heart are of comparatively rare occurrence, and have been accurately described by different authors mentioned by M. Bouillaud. He is disposed to consider these morbid growths the result of inflammation.

Hydatids or Serous Cysts have been found in the heart, and described by numerous authors. Such productions are, however, of very rare occurrence. The origin of these cysts is as yet undetermined. Hydatids have been found in every tissue in the body, and in many organs simultaneously.

HYPERTROPHY.

SPECIES.—1. Simple hypertrophy ; 2. Hypertrophy with dilatation ; (eccentric.) 3. Hypertrophy with contraction ; (concentric.)

SYMPTOMS.—In simple hypertrophy without valvular obstruction, a frequent, firm, and regular pulse, small in hypertrophy with contraction, full in hypertrophy with dilatation ; slight dyspnœa, increased on exertion ; a florid skin, and the appearance of unusually good health. In more severe cases there is increased dyspnœa, flushed countenance and bright eye ; headache, vertigo, hæmorrhage from the nose, or from the hæmorrhoidal vessels ; hæmoptysis, especially when the right side of the heart is affected. In a still more advanced stage, all the above symptoms are increased in severity, and œdema supervenes, usually beginning in the face, and gradually extending to other parts of the body. There is often the most profuse sweating. In the end, the disease is complicated with some visceral disease which is the immediate cause of death.

PHYSICAL SIGNS.—Impulse of the heart greatly increased in force, prolonged and extending over a large space, visible to the eye, and strongly raising the hand of the observer ; the first sound of the heart obscure, when there is little or no dilatation ; louder, more abrupt, and heard over a larger space, where dilatation is at the same time present ; the second sound obscure in the former case, of increased distinctness in the latter. When the palpitations are most violent, there is the bellows sound, but it disappears with repose. On percussion there is dulness, varying with the degree of enlargement, and most extensive where dilatation is combined with hypertrophy. In some instances there is prominence and increased breadth of the

left side of the chest. When the right side of the heart is affected, the dulness on percussion is most marked behind the lower part of the sternum, the venous pulse is strongly marked, the arterial beat little changed. In hypertrophy with dilatation of the left side of the heart, the general symptoms and complications are those of the general circulation ; in disease of the right side, they are those of the pulmonic circulation. When the hypertrophy affects both sides of the heart, symptoms referable to the lungs are combined with those affecting the system at large.

Complications and secondary affections.—Valvular disease, sometimes the cause, at others the consequence, of hypertrophy. Aneurism, hæmorrhage, dropsy, inflammatory diseases, visceral enlargement, headache, cerebral and pulmonary apoplexy.

CAUSES.—Violent exercises, long-continued straining as in gymnastic exercises, strong mental emotions, plethora, obstructions in the large vessels or in the heart itself, long-continued palpitations, inflammation of the lining membrane, or of the pericardium ; chronic diseases of the lungs.

PROGNOSIS.—The disease may continue for many years, and generally proves fatal in consequence of some secondary affections.

TREATMENT.—*Indications.*—1. To lessen the quantity of the circulating fluid. 2. To diminish the irritability of the heart itself.

The first indication is fulfilled by moderate bleedings from a small orifice, repeated at short intervals ; by cupping and leeches to the region of the heart ; by saline aperients, and by strict regulation of the diet.

The second indication requires digitalis given internally in the form of tincture or powder, and in full doses, or applied externally to a blistered surface. (Bouillaud.) If this method be employed a poultice should be kept constantly applied, sprinkled with fifteen or twenty grains of the powder of digitalis. Hydrocyanic acid ; or, in states of great irritability, opium, given internally, or applied to a blistered surface. Mercury has been recommended in small doses, so as to produce slight constitutional effects. The hydriodate of potass has also been recommended. Tartar-emetic and colchicum may be given with benefit. The state of the stomach and bowels should be carefully attended to, as the circulation always sympathises with derangements in the primæ viæ. Counter-irritation by perpetual blisters, or tartar-emetic, or setons, may be resorted to in chronic forms of the disease. Complications and secondary affections must be treated by remedies appropriate to those affections, as diuretics in dropsy, acids and astringents in hæmorrhage, tonics and stimulants in debility.

ATROPHY OF THE HEART.

Laennec found the heart of a man aged fifty-five years as small as that of a child of twelve years. Bouillaud observed the heart of a woman aged sixty-one as small as that of a child of twelve years old. In some cases the substance of the left ventricle was no more than a line and a half in thickness. In other cases the heart lost a third, a fourth, or one-half its natural size. In still more marked cases the ventricle has been found wasted to the thinness of bank paper, and quite transparent.

Signs of Atrophy of the Heart.—The symptoms of atrophy are the reverse of those of hypertrophy. The pulsations of the heart are small and feeble, the bruits which accompany them are indistinct, the shock of the heart is much weaker than natural, and scarcely felt by the hand, and there is scarcely any dulness of sound in the præcordial region. The pulse is small in atrophy without dilatation, and full in atrophy with dilatation. The motions and sounds are extremely feeble and distant on auscultation. The first sound is clear in some cases, but when the disease is extreme, it is inaudible. Atrophy of the heart may exist in cases of general emaciation, but there may be extreme wasting in hypertrophy.

CAUSES.—The causes are local or general. Among the local causes are long-continued compression of the heart by effusion of fluid, by tumors, or by any other mechanical cause; and contraction of the coronary arteries by disease, as ossification, and calcareous or cartilaginous deposits. The general causes are different morbid states, or different conditions which impair the nutrition of the whole body; chronic diseases which induce great emaciation, such as phthisis, cancer, affections of the brain, liver, spleen, uterus, typhoid enteritis, eruptive fevers which do not prove fatal for two or three months, &c.

TREATMENT.—Nutritious aliment,—everything calculated to improve the general health; and the alleviation of such diseases, so far as this can be accomplished, as cause general emaciation. Atrophy of the heart must in general be considered an incurable disease.

DILATATION OF THE HEART.

Dilatations of the heart, until a recent period, were termed aneurisms; dilatation with hypertrophy was called *active*; dilatation with thinness of the parietes, was termed *passive*.

Dilatation of the cavities and orifices of the heart may be *general* or *partial*, and accompanied by thickening or thinning of the parietes. Dilatation with thickening, constitutes aneurismal or eccentric hypertrophy. Dilatation with thinning of the parietes, was termed passive aneurism. Cases are recorded in which the right

cavities of the heart were prodigiously dilated and thinned, and the auricle appeared similar to a transparent membrane. (Fleury, Bouillaud.)

Dilatation may affect one, many, or the whole of the cavities of the heart, and may not be accompanied by hypertrophy, or thinning of the external parietes. In some cases, when complicated with hypertrophy, the heart becomes double or treble its ordinary size, and may become more or less irregular in form and situation.

Partial dilatation of the heart is sometimes preceded by rupture of the internal layers of the parietes of the organ, which is followed by the formation of an aneurismal cyst. The most frequent dilatation is observed in the pulmonary portion of the right ventricle.

Dilatation of the Orifices of the Heart.—M. Bouillaud describes cases in which the auriculo-ventricular orifice was four, and in one case five inches in circumference. It is evident that in such cases the valves cannot perform their functions properly, and there must be more or less derangement of the action of the heart during the passage of the blood through it.

The cavities of the heart, like all hollow organs, dilate when there is any impediment to the course of the blood or other fluid which is to pass through them. Thus, in bad stricture of the urethra, the bladder enlarges; in contraction of the pylorus, the stomach enlarges; and in stricture of the intestine, the tube increases in size above the obstruction. In the same manner, if the valves of the heart are diseased, and offer obstruction to the passage of the blood, the cavity above them becomes enlarged as the accumulation of blood distends its parietes. It is also important to state that the auricles more readily dilate than the ventricles, and the right ventricle more readily than the left. The auricle is distended when the auriculo-ventricular opening is contracted, and the ventricle when the arterial valves are affected. But it often happens, on account of the difference of resistance in the different cavities of the heart, that the cavity nearest to the obstacle is not always the first which is dilated. Thus, when the aortic valves are diseased, the left auricle is often dilated before the left ventricle. It is also to be remembered, that the different cavities of the heart which are closely connected with each other, are often dilated by any great obstacle to the course of the blood through them. Besides the mechanical force, the blood possesses an excitant and irritant power, in consequence of which, the nutrition of the heart becomes frequently increased, so that the same cause of obstruction to the circulation will not only induce dilatation but hypertrophy.

But if hypertrophy does not ensue, the contractility of the heart will be more easily overcome by the dilating power, and the circulation will be greatly diminished and impeded. Hypertrophy is not a constant complication with dilatation of the heart, and in many cases the dilated parietes are thinned; and to this disease the term passive aneurism was applied by Corvisart.

PHYSICAL SIGNS.—Feeble impulse, felt, however, over a greater extent than usual; first sound short and peculiarly distinct, heard over a great extent of the chest both before and behind. In dilatation with hypertrophy, strong impulse with clear sound.

SYMPTOMS.—Pulse large, soft, and very compressible, but regular when there is no valvular disease; palpitation; dyspnæa; habitual cough, with mucous expectoration; hæmoptysis; languid circulation; cold extremities; listlessness, and depression of spirits; countenance pallid, or, in extreme cases, livid and bloated; dull pain in the head; disturbed sleep, the patient often waking in great alarm. Death from coma produced by effusion on the brain, or in consequence of some secondary disease produced by the disordered circulation. (See Hypertrophy.)

CAUSES.—The causes of dilatations or aneurisms of the heart, are all violent exercises, and all trades which require powerful muscular exertion. Thus porters, wheelwrights, paviors, &c. are often affected with this disease. All such causes tend to accumulate the blood in the heart. Powerful mental emotions, such as anger, hatred, jealousy, grief, &c., and the occupations which require the expression of the passions, as those of the tragic actor, the vehement orator, &c., are causes of dilatations of the heart.

Among the causes are deviations of the spine and all vices of conformation, tight lacing, &c., which diminish the capacity of the chest: the latter by compressing the abdomen, and impeding respiration and circulation, induces passive congestions of blood in the brain, lungs, and heart, followed by serous effusion, and often accompanied by a sense of suffocation.

PROGNOSIS.—In the absence of severe complications, of dropsical effusions, or of great debility, favourable but guarded, and much depending upon the treatment to be adopted.

TREATMENT.—*Indications.*—1. To diminish the quantity of the circulating fluid. 2. To ensure repose.

The first indication is fulfilled by small, cautious, and repeated bleeding, general and local; careful regulation of diet, and aperient medicines.

The second indication is answered by bodily and mental rest; all violent exertions of the body and intense applications of mind should be forbidden, and the health be preserved by regular living, gentle exercise, moderation in diet, and constant attention to the secretions, especially those of the primæ viæ. Gentle opiates or sedatives may occasionally be of service to allay irritability. For the treatment of hypertrophy with dilatation, see Hypertrophy.

Partial dilatation or true aneurism of the heart is an equally rare, obscure, and fatal disease. Its general symptoms differ little from those of more general dilatation of the cavities of the heart; the physical signs are equally obscure; the prognosis of the disease, when recognized, is in the highest degree unfavourable, and the treatment similar to that for more general dilatation—small bleedings

to meet occasional symptoms, complete repose of body and mind, and the cautious use of narcotic and sedative remedies.

DISEASES OF THE PERICARDIUM.

HYDRO-PERICARDIUM.

HYDRO-PNEUMO-PERICARDIUM.

HYDRO-PERICARDIUM.

SPECIES.—1. Active, from inflammatory action in the pericardium. 2. Passive from obstruction to the circulation.

SYMPTOMS.—In the case of *active* effusion, the result of inflammatory action, the symptoms of pericarditis are, or have been, present. (See Pericarditis.)

The symptoms of *passive* dropsy of the pericardium are generally obscure. They are a sense of weight and oppression in the præcordia, dyspnœa or orthopnœa, a tendency to syncope, œdema, and a small, frequent, and irregular pulse.

The *physical* signs are, in the case of considerable effusion, striking prominence of the præcordia, with bulging of the corresponding intercostal spaces, extensive dulness, reaching sometimes from nipple to nipple, and nearly the whole length of the sternum; the pulsations of the heart imperceptible in the supine position, and shifting their place in the erect and semi-erect posture; the sounds indistinct in the region of the heart, but more audible at the upper part of the chest; the dulness on percussion varying its situation and extent with the posture of the patient. This part of the diagnosis requires the patient to assume successively the supine, and the erect or semi-erect postures, and to lie on either side.

TREATMENT.—That of dropsies in general, by drastic purgatives, diuretics, &c., modified according to the state of the patient, and existing complications. Paracentesis has been recommended, and in a few cases practised with success. When the disease is dependent upon organic affections of the heart or lungs, such an operation is inadmissible, but when the disease is strictly idiopathic and dependent upon local inflammation, it might be resorted to, after the failure of other means.

Passive Œdema of the Cellular Tissue of the Heart.

The anatomical characters of œdema of the heart are a tremulous gelatiniform matter in the cellular tissue, which, on pressure, is found to be a transparent, serous, limpid, yellowish, or greenish yellow serosity. The infiltrated tissue is opaline, or of a dull white colour, as if it had been macerated in water for some time.

There is no sign by which we can positively recognise this disease of the heart during life; but we may suspect its existence in persons affected with passive general dropsy, which may extend to

every part of the frame, as the basis of every tissue and organ in the body is the cellular tissue.

CAUSES.—Those of dropsies in general, viz. obstacles to the course of the blood, whether mechanical, physical, or vital.

The obliteration of the cardiac veins is a cause of passive hydro-pericardium, or of œdema of the heart. A varicose state of the coronary veins and their branches, and a difficulty of disgorging themselves into the right auricle, was the cause of the disease in persons treated by M. Bouillaud.

Hydro-pericardium may be also induced by the rupture of a serous cyst or hydatid, by circumscribed pleuritic effusion, or even by abdominal tumors. Blood may also be effused into the pericardium.

TREATMENT.—Depletion, diuretics, purgatives, and the usual remedies for dropsy, will be required.

PNEUMO-PERICARDIUM.—HYDRO-PNEUMO-PERICARDIUM.

The pericardium may also secrete gas which is termed *pneumo-pericardium*, and when combined with fluid, *hydro-pneumo-pericardium*.—(Bouillaud.)

The presence of this rare disease is indicated by an extreme degree of resonance of a tympanitic character, in the præcordial region, and by a sound of fluctuation, or a sort of plashing sound. The treatment, if the disease were recognized, would be that of hydro-pericardium.

PHYSICAL AND MECHANICAL LESIONS OF THE HEART.

RUPTURE, WOUNDS, HERNIA.

DISPLACEMENTS AND MALFORMATIONS.

CYANOSIS.

POLYPI.

RUPTURE, WOUNDS, HERNIA.

RUPTURES OF THE HEART.

These are caused by ulcerations, or by the bursting of aneurismal tumors of the heart, and they appear to affect the left cavities more frequently than the right; in the proportion of six of the left, and four of the right; in ten cases. (Bouillaud.) In the last four cases, it was the auricle that gave way. In four of the six first cases, the rupture occurred in the wall of the left ventricle; in one case it affected the mitral valve, and in another the columns of the ventricle. In none of the ten cases were the inter-ventricular and

inter-auricular walls affected. In some cases there was one, in others there were two, three, or five ruptures, (Ollivier, Rostan, Morgagni, Portal, Bland, &c.)

CAUSES.—The causes of rupture of the heart are predisposing and exciting. The predisposing are ramollissement or softening, thinning, abscess, or ulceration. The exciting causes are violent concussions of the body in general, or of the heart; violent and sudden efforts, and in some cases the exertion of walking, riding, laughing, coughing, sneezing, &c.

The mechanism of rupture of the heart is the same as that of the stomach, and uterus, and of the voluntary muscles. Mr. Allan Burns was the first who explained, that rupture of the heart might be caused by violent action of the organ, in the same way as that of the womb, during very violent expulsive contractions, in very difficult parturitions.

SYMPTOMS AND DIAGNOSIS.—When the ruptures of the heart are extensive, there will be a sudden effusion of blood into the pericardium, and in some cases the patient dies as suddenly as if struck with a thunderbolt. M. Rostan describes a case of rupture, in which a coagulum by stopping the opening prevented copious hæmorrhage and sudden death. When the rupture is situated in the partition of the ventricles and the auricles, there will be a mixture of black and red blood; and, according to some authors, cyanosis or the blue disease will be produced.

In other cases there may be rupture of the fleshy columns, valvular tendons or valves, and then there will be more or less disorder of the circulation. MM. Bouillaud and Tarral state that there may be a simple or a sibilant bruit de soufflet; but the former author has heard it when no such lesion existed.

Ruptures of the parietes of the heart, with effusion of blood into the pericardium, are necessarily fatal. Yet this is not the case with those of the inter-ventricular or inter-auricular partition, of the fleshy columns and of their tendons; but the present state of science does not enable us to form an accurate conclusion as to the symptoms or results of the latter diseases. It is scarcely necessary to observe, that there can be no *effectual treatment* for extensive ruptures of the heart; of its fleshy columns or tendons.

WOUNDS OF THE HEART.

Wounds of the heart may be penetrating or not penetrating. They may be complicated with the presence of the foreign substance which inflicts them; as a ball, or a piece of cutting instrument. The best account of them is that of Ollivier, (Dict. de Médecine, in 25 vols. t. viij.) This author describes sixty-four cases, in twenty-nine of which the lesion was in the right ventricle, which forms the most uncovered part of the anterior surface of the heart; the left ventricle was injured in twelve cases; the two ven-

tricles nine times; the right auricle three times; the left auricle once; the apex of the heart seven times; but in three cases the seat of the wound was not described.

A fractured rib may likewise wound the heart.

PROGNOSIS.—The majority of wounds of the heart are suddenly fatal, though in some cases death does not take place for a greater or less period of time. In extensive wounds of the heart, the patient dies as suddenly as if struck with lightning: *quasi fulmine ictus, concidit*, says Diemerbroek in describing the death of a duellist, who was stabbed with a sword through the left ventricle. But wounds of the left ventricle are not always suddenly mortal. Morgagni mentions the case of a man who received a stab of a knife through the anterior part of the left ventricle. There was but a very slight discharge of blood at the moment of the injury. After having walked about sixty steps, the wounded man sat down, and died in about half an hour, while vomiting his dinner. A soldier fell on his bayonet, which penetrated between the sixth and seventh rib on the left side. He survived for forty-nine hours, and expired on the night-chair. A young man was stabbed with a knife under the left breast, and was seized with frequent fits of syncope. He did not expire until the tenth day after the wound was inflicted. There was a penetrating wound of the left ventricle.

According to M. Ollivier, wounds of the left ventricle are most suddenly fatal. He proves that wounds of the auricles are not so suddenly fatal as is generally supposed. On comparing the different cases of wounds of the heart, he states that wounds of the right ventricle are of the most common occurrence, but less frequently mortal.

The cause of sudden death in wounds of the heart is the compression of the organ by effused blood into the pericardium. (Morgagni, Ollivier.) This conclusion is doubted by Bouillaud. Bartholin was of opinion that the straitness and obliquity of the wound tended to retard death. M. Ollivier considers that the direction of the wound is the cause of prevention of sudden death; thus a wound of the left ventricle may only separate the superficial layers of the muscles, and transversely divide those of the deeper layers, and *vice versa*. A transverse wound in relation to these layers will suddenly give rise to a fatal hæmorrhage. Here we should consider the influence of the particular form of the cutting instrument, which traverses the thickness of the ventricular parietes. According to M. Samson, the want of parallelism of the fleshy planes of the heart is the condition which most particularly favours the formation of a coagulum capable of stopping the wound.

These facts are very instructive, not only in a pathological, but in a medico-legal point of view. A case is mentioned by Mr. Guthrie in which a flap of the substance of the heart hung down from the organ, and death did not take place for some time afterwards.

TREATMENT.—Many cases prove that wounds of the heart are not necessarily fatal. The following plan of treatment is proposed by M. Ollivier (d'Angers, *Op. Cit.*) The first indication to be fulfilled is to enfeeble the circulation by copious and repeated bleedings, and to moderate at the same time the movements of the heart with digitalis, &c. It is also necessary, according to the advice of M. Samson, to keep the patient in an atmosphere as cold as possible, and to apply ice to the chest. The most perfect repose should be observed; the patient should be kept quiet in bed, and free from all mental emotions. The external wound should be closed in the usual manner, so as to favour the formation of a coagulum, which would stop up the wound. The most rigid antiphlogistic plan should be enforced. The lowest diet, with nauseating doses of tartarized antimony, are likewise beneficial in such cases.

HERNIA OF THE HEART.

This disease has been observed by different pathologists. Vau-bonais describes a case of a fœtus at the eighth month of pregnancy, in which the heart had escaped through an opening in the superior part of the chest, and hung externally like a medal. Martinez, Besançon, Chaussier, and Breschet, have described cases of hernia of the heart, the accounts of which will be found in the excellent treatise of M. Bouillaud. M. Breschet has termed the disease *ectopia*, and divides it into three species:—1. thoracic ectopia of the heart; 2. abdominal ectopia; and 3. cephalic ectopia.

DISPLACEMENTS OF THE HEART.

The heart may be displaced in different directions by the pressure of different tumors, by large aneurisms or effusions into the left side of the chest, or by enlargement of the spleen, morbid tumors near the diaphragm, or by abdominal effusions. The passage of the stomach or intestines into one side of the chest may also displace the heart. It has been found in contact with the diaphragm, with the spine, in different parts of the left cavity of the chest, and also in the right cavity of the thorax. The diagnosis is simple in such cases, and is readily determined by auscultation, percussion, and inspection.

MAL-FORMATIONS OF THE HEART.

This class of anormal states is most frequently observed in the fœtus during intra-uterine life, and is rarely met with after birth. There may be *acardia* or absence of the heart, absence of one half of the heart; augmentation of the organ termed *bicardia* and *tricardia*; communications between the right and left cavities of the heart, either in consequence of non-obliteration of the foramen ovale, or of anormal perforations between the inter-auricular and inter-ventricular partitions. It is to be lamented that all these diseases are incurable.

CYANOSIS.—BLUE DISEASE.

SYMPTOMS.—A blue colour of the skin, lips, and lining membrane of the mouth; universal coldness of the surface; palpitations; fits of extreme dyspnœa, sometimes almost amounting to asphyxia; faintness, or actual syncope, on slight exertion, or from mental excitement; feeble and irregular pulse; œdema or dropsical effusions.

Anatomical Characters.—A communication between the two sides of the heart, or the two sets of vessels arising from it, with disproportionate strength of the two ventricles, generally combined with narrowing of the pulmonary artery. Extreme contraction of the pulmonary artery alone.

PHYSICAL SIGNS.—A very loud and superficial murmur immediately over the seat of the communication.

PROGNOSIS.—Death during a paroxysm at an early age; in rare instances the patient attains the adult age; and in one case recorded by Louis, the age of 57.

TREATMENT.—Rest of mind and body, pure air, warm clothing, strict diet, careful attention to the state of the stomach and bowels, cautious treatment of complications.

CONCRETIONS OR POLYPI IN THE HEART.

Coagulation of the blood in the heart and in some of the large blood-vessels may occur during life, and give rise to concretions, which were formerly termed polypi. These are now generally divided into two classes, the recent or amorphous, and those of long duration, which are more or less organized. M. Bouillaud has detailed the histories of several cases, and he divides them into three species:—1. the recent or amorphous concretions, developed during the agony of death, or in a very short time after death; 2. concretions which have undergone the first degree of organization; and 3. those that are perfectly organized.

M. C. J. Legroux gives a very full account of concretions developed during life, in a work expressly on the subject.*

RECENT, OR AMORPHOUS CONCRETIONS, WITHOUT ANY EVIDENT TRACE OF ORGANIZATION.

M. Bouillaud describes two remarkable cases of this disease, which were preceded by a sensation of sudden suffocation, and followed by sudden death. The first was that of a man aged fifty-seven years, who laboured under disease of the heart, with paroxysms of orthopnœic respiration, and who expired suddenly. During the fits of extreme difficulty of respiration, the pulsations of the

* *Recherches sur les Concretions Sanguines, dites Polipiformes développées pendant la Vie.* Paris, 1827.

heart were strong, irregular, and dull; whilst in the moments of calm they were very sonorous. Copious blood-letting afforded immediate relief. Death, however, finally took place during a paroxysm, and amidst the agonies of suffocation. The cavities of the heart contained enormous clots of black fibrinous blood, and the largest was in the right auricle.

The second case was that of a child treated for acute bronchitis, which was attended with orthopnœa, lividity of the lips and cheeks, jactitation, and inexpressible agony. The pulsations of the heart were precipitate, irregular, and slightly sonorous, and there was a dull shock behind the sternum, with a feeble pulse. Death took place in a few hours. The left cavities of the heart contained clots of blood, and the right cavities were filled with a fibrinous clot of a citrine colour, semi-transparent, and interlaced with the fleshy columns of the heart and valvular tendons, and which extended into the pulmonary artery and into the superior and inferior cava.

SANGUINE CONCRETIONS WITH RUDIMENTS OF ORGANIZATION, WITH OR WITHOUT THE PRESENCE OF PUS.

These resemble pseudo-membranous matter, the result of inflammation. M. Bouillaud relates eleven cases of this description, the results of which were the following. The first case was that of a man aged sixty-seven years, affected with double pneumonia, with extreme orthopnœa. The concretions were similar to false fibrinous membranes—commencing organization on the fleshy columns and valvular tendons. The second case was that of a woman aged eighty-six years, whose right ventricle contained semi-fibrous concretions. Another patient laboured under acute pleuritis, one under acute rheumatism, one under disease of the heart with venereal disease, and others under cerebral disease, typhoid enteritis, and urinary abscess.

FIBRINOUS CONCRETIONS ENTIRELY ORGANIZED.

A girl aged eighteen years, affected with a large tumor of the shoulder and in the axilla, was seized with hæmoptysis. The right auricle of the heart was filled to a great extent with a concretion, in the centre of which there were vesicles filled with a semi-concrete matter. This concretion was traversed by an infinity of vessels, injected with red and black blood. It extended into the superior vena cava, and the right subclavian and jugular veins, with the parietes of which it was confounded as if by continuity of tissue. It was also prolonged into the right ventricle.

Another well-marked case was that of a man aged thirty-six years, who was supposed to labour under aneurism of the heart. The right cavities of the organ contained clots of blood and a fibro-albuminous organized substance, adherent to the parietes of the

cavity by filaments which required to be torn to separate them, and they were prolonged into the vena cava superior, and also into the pulmonary artery, the orifices of which they almost completely obstructed.

Situation and Anatomical Characters of Polypi of the Heart.

Polypi are most frequently found in the right cavities of the heart, and in the auricles more than in the ventricles. The reason of this is, that the course of the blood is more easily arrested in the right than in the left cavities of the heart, and that phlebitis more frequently extends to the right than to the left side of the heart, and perhaps there is a more marked disposition to coagulation in venous than in arterial blood.

The anatomical characters of concretions vary very much. Thus the recent ones do not differ from a clot of blood in a common vessel after venæsection; and the quantity in the cavities of the heart has amounted to twelve ounces, (Bouillaud,) of which, however, some clots were formed after death. The organized concretions present different characters. In the first stage of their formation they are whitish, analogous to gluten or prepared fibrin, elastic and slightly adherent to the parietes of the cavities of the heart, to the fleshy columns and valvular tendons, round which they are entwined. At this period of rudimentary organization, they may be compared to the buffy coat on the blood drawn during acute inflammation, or to the false membranes formed on the surface of serous membranes. In fine, there are intermediate degrees from the gelatiniform to the fibrous state, which appears to be the last term of density of concretions. (Legroux.)

When the concretions are in a more advanced state of organization, they adhere by real cellular tissue to the parts on which they are formed, and, thus engrafted on living parts, they penetrate the vessels, become hardened, and closely resemble certain fibrous polypi, fungous vegetations, and tumors. M. Legroux has found concretions so intimately connected with the valves, that it was difficult to determine whether they were formed by the blood in the cavities of the heart or secreted by the inflamed tissue. In some cases there is a quantity of pus in the centre of the concretions, and these then resemble real unilocular or multilocular cysts. In other examples there are whitish, glutinous, membranous masses, which are the first lineaments of organization. Some ascribe the pus in concretions to inflammation of the concretions themselves, (Legroux and others,) while Bouillaud is of opinion that it is secreted, and then surrounded by the clot; but this able author does not deny that sanguine concretions may inflame and suppurate. These concretions may undergo various transformations, and they diminish the cavities and orifices of the heart according to their size. It is important to recollect this fact, for it is to it that the principal symptoms of concretions in the heart are to be ascribed.

Causes and different Modes of Formation of Polypi in the Heart.

Polypi are developed in the heart, arteries, and veins, under the influence of purely physical and mechanical conditions, which oppose the circulation of the blood, and also by causes which act chemically on this *fluid flesh*. In the first case, concretions are formed by a mechanism similar to that of coagulation of the blood after it has escaped from the vessels, but this process is as yet unexplained. If we practise venæsection at the approach of the agony of death, or in those diseases of the valves or orifices of the heart which oppose a great obstacle to the circulation, the blood will be thick and semi-concrete on flowing from the vein. It is, therefore, to the concretion of the blood in the cavities of the heart and to the formation of polypi that many cases of sudden death are to be ascribed in certain diseases of this organ.

As to the chemical and vital causes of sanguine concretions, "a kind of crystallization of the blood," the principal are, primitive or consecutive inflammation of the internal membrane of the heart, (endocarditis,) and the introduction of different foreign substances into the circulation, as pus, for example. M. Bouillaud is disposed to believe that in febrile and inflammatory diseases in which there is a buffy coat on the blood, there is a strong predisposition to fibrinous concretions of the heart, which strongly resemble, in their incipient stage of developement, the inflammatory coat of the blood; and he is convinced of this by the fact, that in almost all cases of concretions which he has met with not caused by an obstruction to the course of the blood through the heart, they occurred with an idiopathic inflammation of the heart, or with an inflammation of some other organ, which powerfully reacted on the heart, or on the whole of the circulating system.

Symptoms of Polypi of the Heart.—These vary with the situation of these substances. They will necessarily produce more or less impediment to the circulation of the blood through the heart, difficulty of breathing, headache, symptoms of apoplexy, &c. When they occupy the right cavities of the heart, which is the most common occurrence, the blood enters the lungs, but in small quantities; it reflows into the vessels situated behind the obstacle; it engorges all parts, but especially those that are most vascular, as the brain, the liver, &c. Hence hæmorrhages and congestions, serous effusions in the head, abdomen, and chest. When, however, the different parts of the body receive but a small quantity of blood, which has been submitted to the air in the lungs, the phenomena of asphyxia are produced.

The disorders are almost similar, when concretions obstruct the passage of the blood through the left cavities of the heart. But in this case there will be congestion of the pulmonary veins, which cannot disgorge themselves freely into the left auricle, and hence

will arise a degree of dyspnœa which does not happen in concretions of the right cavities.

Concretions in different parts of the cavities of the heart will impede the circulation of the blood in different degrees, and those connected with the valves will most obstruct it.

The symptoms of polypi, then, are tumultuous beatings of the heart, with obscurity of the bruits which accompany them, a simple or sibilant bruit de soufflet, a sense of suffocation, orthopnœa, anxiety, followed by venous congestions, and, in some cases, coma, stertorous breathing, with or without convulsions, smallness of the pulse, coldness of the extremities. When these symptoms supervene during acute pericarditis, endocarditis, or carditis, it is extremely probable that concretions are being formed in the cavities of the heart.

PROGNOSIS.—Supposing the existence of these formations to be ascertained during life, the prognosis of polypi would be most unfavourable, for they sooner or later prove fatal, especially when they are large and considerably obstruct the course of the blood.

TREATMENT.—Copious depletion and other antiphlogistic measures, as in pericarditis; the free use of tartarized antimony, and of the neutral salts of soda and potass, which are supposed by some to exercise a solvent power on the blood, (Legroux, Stevens, Cameron, &c.) Bouillaud entertains the opinion that recent concretions may be dissolved and carried into the blood-vessels; but that when they are organized they are incurable. But it remains to be determined whether the use of the hydriodate of potass might not cause their absorption, as it does of other adventitious growths.

CHAPTER IX.

DISEASES OF THE ORGANS OF RESPIRATION.

1. Of the larynx and trachea.
2. Of the bronchial-tubes and air-cells.
3. Of the substance of the lungs.
4. Of the pleura.

DISEASES OF THE LARYNX AND TRACHEA.

LARYNGITIS.	.	.	.	.	Inflammation of the larynx.
TRACHEITIS.	.	.	.	.	Croup.
LARYNGISMUS STRIDULUS.	.	.	.	.	Crowing inspiration.

LARYNGITIS.—INFLAMMATION OF THE LARYNX.

Species.—1. *Acute.*—2. *Chronic.*

ACUTE LARYNGITIS.

SYMPTOMS.—After rigors, followed by pyrexia, and usually by some degree of inflammation in the tonsils; there is hoarseness; a husky and convulsive cough; pain in the larynx, generally increased by pressure, with a sense of constriction in that part, and constant hawking of glutinous mucus; the respiration difficult and sonorous; the act of swallowing is painful, and often followed by convulsive fits, coughing and dyspnœa. There is inflammatory fever, with flushed face, hot skin, full and hard pulse. The fauces are generally red and swollen; and, if the tongue be pressed downwards and forwards, the epiglottis may be seen thickened and inflamed. These symptoms are followed by others of greater severity and more formidable character. The countenance becomes pale and anxious; the lips livid; the eyes staring and watery; the nostrils expanded; the pulse frequent, feeble, and irregular; the voice reduced to a whisper, or lost; the throat often œdematous. There is extreme restlessness; jactitation; urgent fear of suffocation; sleeplessness, or, if the patient doze, he wakes in a dreadful agitation, gasping and struggling for breath. Delirium and coma ensue, and death takes place in from four to five days, or the patient dies at an earlier period asphyxiated.

ANATOMICAL CHARACTERS.—Injection and thickening of the lining membrane of the larynx, with œdema of the submucous cellular tissue; the glottis and epiglottis red and swollen, and containing serum, sero-purulent fluid, or pus; œdema of the surrounding cellular membrane. In some cases, œdema of the glottis is the only post-mortem appearance.

CAUSES.—*Predisposing.*—Previous attacks of cynanche tonsillaris, intemperance, abuse of mercury, frequent, and long-continued exertions of the voice; the adult age. *Exciting.*—Exposure to wet and cold; extension of inflammation from the tonsils or salivary glands; swallowing scalding or corrosive liquids; inhaling acrid gases or hot air; extension of inflammation in erysipelas, scarlatina, small-pox, and measles.

DIAGNOSIS.—From diseases of the chest by the local affection, and the absence of the physical signs of those diseases; from spasmodic affections of the larynx by the presence of fever and local pain, and by the gradual progress of the disease; from tracheitis, by the peculiar stridulous voice, and the absence of the croupy inspiration.

PROGNOSIS.—Most unfavourable; more so when the disease has already lasted some time, with an increase of the symptoms, when

the dyspnœa is extreme, the convulsive fits of frequent occurrence, the face livid, the circulation languid, and the head affected. On the other hand, a decrease of dyspnœa, a free expectoration, an improved aspect of countenance, and greater ease in swallowing, are favourable signs.

TREATMENT.—1. To reduce inflammatory action, and prevent effusion. 2. Effusion having taken place, to promote the absorption of the effused matter. 3. In extreme cases, to remove the mechanical obstruction to the respiration.

I. Inflammatory action can be reduced and effusion prevented only by the most prompt and active measures. Bleeding to the *approach* of syncope, repeated if necessary, and followed by tartarized antimony, in combination with calomel and opium in full doses. We may give two, three, or four grains of calomel, with from an eighth to a sixth of a grain of tartarized antimony, and a third or half of a grain of opium every one, two, or three hours, according to the urgency of the symptoms. The object of this treatment is to reduce inflammation by means of the tartar-emetic, to supersede inflammatory action by inducing salivation as speedily as possible by the mercury, and to soothe existing irritation by the opium. The local treatment in the early stage, consists in leeches to the throat. (Counter-irritants should be reserved for the more advanced stages of the complaint.) Rough ice should be held in the mouth, and applied around the throat. Would not this prove the most effectual remedy in the early stage?

II. The second indication is fulfilled by mercury and by that alone. This remedy should be resorted to without loss of time. It may be taken internally, and rubbed in at the same time. When effusion has actually taken place, bleeding is of little use, except to counteract urgent symptoms which may supervene. Counter-irritation may now be employed with advantage in the form of blisters, acetum cantharidis, or strong ammonia to the side of the neck. Where laryngitis supervenes on other diseases the treatment must be appropriate to both complaints, and be modified according to the state of the system.

III. The mechanical effects of the inflammation and effusion can be obviated, and the obstruction to the respiration removed only by making an opening into the larynx or trachea. This operation should not be delayed too long. When, in spite of remedies, the dyspnœa increases rapidly, and there is urgent danger of suffocation, an operation should be resorted to without loss of time. A free incision is recommended between the thyroid and cricoid cartilage; after the operation the edges of the opening must be kept separated, so as to admit the free passage of air.

CHRONIC LARYNGITIS.

SYMPTOMS.—Hoarseness, sometimes increasing till the voice is

reduced to a whisper, or quite lost; dry, husky cough; pain or soreness in the larynx, increased by lateral compression or backward pressure. The cough is brought on by any unusual exertion, or by the inhalation of cold air, and is accompanied in the first stage with scanty mucous expectoration; in more advanced cases, and where ulceration is present, with pus, mixed with streaks of blood; or there is a sort of sanious fetid expectoration. In confirmed cases, dyspnœa is an invariable attendant, coming on generally in paroxysms, and leaving the patient nearly free in the intervals. In the last stage of the disease, the dyspnœa is increased to orthopnœa, obliging the patient, during the fits, to sit up in bed. In the intervals of the paroxysms the breathing has a peculiar hissing sound. The patient does not long survive the appearance of orthopnœa, and generally dies asphyxiated.

ANATOMICAL CHARACTERS.—Inflammation and its consequences in the mucous and submucous textures of the larynx; enlargement of the mucous follicles; œdema; ulceration of the mucous membrane; ossification, or caries of the cartilages.

CAUSES.—The acute form; catarrh; indulgence in spirituous liquors; excessive exertions of the voice; injuries to the larynx; the inhalation of air loaded with dust, or irritating particles of matter; syphilis; the abuse of mercury; tuberculous matter deposited in the mucous membrane of the larynx. Ulceration from this cause occurred in about a fourth of the cases of phthisis quoted by Louis.

DIAGNOSIS.—The permanent change of the voice, the cough, the hissing breathing, and the pain or tenderness in the larynx, will serve to distinguish this from other forms of disease. The tuberculous variety may often be distinguished from the effect of simple inflammation or relaxation, by the co-existence of the symptoms and physical signs of phthisis. (See Phthisis Pulmonalis.)

PROGNOSIS.—This will depend on the history of the case. The absence of signs of disease of the chest is favourable; as is also its evident dependence upon some mechanical cause, or on syphilis. The continuance of the symptoms without intervals of freedom is highly unfavourable.

TREATMENT.—*Indications.*—1. To reduce the chronic inflammation. 2. To promote the absorption of effused fluids. 3. In cases of relaxation of the mucous membrane, to restore tone to the part. 4. To relieve urgent symptoms. 5. To improve the general health.

1. The chronic inflammation of the larynx may be subdued by the repeated application of a few leeches to the upper part of the throat, and by counter-irritants, such as blisters, mustard-poultices, and tartar-emetic ointment. The part itself should, at the same time, be kept at rest, the patient being prevented from talking more than is necessary, and never above a whisper.

2. To fulfil the second indication, the promotion of absorption, mercury should be given in small doses so as to affect the mouth, or the hydriodate of potash in five-grain doses three or four times a day.

3. To restore the tone of the relaxed mucous membrane, various remedies have been recommended: the inhalation of steam holding some gentle stimulant in solution, as ammonia, camphor, turpentine, or one of the balsams; or the still stronger stimulants, applied directly to the part in a liquid or solid form. Nitrate of silver, corrosive sublimate, and sulphate of copper, have been recommended for this purpose. The preference should be given to the nitrate of silver, which may be used in the proportion of one or two parts in four of water, applied by means of a roll of paper or a piece of sponge to the epiglottis, or injected by means of a syringe. If solid substances are preferred, they must be used in the form of an impalpable powder, and drawn into the larynx through a tube. Trisnitrate of bismuth; or calomel with twelve times its weight of sugar; or red precipitate, sulphate of zinc, and sulphate of copper, mixed with thirty-six times their weight of sugar; alum with twice its weight; and acetate of lead with seven times its weight; are the remedies recommended by MM. Trousseau and Belloc. (See Lib. Pr. Med., vol. iii. p. 51.)

4. The urgent symptoms consist chiefly in paroxysms of dyspnoea or convulsive cough. These may be relieved by narcotics and sedatives, as opium, æther, camphor, belladonna, or stramonium, inhaled or given internally. Where urgent symptoms are found to admit of no relief, an operation may be necessary.

5. The improvement of the general health may be brought about by the usual remedies, such as tonics, especially steel, nourishing and wholesome diet, bracing air, the cold or shower-bath, and strict attention to the stomach and bowels, and to the state of the secretions generally.

TRACHEITIS.—CYNANCHE TRACHEALIS.—THE CROUP.

SYMPTOMS.—The disease generally creeps on imperceptibly, beginning with hoarseness and wheezing, short, dry cough, and sometimes a rattling in the throat during sleep; restlessness, the child often raising the hand to the throat; the difficulty of breathing increases, and at length becomes indescribably anxious; the face is flushed, and the veins of the neck varicose; the voice, in speaking and coughing, acquires a shrill and peculiar sound, similar to the crowing of a cock, or to the noise which a fowl makes when caught in the hand. The sound of inspiration at first resembles the passing of air through a piece of muslin; afterwards as through a metallic tube. At the commencement of the disease the cough is dry; soon, however, a viscid matter is brought up, with portions of film or membrane of a whitish colour; and the efforts made to ex-

pectorate these are often so distressing as to endanger strangulation. It is accompanied with the symptoms of inflammatory fever. It most frequently terminates fatally about the second or third day, when the patient expires from suffocation.

ANATOMICAL CHARACTER.—Inflammation of the lining membrane of the trachea, and the consequent formation of a false or adventitious membrane, which may extend from the trachea into the bronchi, and become so thick as to fill the wind-pipe, and cause suffocation. Large portions of this matter, bearing the shape of the tube, have been expelled by vomiting. The inflammation generally extends upwards to the larynx as well as downwards to the bronchi.

CAUSES.—*Remote and predisposing.*—Its attack is mostly confined to children between the age of three and thirteen years. It is more frequent in low and damp situations, and on the sea-shore. It may be induced by any of the causes of inflammation. It has been epidemic, and is by some supposed to be contagious.

DIAGNOSIS.—The peculiarity of breathing, of speaking, of coughing above described, are the pathognomonic symptoms.

From the convulsive asthma of children.—This disease attacks children of the same age, and is attended with symptoms much resembling those of cynanche. Distinguished by its consisting of repeated paroxysms, having an interval of twelve or fifteen hours; by the attack being more sudden, and not at first attended with fever; by being unattended with expectoration; by the respiration, though equally sonorous, having a much deeper sound.

PROGNOSIS.—*Favourable.*—Early and copious expectoration, the breathing not much impeded, the voice little changed, the febrile symptoms moderate.

Unfavourable.—Vast anxiety, anxious difficulty of breathing, violent fever, the sound of the voice becoming more acute, no expectoration.

TREATMENT.—*Indications.*—The same as obtain in all the phlegmasiæ.

They are best fulfilled by,

1. General and topical bleeding from the arm or jugular vein, and by the application of leeches to the larynx and trachea.

2. Emetics in full and nauseating doses, especially ipecacuanha, squills, or tartar-emetic, which is perhaps the most certain of all, and the least objected to by young persons.

3. Cathartics of neutral salts or submuriate of mercury.

4. Blisters to the neck, kept open by the use of the unguentum cantharidis, or unguentum sabinæ.

5. Submuriate of mercury, so administered as to excite salivation, has been successfully employed, and is one of the best remedies.

If the bowels are soon purged and the motions are green, the submuriate of mercury must be discontinued, and mercurial oint-

ment rubbed into the thighs or axillæ, if the inflammation is not abated. Dr. Hamilton, however, has given calomel in repeated and successive doses to children, to the amount of one hundred and eighty grains, with success, and he advises it to be continued until the alvine dejections become green, like spinach.

6. Strong decoction of senega, frequently taken into the mouth in small quantities, has been successfully used to promote a separation of the films of the coagula. Others recommend a strong solution of alum, or nitrate of silver; but the former is generally preferred.

Venæsection; leeches along the trachea; an emetic; the warm bath; a sinapism to the throat for a quarter of an hour; and repeated doses of calomel, in combination with tartar-emetic, form the principal items of the treatment. In infants, leeching is generally successful; but should cerebral or pulmonary congestion supervene, we must abstract blood from the neck and thorax, place the patient in a warm bath when the brain is congested, and at the same time apply cold water to the head; but especially while the body is in the bath. When there is bronchitis, we leech and blister the chest.

In either case, sinapisms or blisters should be applied to the legs; and when children are affected, the former should not be left on more than five or ten minutes; and the latter about three hours.

The great danger arises from the formation of false membrane; and this is to be prevented by local and general bleeding, with the other remedies described. The blister should be applied along the trachea; and, in bad cases, mercurial inunction over the angles of the jaws has been employed with success. When all fail, tracheotomy must be employed. Even this, however, will fail in the majority of cases, as the inflammation extends to the bronchial tubes which are filled with false membrane.

Sir James Murray has proposed an improved mode of performing this operation. On laying bare the cartilaginous rings of the trachea, they are raised with a hook, and a lozenge-shaped piece is removed with a scissors or bistoury. Mr. Carmichael has repeatedly performed the operation in this manner, in laryngitis and in chronic ulceration of the larynx, and with success.—*Dublin Medical Journal*, Nov. 1832.

LARYNGISMUS STRIDULUS.—SPASMODIC CROUP.— SPASMODIC ASTHMA OF CHILDREN.

HISTORY AND SYMPTOMS.—Croupal respiration may supervene on cerebral diseases, and was designated by Dr. Clarke “a peculiar species of convulsion in infant children.” It is also described by Dr. Cheyne, in his work on Hydrocephalus, “as consisting in a crowing inspiration, with purple complexion, not followed by

cough ;" the muscles were rigid, the thumbs clenched in the hands, the extremities livid and swollen, and general convulsions supervened. It proved fatal in seven cases. Change of air and diet are strongly advised. This disorder occurs during sleep; the child starts suddenly, the respiration becomes laborious and difficult, the face purple, convulsions supervene, and death is produced by asphyxia. One of the best accounts of this affection is that by Dr. Marsh, in the Dublin Hospital Reports, 1830, v. 5, in which several cases are described under the terms, "A peculiar Convulsive Disease affecting Young Children, which may be termed Spasm of the Glottis." It was called spasmodic asthma of children by Miller and Parr.

PATHOLOGY.—Dr. Ley has given a new view of the pathology of this disease, which he has termed Laryngismus Stridulus. He gives an elaborate account of all the writers who have treated of it, and adds the history of numerous cases which fell under his own care with the morbid appearances. In his opinion, the cause of croupal inspiration is a diseased condition of the bronchial and cervical glands, producing irritation of the eighth pair and recurrent nerves. It is remarkable that the author makes no mention of the hydriodates of potass and iron, in this disease, and only employed aperients, tonics, and narcotics. (*An Essay on Laryngismus Stridulus or Croup-like Inspiration of Infants*, 1836.)

DIAGNOSIS.—"The disease," says Dr. Marsh, "is essentially different from every form and variety of croup; it is purely a spasmodic affection, and in all its stages is characterised by convulsive movements, partial or universal, and in its earlier stages all its symptoms will be aggravated, if it be confounded in treatment with any inflammatory affection of the larynx or air tubes. I do not find it described in any systematic work in the English or French languages."

TREATMENT.—Warm bath, cold to the head while the child is in the bath, venæsection, leeches to the larynx, ammoniated liniment to the base of the skull and neck. Change of air and of diet are strongly recommended, and, during the violence of the paroxysm, an infusion of five grains of tobacco leaves in six ounces of water was administered with the best effects. The disease occurred in three cases in a newly-painted house. Dr. Marsh thinks the disease arises from irritation or vascular congestion at the origin of the pneumogastric or eighth pair of nerves. Dr. Monro, in his Morbid Anatomy of the Brain, attests this pathology. The affection is most common in strumous habits. It is confined to the muscles of the larynx, and the treatment consists in improving the general health, and giving tone to the nervous system. The disease is described by Dr. Kellie of Leith; (*Edinb. Med. Journ.*, 1815;) by Porter on the Pathology of the Larynx and Trachea; Pretty (*Lond. Med. and Phys. Jour.*, v. 45); and Richter, Specielle

Therapie. In most cases, nothing will be necessary during the paroxysm but sprinkling the face with cold water, or blowing cold air into the ear. In the intervals all causes of irritation must be removed, and the general health carefully attended to. Stronger remedies will be rarely required.

Spasmodic diseases of the larynx, marked by croupy respiration, convulsive cough or loss of voice, are of frequent occurrence in females, and belong to the long list of anomalous affections which are apt to occur in hysteria. They must be treated in the same way as other hysteric symptoms.

DISEASES OF THE BRONCHIAL TUBES AND AIR CELLS.

CATARRHUS.	.	.	.	.	.	Catarrh.
CATARRHUS EPIDEMICUS.	.	.	.	.	.	Influenza.
BRONCHITIS.	.	.	.	.	.	Bronchitis.
ASTHMA.	.	.	.	.	.	Asthma.
PERTUSSIS.	.	.	.	.	.	Hooping Cough.
EMPHYSEMA.	.	.	.	.	.	Emphysema.

CARTARRHUS.—CATARRH.

Acute catarrh, or what is commonly called "a cold," is a febrile affection, complicated in the majority of cases with inflammation of one or other of the mucous membranes. If confined to the mucous membrane of the eyes and nostrils, it is called *coryza*, or *a cold in the head*; if it extend to the bronchial tubes, it is termed *bronchitis*; if it attack the mucous membrane of the bladder, it becomes a *catarrhus vesicæ*. Sometimes the inflammation, instead of attacking the mucous membrane of the air-passages, affects that of the alimentary canal, and is attended with sickness and diarrhœa, or with both together, assuming the form of gastritis, enteritis, or gastro-enteritis mucosa. Its essential characters, therefore, are, an increased secretion of mucus from the mucous membrane of the nose, fauces, bronchi, intestinal canal or bladder, attended with pyrexia.

SYMPTOMS.—Pyrexia; weight and pain in the head; oppression of the chest, and impeded respiration; sense of fulness and stopping up of the nose; watery inflamed eyes; coryza; cold shiverings, succeeded by transient flushes of heat; soreness of the fauces and trachea; cough; pains about the chest; rheumatic pains in the back, neck, and head; increased secretion of mucus from the mucous membrane of the nose, fauces, bronchi, &c. It may be acute or chronic: when it assumes the chronic form, the symptoms are those of inflammation of the mucous membrane originally affected. As this is most frequently the mucous membrane of the air-passages, catarrhus and bronchitis are frequently treated as sy-

nonymous terms. The term catarrh is here used to designate a febrile affection, complicated with inflammation of one or other of the mucous membranes; those inflammations being afterwards treated as separate diseases.

CAUSES.—*Remote*.—Cold applied to the body; contagion?

PROGNOSIS.—It is seldom attended with immediate danger, but often lays the foundation for serious diseases.

TREATMENT.—*Indication*.—To reduce the existing fever and allay irritation.

If the fever run high, the best remedy is tartar-emetic in nauseating doses and at short intervals, with cooling drinks and saline purgatives; but where the fever is inconsiderable, or the cold stage still continues, an opposite plan of treatment will be equally effectual, and the above indication may be fulfilled by ten grains of Dover's powder given over night, followed by the pediluvium, a basin of warm gruel, and a hot bed. By these means a profuse perspiration is excited, which effectually removes the febrile action. The Dover's powder may be followed up next morning by a brisk aperient. A large draught of cold water will often effectually remove a common cold. The treatment of the accompanying inflammation must vary with the mucous membrane affected. If the symptoms are those of coryza in the severe form, relief may be obtained by holding the head over the steam of hot water, or bathing the eyes repeatedly with warm water. For the remedies appropriate to the other inflammations, see the diseases themselves.

CATARRHUS EPIDEMICUS.—INFLUENZA.

SYMPTOMS.—Rigors, lassitude, weariness, severe pains in the head, back, and loins, followed by flushing, feeling of weight in the head and oppression at the chest, redness and suffusion of the eyes, sneezing and tingling at the nose, with an acrid discharge from the nostrils, redness and soreness of the fauces and tonsils, a frequent short cough, with expectoration, at first of a thick, viscid mucus, afterwards of opaque, muco-purulent, or purulent matter. The pulse is small and frequent at the commencement of the disorder, and towards the decline often becomes slow, and sometimes irregular. There is loss of appetite, nausea, or vomiting, a furred tongue, the urine scanty and turbid, the skin at first hot and dry, afterwards covered with profuse perspiration. With these symptoms there is extreme prostration of strength, loss of energy, and depression of spirits. Sometimes there is extreme debility without accompanying local symptoms.

TERMINATIONS AND COMPLICATIONS.—Bronchitis, pneumonia, pleuritis; inflammation of the brain or its membranes; muscular and articular rheumatism; cynanche tonsillaris; diarrhœa and dysentery; skin disease; erysipelas; typhus.

CAUSES.—The disease is epidemic, and dependent upon some peculiar condition of the atmosphere.

DIAGNOSIS.—From common catarrh by the greater prevalence of the complaint, and by the extreme debility which attends and follows it.

PROGNOSIS.—Rarely fatal to the young and robust, unless it is complicated with very severe local affections; dangerous to the feeble and aged.

TREATMENT.—In mild cases, that of catarrh; in severe ones, stimulants, combined with opiates, and local treatment appropriate to the existing complication. General blood-letting is contra-indicated, except in very rare instances, the local remedies being generally sufficient to remove or mitigate any symptoms which may occur. The state of the bowels should be carefully attended to, and the diet must be strictly regulated. Throughout the treatment it must be borne in mind that the debility is real, not the result of oppression of the nervous power, but a depression of strength. For the treatment of the local complications, see the several diseases themselves.

BRONCHITIS.

SPECIES.—1. Acute. 2. Chronic. 3. Bronchitis, vel catarrhus, senilis.

SYMPTOMS.—*Acute bronchitis.*—The general symptoms are those of catarrh in its most severe form, or they are those of common continued fever. The symptoms referable to the chest, are oppression and sense of constriction, rarely attended with actual pain within the chest, but often combined with muscular pains, which are a part of the original catarrh or the consequence of the effort of coughing; the pain is not increased by a deep and slow inspiration. There is dyspnœa, increased by exertion and cough, attended with expectoration, which is scanty at first, then more copious, of a white glairy appearance resembling white of egg; in still more advanced stages it is muco-purulent or purulent, and sometimes tinged with blood. The symptoms are generally more severe towards evening, when there is an increase of feverish symptoms. In favourable cases, the severity of the symptoms abates between the fourth and eighth day; the dyspnœa subsides, the expectoration gives more relief, the febrile symptoms disappear, and the patient recovers, or the disease passes into the chronic form. Acute bronchitis often occurs in children: its most severe and urgent form has received the name of suffocative catarrh.

Chronic Bronchitis.—Is the sequela of the acute form, or commences as a common cold in the young and middle-aged, and continues a month or two. In the middle-aged, or old persons, it returns every winter with increased severity, and reappears for several years in succession, in which case it is called winter cough.

When the mucous membrane secretes freely, and the breathing is difficult, the disease is called humoral asthma. The expectoration may be copious or sparing, and of all characters, even purulent; being sometimes inodorous, at others extremely fetid. It varies in colour and consistence. In severe cases there is dyspnœa or orthopnœa, and great pulmonic congestion. The pulse is commonly small and feeble, and there is often great prostration of strength, in which case the secretion of the lungs is expectorated with difficulty, and the patient may die suffocated. When great debility is present, the disease receives the name of *Asthenic bronchitis*, or *peripneumonia notha*.

BRONCHITIS or CATARRHUS SENILIS.—This, as the name implies, is a disease of advanced age. Its symptoms are dyspnœa, wheezing, cough, orthopnœa, abundant mucous expectoration, drowsiness, extreme debility, cold extremities. The patient expires slowly and without suffering, suffocated by the accumulated mucus which he has no longer strength enough left to expectorate. It generally occurs in more than one winter in succession before it proves fatal.

PHYSICAL SIGNS.—Sound on *percussion* clear, or slightly duller than natural. Sonorous and sibilant rhonchi in the first stage, followed by the mucous and submucous rhonchi. These sounds are often heard without applying the ear to the chest. The death rattles are caused by an accumulation of mucus in the bronchial tubes.

Anatomical Characters.—Redness of the tracheal or bronchial mucous membrane to a greater or less extent. This redness is observed most commonly at the termination of the trachea, and in the first *division* of the bronchi. There may be purulent expectoration though the mucous membrane appears perfectly healthy.—*Bayle and Andral*.

Effects of Bronchitis.—The effects of chronic bronchitis are partial or extensive dilatation of one or several bronchial tubes, evidenced by bronchophony; or, where the dilatation is partial and of considerable extent, by pectoriloquy. These sounds are heard, either over the site of the larger bronchial tubes, or in parts of the chest in which it should not exist.

Another effect of bronchitis is emphysema. The disease may also become converted into pneumonia. Diseases of the heart may follow the long continuance of bronchitis. Dyspepsia is a common accompaniment of the chronic form of the disease. Ascites and anasarca supervene in the last stage of bronchitis.

TREATMENT.—This will vary with the form of the disease. In very acute attacks, occurring in persons previously in strong health, general blood-letting, followed by tartar-emetic in nauseating doses, may be necessary. When the disease is less severe and the general health is impaired, local depletion, followed by counter-irritants to the chest, will be required, and the compound squill pill, alone or

in combination with extract of conium, given three or four times a day. When the cough comes on in fits, a lozenge containing a sixth of a grain of extract of stramonium often proves serviceable. In the chronic form of bronchitis, the treatment must be nearly the same as in the milder form of the acute disease, except that local depletion will rarely be required, unless in case of severe exacerbations. The compound squill pill is here an excellent remedy, and it may be advantageously combined with Dover's powder or the extract of conium. When there is a considerable collection of mucus in the air-tubes, an emetic may be given early in the morning, or twice in the week. The chest and body should be kept warm, and the chest itself may be protected by a full-sized emplastrum roborans. When the debility is extreme, and in all cases of *bronchitis senilis*, the appropriate remedy is a combination of stimulants and narcotics. One of the best consists of five grains of sesquicarbonate of ammonia with five minims of laudanum in an ounce of julepum camphoræ. In extreme cases still stronger stimulants are required. When dropsical effusions supervene, stimulants, diuretics, and expectorants are indicated. In the bronchitis of children emetics are very serviceable by promoting expectoration.

A variety of remedies have been recommended in chronic bronchitis, such as oil of turpentine, balsam of copaiba, lobelia inflata, colchicum, and the inhalation of chlorine, iodine, or tar vapour.

It is important that those who are subject to bronchitis, or who labour under it in the chronic form, should avoid all unnecessary exposure to cold. This is more especially necessary in the bronchitis of old people, which is greatly aggravated by exposure to cold. The rooms which they inhabit should, therefore, be kept warm, and as nearly as possible of a uniform temperature; the chest and extremities should be carefully protected from cold; and they should avoid exposing themselves to cold air. If obliged to leave their rooms during the winter, they should use a respirator, or what answers nearly as well, a folded handkerchief held before the mouth. In many cases exposure to cold air gives temporary relief, but the symptoms return with renewed severity when the circulation is restored by the warmth of the room.

ASTHMA.

CHARACTER.—Dyspnœa occurring in paroxysms, with intervals of freedom of respiration.

SPECIES.—1. *Humoral asthma, bronchorrhœa, or bronchial flux.*
2. *Congestive asthma, or dry catarrh.* 3. *Spasmodic asthma.*

HUMORAL ASTHMA.

SYMPTOMS.—The attack is usually preceded by a sense of fullness about the stomach, lassitude, depression of spirits, drowsiness,

and pain in the head. On the approach of the succeeding evening, a sense of tightness and stricture is perceived across the breast, with distressing straitness of the lungs, impeding respiration. The difficulty of breathing continues to increase for some length of time; both inspiration and expiration are performed slowly and with a wheezing noise; the speech becomes difficult and uneasy; cough succeeds, followed by the most anxious difficulty of breathing; the patient is threatened with immediate suffocation, and is obliged instantly to rise from a horizontal position; the face is sometimes turgid, and of a livid hue; at others it is morbidly pale and contracted. These symptoms usually continue till towards the approach of morning, when a copious expectoration of a thin frothy mucus comes on, the breathing becomes less laborious and more full, the patient speaks and coughs with greater ease, and feeling every way relieved, soon falls asleep. The dyspnœa and tightness across the chest remain for some days after the attack, and for several succeeding evenings an exacerbation occurs similar to that above described.

ANATOMICAL CHARACTERS.—Not constant. The mucous membrane is generally free from disease; but some affection of the heart, particularly of the right side, is not uncommon. Miliary tubercles, and extensive disease of the bronchial glands, have been met with in fatal cases.

PHYSICAL SIGNS.—Sound on percussion generally good, but in extreme cases dull. Sonorous and sibilous rhonchi at the commencement of the attack, followed by the mucous, submucous, and subcrepitant rhonchi. Some degree of wheezing and sibilus usually remains after the attack.

CAUSES.—*Predisposing.*—Hereditary peculiarity; lax habit of body; long-continued dyspepsia; gout.

EXCITING.—Sudden transition of temperature; disorders of the primæ viæ, especially flatulence; certain effluvia, as of hay or ipecacuanha.

DIAGNOSIS.—The pathognomonic symptoms are, paroxysms generally coming on at night, in which there is frequent and extremely anxious respiration; together with a wheezing noise, and sense of tightness across the chest.

PROGNOSIS.—*Favourable.*—Youth and unimpaired constitution, and the absence of organic disease. *Unfavourable.*—Repeated attacks; old age; debility; organic disease.

TREATMENT.—*Indications.*—1. To shorten the paroxysms and relieve urgent symptoms. 2. To prevent the recurrence of the fits by removing the predisposing and exciting causes.

I. The first indication may be fulfilled by an emetic at the onset of the attack, but this is inadmissible where there is great debility. In strong and healthy persons, full doses of tartar-emetic, of ipecacuanha, or the lobelia inflata, in the form of tincture, in doses of from twenty to thirty drops, may be given with great advantage.

In the debilitated, stimulants are required, such as strong coffee, ammonia, or æther. These may be combined with opium in moderate doses. Heat applied to the extremities, or to the entire surface, by means of the warm or vapour-bath, is extremely serviceable, but should be applied at the onset of the attack. Where the fit has already lasted some time, and the expectoration is abundant, provided at the same time there are no very severe or dangerous symptoms, it is best to leave the patient to himself, as the increased secretion is the best relief to the breathing.

II. The exciting causes must be carefully avoided, the general health must be preserved, and the state of the digestive organs be carefully attended to. The bowels should be kept free, but hypercatharsis must be avoided; liquids should be taken in moderation; the diet should consist of a due mixture of animal and vegetable food, but ascendent fruits and such vegetables as occasion flatulence should be taken sparingly. The internal remedies will vary with the state of the system.

I have found alum in combination with ginger very serviceable in removing the distressing flatulence which often precedes and accompanies the fit. Ten grains of the one with five grains of the other, and three or four grains of rhubarb, may be given three or four times a day. I have also more than once met with tenderness on pressure in the cervical and dorsal regions, and have used tartar-emetic ointment with much benefit. (G.)

CONGESTIVE ASTHMA.

This resembles the foregoing variety in coming on in paroxysms of severe dyspnœa, but differs from it in the scanty expectoration which accompanies the cough, and terminates the fit. The physical signs are those belonging to a swollen state of the mucous membrane of the air-tubes, viz., clear sound on percussion, indistinct respiratory murmur, with sibilant rhonchi, or a peculiar click, and, in limited portions of the chest, the mucous rhonchi.

The *anatomical characters* are a deep red or violet colour of the mucous membrane of the air-tubes, with scanty mucous secretion.

The *causes* are dyspepsia, exposure to wet and cold, and organic disease of the heart, leading to obstructed circulation. The *prognosis* is generally favourable, except where the disease is of long standing, or complicated with other functional or organic derangements.

TREATMENT.—Dry cupping and counter-irritation to the chest, expectorants, as squills, ipecacuanha, or colchicum in combination with alkalies, the inhalation of steam holding some stimulant in solution, such as tar-vapour, or ammonia. Smoking stramonium is sometimes found advantageous. Strict attention must be paid to the state of the digestive organs, the bowels must be kept free by

aloetic purgatives, and the general health must be carefully attended to.

SPASMODIC ASTHMA.

This term is applied to a dyspnœa occurring in paroxysms, unaccompanied by signs of congestion or inflammation of the bronchial tubes, and presumed to depend on a spasmodic action of the muscular fibres of the air-tubes.

SYMPTOMS.—Sudden and extreme dyspnœa; a feeling of constriction in the chest, as if a cord were bound tightly round it; the countenance suffused, and expressive of intense anxiety and distress; the superficial veins distended; the skin covered with a profuse perspiration. The body is bent forwards, the arms resting on the knees, the shoulders are raised, the abdomen contracted, and all the muscles of respiration are thrown into violent action.

PHYSICAL SIGNS.—Sound on percussion less clear than usual, respiratory murmur very faint, and occasionally accompanied with slight wheezing or whistling. If the patient is desired to hold his breath for a few seconds, or to count until the air in the chest is exhausted, and then to inspire slowly and steadily, the air will be found to enter as usual. The respiratory murmur soon becomes feeble again. The distinctive physical sign, then, of spasmodic asthma, is imperfect respiratory murmur, *except after holding the breath*, when it becomes as loud as, or even louder than, usual. (Williams.)

CAUSES.—*Predisposing.*—The same as in other spasmodic diseases; hereditary peculiarity; hysteria. *Exciting.*—Attacks of dyspepsia; extreme flatulence; irritation of the upper part of the spinal cord; pressure of tumors on the pulmonary plexus or on the par vagum; peculiar odour, as of hay, the smell of a stable, of ipecacuanha, &c.

PROGNOSIS.—Favourable in the absence of complications. It is dangerous when combined with other diseases of the lungs, or with those of the heart. It often lays the foundation of emphysema, pulmonary congestion and hæmorrhage, dilatation and hypertrophy of the heart, &c.

TREATMENT.—*Indications.*—1. To relieve the patient's sufferings during the fit. 2. To improve the general health, and give tone to the system during the intervals.

I. When the fit has actually commenced, some relief may be afforded by counter-irritants to the chest, epigastrium, and extremities; by antispasmodics, as æther, opium, belladonna, assafœtida, and valerian; and by strong coffee. This latter remedy has been strongly recommended by Pringle and Laennec. When the patient is aware of the approach of a fit, he may sometimes ward it off by an emetic, or by smoking stramonium, or tobacco. Dashing cold water over the face and body will often succeed in preventing a

paroxysm. Electricity has been used with the same view. The ascertained causes of the fit must of course be carefully avoided.

II. The state of the digestive organs demands peculiar attention : the diet should be light, wholesome, and easy of digestion ; all substances which encourage flatulence should be avoided. The state of the bowels must be carefully attended to. For the improvement of the general health, the shower-bath, or cold sponging, followed by frictions of the chest, should be employed every morning, and tonics should be administered in full doses. The preparations of iron, zinc, silver, or bismuth, are the best. Where much flatulence is present, alum in combination with ginger may be given with advantage. If there is tenderness in any part of the spine, leeches may be applied, or the tartar-emetic ointment, or both. When the spasm of the bronchial tubes is combined with congestion of the mucous membrane, or increased secretion, the treatment must be varied accordingly. Depletion or counter-irritation must be employed with antispasmodic remedies. The same strict attention to the diet, to the state of the bowels, and to the general health, will be required in every form of asthma.

Spasmodic asthma is sometimes confounded with a totally different disease, which has its seat in the external muscles, and is closely allied to chorea and hysteria. It is characterized by extraordinary frequency of the respiration, and by the perfectly healthy sound of the chest and breathing. It is sometimes also a marked symptom of paralysis agitans, the muscles of respiration partaking of the affection of the other muscles. A remarkable case of this disease occurred in a female aged twenty-two, who came under my notice some years back as a patient of the Surrey Dispensary. The paroxysms, which were of variable duration, were characterized by extreme frequency of breathing, with comparatively little general disturbance of health, and perfect freedom of respiration. There was amenorrhœa, some tenderness of the upper part of the spine, and constipation. The disease was cured by purgatives judiciously and perseveringly administered. No other remedy was employed. Hypercatharsis was invariably followed by a paroxysm. (G.)

PERTUSSIS.—HOOPING-COUGH.

SYMPTOMS.—The disease comes on with slight difficulty of breathing, thirst, quick pulse, hoarseness, cough, and all the symptoms of common catarrh. In the second or in the third week after the attack, it assumes its peculiar and characteristic symptoms.—The expiratory motions, peculiar to coughing, are made with more rapidity and violence than usual ; and after several of these expirations thus convulsively made, a sudden and full inspiration succeeds, in which, by the air rushing through the glottis with unusual velocity, a peculiar sound is caused, which has obtained the name of whoop.—When the sonorous inspiration has happened, the con-

vulsive coughing is again renewed, and continues in the same manner as before, till a quantity of mucus is thrown up from the lungs, or the contents of the stomach are evacuated by vomiting, which generally terminates the fit: the patient has then most frequently an interval of perfect freedom from cough, and often expresses a desire for food; but when the attack has been severe, it is succeeded by much fatigue, hurried respiration, and generally by languor and debility.—After a longer or shorter continuance of the disease, the paroxysms become less severe, and at length entirely cease. In some instances, however, it has been protracted for several months, and even for a year.

CAUSES.—Children are most commonly the subject of the disease; and it is supposed to depend on a specific contagion; at first it is a nervous disorder, but may be followed by pulmonary or cerebral congestion, or inflammation.

DIAGNOSIS.—It is distinguished from every other disease by the convulsive cough, followed by the peculiar sonorous inspiration above described; and by its terminating in vomiting or free expectoration.

PROGNOSIS.—*Favourable*.—Moderate and free expectoration; the strength little impaired; the fits neither frequent nor violent; in the interval, the respiration free; the appetite good; the absence of fever; moderate hæmorrhage from the nose.

Unfavourable.—The disease occurring in children under two years of age; in children born of phthisical or asthmatic parents; much fever, with symptoms of pneumonitis: very copious or scanty expectoration; great debility; convulsions, or coma.

TREATMENT.—*Indications*.—I. To keep up a constant state of nausea, so that the fit may be more promptly finished by vomiting.
II. To reduce existing inflammation of the lungs.

These two indications may be perfectly fulfilled in a large majority of cases by the same remedy, viz. tartar-emeti in doses sufficiently large to keep up a constant state of nausea. From a twelfth to a sixth of a grain, according to the age of the patient, may be given at short intervals, either alone, or in combination with a grain of hydrargyrum c. cretâ. The bowels must, at the same time, be kept free by gentle aperients, and the diet must consist of bland farinaceous substances. No other remedies are required.

If there are signs of inflammation in the lungs, the same remedies must be continued in increased doses; one or more leeches may be applied to the chest, (the most convenient place is the upper bone of the sternum,) followed, if necessary, by counter-irritants, hot water, or mustard-poultices to the extremities; and, in fact, the treatment appropriate to pneumonia. If there is determination of blood to the head, leeches to the temples and cold applications. When the severity of the disease has passed away, change of air is the best restorative. Existing debility must be treated by tonics, of which the best are the preparations of steel.

For a more lengthened account of hooping-cough, and of the various remedies recommended, see the larger works on the practice of medicine.

EMPHYSEMA.

SYMPTOMS.—Permanent shortness of breath increased to extreme dyspnœa by occasional exciting causes, as exercise, flatulence, or a common cold. There is occasional blueness of the face and lips, œdema, or dropsical effusions, with severe palpitations of the heart. There is usually some expectoration, which varies in character, consisting in most cases of a thin mucus, mixed with small tenacious clots. The expectoration is increased by a supervening attack of bronchitis. The general aspect of the body undergoes a change by the long-continuance of the malady; the countenance becomes pale, the body is emaciated, and there is a depraved state of the excretions.

PHYSICAL SIGNS.—Peculiarly clear sound on percussion, with indistinct respiratory murmur, dry crepitous rhonchus, with occasional loud clicking sound, or a friction sound, similar to that of a finger rubbed on a table. When there are complications, the physical signs of such complications are superadded. In marked cases the chest is enlarged and rounded in all directions.

ANATOMICAL CHARACTERS.—Enlargement of the air-cells, or rupture of the air-cells and effusion of air into the subserous cellular membrane (interlobular emphysema). The lungs increased in volume.

PROGNOSIS.—The disease is not fatal in itself, but dangerous by laying the foundation for other diseases.

TREATMENT.—The disease does not admit of cure. The treatment is that of the complications which may exist with it.

DISEASES OF THE SUBSTANCE OF THE LUNGS.

PNEUMONIA . . . Inflammation of the substance of the lungs.

HÆMOPTYSIS . . . Spitting of blood.

PHTHISIS PULMONALIS Pulmonary consumption.

PNEUMONIA.—PNEUMONITIS.—INFLAMMATION OF THE SUBSTANCE OF THE LUNGS.

SYMPTOMS.—The disease sometimes sets in with rigors followed by pyrexia, at others the local symptoms are the first to show themselves. There is high fever, with increased heat of surface, especially on the chest; flushed face; injection of the eyes; head-

ache; frequent, quick, and compressible pulse; thirst; furred tongue; anorexia; weakness; and pain in the head and limbs. The symptoms referable to the chest itself are a diffused, dull pain, deep-seated, rarely acute unless the disease involves the pleura; a short and dry cough, accompanied at first with scanty mucous expectoration, but after the lapse of one or two days, with a rusty-coloured, viscid sputum; the respiration is frequent and short, rising from 13 or 14, (the probable number in the recumbent posture in health,) to 30 and upwards.

In favourable cases this disease may decline on the third or fourth day; more frequently it is protracted to ten days or a fortnight. In unfavourable cases the symptoms increase on the third or fourth day; the respiration becomes more and more frequent; the sputa of a deeper hue, of a more viscid consistence, and often streaked with blood; the pulse increasing in frequency and feebleness; the tongue dry and covered with a brown fur; the skin hot and pungent to the touch; the debility extreme; delirium and coma come on, with all the symptoms of typhoid fever. In the last stage the expectoration loses its viscid character, and becomes a thin reddish-brown fluid; the dyspnoea increases; the pulse is small and fluttering; the countenance pallid; the lips livid; the skin covered with a clammy sweat; there is increasing rattle in the throat; and at length the patient dies exhausted or asphyxiated.

ANATOMICAL CHARACTERS.—Corresponding to the first stage of the disease, *sanguineous congestion*; to the second, *red hepatisation*; to the third, *yellow hepatisation or diffused suppuration*.

PHYSICAL SIGNS.—At the onset puerile respiration; when the disease is fairly established, and during the stage of congestion, *crepitant rhonchus*; in the stage of hepatisation, absence of respiratory murmur, bronchial respiration, and bronchophony; in the third stage, (that of suppuration,) *mucous rhonchus*. Throughout the disease dulness on percussion, which is most marked during the stage of hepatisation. The parts most commonly affected are the lower lobes of one or both lungs; and the physical signs are most strongly marked at the lateral and posterior parts of the chest. When pneumonia terminates in abscess, (vomica,) the physical signs are those of tuberculous excavations. (See Phthisis pulmonalis.)

VARIETIES AND COMPLICATIONS.—Supervenes on typhus, small-pox, measles, erysipelas, and scarlatina; when it is often obscure and liable to be overlooked. Great heat of chest, unusual dyspnoea, and sudden aggravation of the symptoms, should lead the practitioner to suspect this complication. The physical signs are nearly the same as in idiopathic pneumonia. It is also apt to attack patients labouring under phthisis, is a frequent concomitant of bronchitis, and comes on occasionally after severe injuries and surgical operations. Sometimes it is combined with pleurisy (pleuro-pneumonia).

CAUSES.—*Remote and predisposing.*—Sanguineous temperament, vigorous and plethoric habit, winter and spring seasons, vicissitudes of temperature, all the causes inducing inflammation, violent exercise of the body, or exertions of voice, a peculiar state of the atmosphere.

Exciting.—All the causes inducing inflammation in general; vicissitudes of temperature, violent exercise of the body, or exertions of voice; congestion occurring from common causes, or in the course of various febrile diseases; affections of the lungs and heart.

DIAGNOSIS.—The pathognomonic symptoms are the peculiar rusty tinge of the sputa, the crepitous rhonchus, and the peculiar heat and pungency of the surface of the chest. The history of the case, added to these symptoms, will rarely leave any difficulty. The history will also serve to distinguish idiopathic pneumonia, from typhus fever with chest complication.

PROGNOSIS.—*Favourable.*—An early and copious mucous expectoration; spontaneous hæmorrhage from the nose; warm, equable, and free diaphoresis; diarrhœa; the appearance of inflammation on an external part; the urine depositing a sediment; diminished frequency of respiration; this is an extremely favourable symptom, and one which should be carefully looked for; the absence of complication; the disease being of limited extent.

Unfavourable.—The duration of the disease beyond the fourteenth day; violent symptoms of fever and delirium, or those of typhus with low delirium or coma; no expectoration, or the expectorated matter tinged with blood, or of a dark or black colour; sudden cessation of pain, followed by a change of countenance, and a sinking or irregularity of the pulse; the symptoms indicating suppuration or suffocation; a previously broken constitution; complications; increasing frequency of respiration; the disease extending to the whole lung or to both lungs; occurring in very young children, or in the aged and debilitated.

TREATMENT.—This must vary with the stage of the disease. *During the first stage*, or that of congestion, the remedies are free bleeding from the arm, to be repeated if necessary, followed by a brisk purgative of calomel (5 gr. to ℥i.); and tartar-emetic, in half grain doses, at intervals of one or two hours. The quantity may be increased to a grain, or even more. This medicine may always be advantageously combined with calomel. Half a grain of tartar-emetic with two of calomel may be given every one or two hours, with the best effect. This combination, in doses proportioned to the age, is of great efficacy in the pneumonia of infants.

In the second stage, or that of hepatisation, local bleeding, by cupping or leeches, with counter-irritation, must be substituted for general bleeding, and calomel and opium given frequently so as to affect the gums, for the tartar-emetic. If, however, there is

high fever the tartar-emetic may still be continued in combination with the calomel; but if typhoid symptoms have already supervened, stimulants are called for. Of these, the best is ammonia, in combination with camphor.

In the third stage, or that of suppuration, stimulants will be required, such as ammonia, æther, and wine; if the fetid character of the sputa announces the presence of gangrene, still stronger stimulants will be necessary.

The foregoing remedies must be employed with due regard to the severity of the local disease as well as of the general symptoms. When bleeding is employed its effects should be carefully watched. Debility, in the absence of marked typhoid symptoms, does not counter-indicate it, and if the pulse rises under its use, it may be continued with advantage. The diet must be strictly antiphlogistic in the first stage; nourishing and stimulant if typhoid symptoms supervene; nourishing but not stimulating during convalescence. The patient's room should be of a moderate and equable temperature (about 60°); the head should be raised as much as the patient's strength will allow, and the posture should be changed from time to time.

If a chronic form of pneumonia continues after the severe symptoms have been removed, a course of mercury, external counter-irritation, tartar-emetic in small doses, the hydriodate of potash with sarsaparilla, or Plummer's pill; with change of air, regular exercise, and temperate diet, may be resorted to. The patient requires to be closely watched during his convalescence, and the chest should be examined from time to time.

GANGRENE OF THE LUNGS.

SYMPTOMS.—Extreme prostration of strength; a frequent feeble pulse; expectoration of dingy-green sputa, mixed with blood, and of a peculiarly offensive odour; mucous rhonchus; the symptoms of typhus; and death from exhaustion.

CAUSES.—Acute pneumonia; inflammation occurring in extremely feeble constitutions.

DIAGNOSIS.—The peculiar colour and offensive odour of the sputa.

PROGNOSIS.—Highly unfavourable; especially when the disease involves a large portion of the lungs; more favourable where it is limited in extent.

TREATMENT.—Strong stimulants, as in gangrene affecting other parts.

HÆMOPTYSIS.—SPITTING OF BLOOD.

SYMPTOMS.—Sense of weight and oppression in the chest often referred to one spot; dry tickling cough; pulse generally frequent,

sharp, and compressible ; difficulty of breathing ; sense of pain and heat, referred to the sternum ; saltish taste in the mouth ; flushed countenance ; constant irritation at the top of the larynx, which excites hawking and coughing, during which the profusion of blood takes place. There are generally slight febrile symptoms.

PHYSICAL SIGNS.—The chest sometimes affords the natural sound on percussion, and there is slight mucous râle ; at other times there is dulness on percussion over a limited spot surrounded by crepitant rhonchus. In the former case, the hæmorrhage is from the bronchial tubes (bronchial hæmorrhage) ; in the latter, blood is effused into the substance of the lungs (pulmonary apoplexy).

CAUSES.—*Predisposing.*—A certain age ; from the period of puberty to the thirty-fifth year ; sanguineous temperament ; great sensibility and irritability ; suppression of usual evacuations ; narrow conformation of the chest ; previous affections of the same disease ; hereditary predisposition ; plethora ; diseases of the heart, especially an impediment to the return of the blood to the left auricle ; engorgement of the liver ; and purpura.

Exciting.—Excessive heat of the atmosphere ; violent exercise ; inordinate exertion of the organs of respiration ; external violence ; tubercles in the lungs ; pneumonia and gangrene ; suppression of usual or habitual evacuations.

DIAGNOSIS.—The blood being brought up by hawking and coughing ; of a florid red colour ; and mixed with a little frothy mucus ; history of the case.

From hæmatemesis.—The blood thrown up in hæmatemesis is usually in much larger quantity ; of a darker colour ; more grumous ; mixed with other contents of the stomach ; and usually unattended with cough.

PROGNOSIS.—Generally favourable as regards the disease itself. Its occurrence must excite suspicion of the existence of tubercles. This ground of suspicion is stronger in the male than in the female, because hæmoptysis is often a vicarious disease in females. The prognosis, too, is generally favourable, when it occurs at the menstrual periods, or at the change of life. When the hæmoptysis is preceded or followed by the expectation of bronchial polypi, the prognosis is also favourable.

TREATMENT.—*Indications.*—The same as hæmorrhage, which will be answered by,

1. Avoiding heat, every kind of bodily exertion and conversation.

2. Making use of a light *vegetable diet*.

3. *Bleeding*, where symptoms of the inflammatory diathesis are indicated by the hardness and peculiar jerk of the pulse ; the constitution of the patient ; and the florid colour of the blood evacuated from the lungs, and when the quantity is large.

On the contrary, where there are marks of debility and laxity,

and the blood is of a dark colour, depletion is improper, and in nervous, sensitive persons.

Leeches to the anus when hæmorrhoids have existed, and to the hypogastrium, or genital fissure, when the catamenia are suppressed.

When the hæmorrhage is copious, it probably arises from pulmonary apoplexy, or congestion, or from a ruptured vessel, and then copious depletion is necessary.

When the disease is intermittent, or attacks nervous persons, or those of a scorbutic habit, quinine is a most useful remedy.

4. *Cooling purges*, of the sulphate of magnesia or soda, in infusion of roses.

5. *Refrigerants*; nitrate of potass; sulphuric acid; citric acid, tamarinds, &c.

The French use half-ounce doses of nitre given in mucilage.

Draughts of cold water acidulated with lemon-juice.

6. *Astringents*; the vegetable acids; acetate of lead; but especially the acetate of lead in combination with opium, which proves the most certain styptic when the febrile state is removed by venæ-section, and it agrees with the bowels.

The lead, given with an excess of the acid, may be increased to ten or fifteen grains daily.

7. *Sedatives*; digitalis; hyosycamus; conium.

8. Emetics are recommended by Dr. Darwin and others.

Richter, in his *Elements of Surgery*, recommends ipecacuanha for its anti-hæmorrhagic effect, and Sheridan and Graves speak of it in high terms. The latter gives it with opium towards the termination of the disease, and prefers it to the acetate of lead. Dose, two grains every quarter of an hour, or every half-hour, until the bleeding is arrested.—*Lond. Med. and Surg. Journ.*, v. ii. p. 217.

The ergota or secale cornutum, in doses of three grains every three hours, is a valuable astringent.

9. Nauseating medicines; antimonium tartarizatum in small and repeated doses.

10. Cold lotions applied to the chest; vinegar and water; a solution of muriate of ammonia; ice applied externally and taken internally.

Where symptoms of debility prevail, blisters to the chest; quinine; opium; chalybeates.

PHTHISIS.—PULMONARY CONSUMPTION.

SYMPTOMS.—Regular tubercular phthisis usually begins with a short dry cough, so slight as to become habitual before it excites the attention of the patient. The breathing is more easily hurried by bodily motion; the patient becomes languid and indolent, and gradually loses strength; the pulse is generally more frequent than usual, small, and *quick*; at length, from some fresh exciting

cause, the cough becomes more considerable, and is particularly troublesome during the night; the breathing more hurried; there are sense of straitness and oppression of the chest, accompanied in many cases with shooting pains; an expectoration takes place, at first of a frothy mucus, which afterwards becomes more copious, viscid, and opaque, and is most considerable in the morning; the sputa are often tinged with blood, or hæmoptysis occurs in a more marked form and to a greater extent.

As the disease advances, the breathing becomes more and more difficult; the emaciation and weakness go on increasing; a pain arises in some part of the thorax, at first generally referred to the sternum, but as the disease advances it is felt on one or both sides, is increased by coughing, and sometimes becomes so acute as to prevent the patient from lying upon the affected side.

The face now begins to flush towards evening; the pulse increases in quickness and frequency; the urine is high-coloured, and deposits a branny sediment; the palms of the hands and soles of the feet are affected with burning heat; the tongue, from being white, is now preternaturally clean and red; purulent matter is expectorated; all the symptoms are increased towards the evening; the fever assumes the hectic form, having an exacerbation twice in the day; the first about noon, which is inconsiderable, and soon suffers a remission; the other in the evening, which gradually increases until after midnight. Each exacerbation is usually preceded by chilliness, and terminates in profuse perspiration, and the deposit of a furfuraceous sediment in the urine.

The appetite now often mends, and generally becomes better than in the first stage of the complaint; the sclerotic membrane of the eye assumes a pearly white colour; during the exacerbations, a circumscribed redness appears on each cheek, but at other times the face is pale, and the countenance dejected; food is returned by vomiting; a diarrhœa comes on, and generally alternates with colliquative sweats; the emaciation is extreme; the countenance assumes a cadaverous appearance; the cheeks are prominent; the eyes hollow and languid; the hair falls off; the nails are of a livid colour, and much incurvated; the legs swell, and are œdematous; aphthæ appear in the throat; still the appetite often remains entire, and the patient flatters himself with the hopes of speedy recovery, and is often vainly forming distant projects of interest or amusement, when death puts a period to his existence.

ANATOMICAL CHARACTERS.—Tuberculous matter in the form of miliary tubercles or granulations, scattered through the lungs; or of opaque yellowish-white masses; infiltrated through the texture of the organ (*infiltrated tubercle* of Laennec). Cavities, of various size and shape, sometimes found in every part of the lung, but generally confined to the upper lobes, larger and more numerous on the right than on the left side. In the larynx and trachea

ulcerations (in the larynx in one-fifth of his cases, in the trachea in one-third—Louis). In the intestines, also, ulcerations (in five-sixths of Louis' cases). The liver enlarged and changed in appearance and consistence (the fatty liver). Tubercular deposits in various organs of the body.

PHYSICAL SIGNS.—In the incipient stage, before suppuration sets in, dulness on percussion over the clavicles and in the supra and infra-clavicular regions. This dulness is sometimes common to both sides, but generally greater on the one side than on the other. In the majority of cases, the dulness is most marked on the right side. Similar dulness between the scapulæ. The upper part of the chest in some instances is obviously contracted, the clavicles being very prominent, the supra-clavicular regions deeply hollowed, the anterior and upper part of the chest flattened, and the shoulders thrust prominently forwards. The stethoscopic indications are a roughness in the respiratory murmur; a prolonged expiratory sound; bronchial respiration heard more distinctly on one side than the other, and most to be depended on as a sign of incipient phthisis when heard towards the point of the shoulder; mucous, sub-mucous, and sibilant rhonchus; a slight click; slight crepitant rhonchus; increased resonance of the voice; in some cases, extremely indistinct respiratory murmur.

In *confirmed* phthisis, the physical signs are less obscure. They consist of a more distinct click or bubbling sound, which is most distinctly heard when the patient coughs or takes a full inspiration; cavernous rhonchus; cavernous respiration; pectoriloquy; amphoric resonance; metallic tinkling; distinct gurgling, when the patient coughs; and in rare cases, equally distinct sound of fluid in motion on succussion. The situation in which these sounds occur, and the limited space which they occupy, will generally serve to distinguish phthisis from other conditions of lung productive of the same or similar sounds. The peculiar distinctness of the heart's beat over the entire chest may be mentioned as a common concomitant of phthisis.

The character of the sputa may be classed with the physical signs. At first they are opaque and muco-purulent, as in bronchitis; they then become purulent, often sink in water, and sometimes contain particles of clotted matter, like softened cheese; in rare instances distinct portions of pulmonary tissue are spit up; streaks or small clots of blood are often mixed with the expectoration; pus is often expectorated in distinct masses resembling "irregular balls of flock or wool of a yellow or greenish colour, sinking and breaking down in water."

COMPLICATIONS.—Bronchitis, pneumonia, pleurisy, followed by adhesions, or pneumothorax. Extensive disease of the liver; anasarca; in rare cases head-affections.

DURATION.—The average is about two years. In acute cases, from a few months to one or two years; in chronic cases death

often takes place after the lapse of years, and after repeated attacks.

CAUSES.—*Predisposing.*—Hereditary predisposition; particular formation of the body; marked by long neck, prominent shoulders, narrow chest, and long slender fingers; the sanguineous temperament, indicated by a fine clear skin, fair hair, delicate rosy complexion, and great sensibility; or the black hair, dark eye, and sallow complexion; constitutional irritability of the lungs; sedentary life; bad air, insufficient and unwholesome food.

Exciting.—Certain preceding diseases; as hæmoptysis, pneumonia, catarrh, asthma, scrofula, syphilis, variola, rubeola. The dust to which certain artificers are exposed; as needle-pointers, stone-cutters, millers, &c. The fumes of certain metals or minerals; violent and depressing passions of the mind, as grief, disappointment, anxiety; intemperance of any kind; profuse evacuations, as diarrhœa, diabetes, fluor albus, menorrhagia; hyperlactation; the application of cold united to moisture; as the lying in damp beds, sudden exposure to cold when the body is preternaturally warm, especially if made so by previous exertion.

DIAGNOSIS.—The symptoms and physical signs taken together render the diagnosis of confirmed phthisis easy; some difficulty will be experienced in cases of complication with other chest affections; but no precise rules can be laid down for distinguishing such complications from the uncombined diseases themselves. The history of the case, the symptoms, and the physical signs combined, will rarely leave any doubt. The diagnosis, however, is often difficult in the early or incipient stage.

The following observations may facilitate the distinction. The first onset of phthisis is marked by very slight and very variable symptoms. One patient complains merely of debility; another of debility and slight emaciation, for which he can assign no cause; a third of constant headache; a fourth of dyspepsia; a fifth of muscular pains; a sixth of diarrhœa; a seventh of distressing perspiration on slight exertion; an eighth of hæmoptysis; a ninth of slight hacking cough, with scanty mucous expectoration in the morning, and so on. Another patient has been subject to winter cough, or what he terms asthma, for years, but never suffered so much in previous winters; his cough, for the first time, continues through the summer months. A few well-directed inquiries on the part of the medical man will often, and even generally, bring to light some additional symptom actually existing, or present at some former period; but, in spite of the most careful inquiry, the case will often remain obscure, and in very many instances the physician will be led to stop at the most obvious symptom, and to direct his treatment to its removal, unsuspecting of the lurking disease which is its cause. In all these obscure cases, there is one symptom which will stand him in good stead, and serve to arouse his suspicions; and this is the peculiar character of the pulse. This consists—1, in increased

frequency ; 2, in increased quickness or sharpness ; or 3, in both combined. In the first place, with regard to increased frequency. I have shown elsewhere* that in five out of six cases the pulse in phthisis exceeds the highest number (92) observed in *apparently* healthy males of the same mean age. In five out of six cases, therefore, the frequency of pulse taken alone will serve to excite suspicion, occurring as it does in a patient whose health and strength are but slightly impaired, and who is evidently labouring under no acute disease, which could account for such increase of frequency. Sometimes this symptom is almost the first to show itself, accompanying the first feelings of weakness and indisposition, and continuing throughout the whole duration of the disease. I have known it as high as 140, where debility was the only marked symptom. 2. The quickness of the pulse, that is to say, the promptitude with which each separate pulse rises beneath the finger, is even more constant than the increase of frequency, and may exist with a pulse of 70. The pulse of health is exactly the reverse of this, rising slowly, and, as it were, deliberately beneath the finger ; so also is the infrequent pulse of mere debility. To quickness is superadded smallness of pulse in phthisis, whilst the pulse in health is of moderate fulness. 3. The combination of the three characters of pulse,—the frequency, the smallness, and the quickness, should always lead to an examination of the chest ; but the small quick pulse alone is sufficient ground of suspicion. These observations apply only to the male, as the characters here pointed out form a striking contrast to those of the male pulse both in health and disease ; whilst, on the contrary, the pulse of the female, even in health, possesses these three characters in a marked degree, and assumes them in most functional and in many organic diseases. The slight effect produced by a change from the erect to the sitting posture will also assist the diagnosis in the male, by distinguishing the debility of phthisis from that due to other causes. Whenever, then, a man presents himself for advice, complaining of debility, or of other obscure symptoms of phthisis, or even of symptoms proper to functional diseases of other organs, and is at the same time obviously free from acute disease, the pulse should be examined, and if, after allowing the patient's agitation to subside, the pulse is either very small and frequent, or very small and quick, or if it combine all these characters of increased frequency, smallness, and quickness, the chest should be examined, and in by far the majority of cases the physical signs will be found to justify the suspicion raised by the pulse.—(G.)

PROGNOSIS.—*Unfavourable*.—The disease arising in consequence of hereditary predisposition ; high degree of hectic fever ; great frequency of pulse and respiration ; great emaciation and debility ; a morbidly clean or fiery red tongue ; fixed pain in the chest ; colliquative sweats or diarrhœa ; profuse purulent expectoration ;

* Guy's Hospital Reports. No. IX.

œdema of the legs; anasarca; aphthæ. The disease being very extensive, the supervention of pneumonia or pleuritis.

Favourable.—The disease being limited in extent; not traceable to hereditary predisposition; slight emaciation and debility; pulse and respiration but little increased in frequency; absence of night sweats, or diarrhœa, and of complications:—these circumstances justify a favourable prognosis as to the existing attack. In any case, the prognosis should be very guarded, as the patient may survive three, four, or more severe attacks in succession, and the physician may incur censure for the apparent incorrectness of his diagnosis. Where the disease is very limited, ultimate recovery is a possible, though rare event.

TREATMENT.—This must vary with the stage of the disease.

In *incipient phthisis*, the indications are—1. To promote the absorption of the tuberculous matter; 2. To prevent or subdue local inflammation; 3. To improve the general health.

1. With a view to promote the absorption of tuberculous matter, two remedies have been recommended, viz. mercury and iodine. The first may be given so as slightly to affect the system; the second may be administered in the form of the hydriodate of potash or iron. Iodine may also be inhaled with the steam of warm water. It is very doubtful whether these or any other remedies possess any power of removing tuberculous deposits.

2. Local inflammation may be prevented by guarding against cold and all those causes which excite the circulation. Warm clothing, the avoidance of exposure to wet and cold; a diet consisting chiefly or entirely of vegetable food to the total exclusion of all stimulants; and a proper attention to the state of all the secretions, will fulfil the first part of this indication. Inflammation, where it already exists, may be subdued by small bleedings repeated at intervals of a few days, or a week, by leeches applied over the site of the tubercular deposits, by counter-irritants to the upper parts of the chest, and, in certain cases, by small doses of tartar-emetic.

3. The general health may be improved by proper exercise, wholesome diet, regular habits, change of air, especially to the sea-side, sea-voyages, cold sponging, followed by friction every morning, and all the means in common use for this purpose.

In *confirmed phthisis*, that is to say, where suppuration has already taken place, the indications are—1. To facilitate the expectoration of the products of suppuration; 2. To subdue local inflammation; 3. To mitigate distressing symptoms; 4. To support the patient's strength.

1. The first indication is fulfilled by emetics. These remedies, however, are not admissible, nor are they of use, in the advanced stages of the disease, where much debility is present. When the patient's strength is little impaired, they may be given with the best effect. They should be taken on first rising in the morning,

and be followed up by a moderate quantity of warm water or warm camomile-tea. Tartar-emetic in half-grain doses, or ipecacuanha, or zinc in doses of a scruple, may be given every morning, or on alternate mornings, or once or twice in the week, according to the strength of the patient. They prove most beneficial where they cause the expectoration of abundant sputa from the lungs; perhaps they are also useful by detaching the tuberculous matter from the walls of the suppurating cavity. Whatever may be the rationale of their action, their beneficial effect is beyond question.

2. Local inflammation must be combated by the occasional application of a few leeches over the part affected, and the assiduous use of counter-irritants, of which the tartar-emetic ointment or solution is perhaps the best.

3. The most distressing symptoms are the night sweats, cough, the febrile flushes, the diarrhœa, and hæmoptysis. The *cough* may be relieved by the compound squill pill, in combination with the extract of conium, or by small and repeated doses of the more powerful sedatives. Of these the best is extract of stramonium, in the dose of the sixth of a grain made into the form of lozenge, with extract of liquorice, and sucked frequently in the course of the day and night when the cough is most urgent. The *febrile flushes* are relieved by cold sponging, and cooling drinks. The *night sweats* often subside under the use of the mineral acids, as the dilute sulphuric acid, in the dose of twenty drops. This may be combined, when there is much restlessness, with a quarter of a grain of morphia. *Diarrhœa* commonly subsides by strict regulation of the diet, and the prohibition of every form of solid food. If this should not suffice, the common remedies for diarrhœa must be employed. In *hæmoptysis*, the acids, or, if these fail, the acetate of lead with small doses of opium. When the pulse is very frequent and the palpitation is distressing, digitalis.

4. The patient's strength will be best supported by nourishing diet, without stimulants. In the last stage of the disease, however, stimulants may be administered with advantage. Change of air—in our own country, Undercliff in the Isle of Wight, Torquay, Hastings, and Cork; in foreign parts, Rome, Nice, the Cape, Madeira, India, have been recommended. The sea-voyage may be beneficial; the benefit of the foreign residence is more doubtful. A great variety of medicines and many articles of diet have been recommended with great confidence. To the former belong the inhalation of æther, conium, tobacco, stramonium, digitalis, iodine and chlorine, hydrogen and hydro-carbon; the vapours of tar;* conium and digi-

* If tar is used, it should be boiled for a few minutes in the open air, adding from one to two ounces of subcarbonate of potass, dissolved in a little water, to each pound; this mixture is to be placed over a spirit-lamp in the sick room, keeping up a heat which disengages the volatile part of the tar. If a white vapour arises, the heat is too strong, or the tar impure. The air of the chamber soon becomes impregnated with the vapour of the tar. This

talís, and hydrocyanic-acid; tonics and chalybeates; quinine, &c.: to the latter, certain mosses, as the Iceland or Irish moss. Everything that has ever been recommended, however trivial, has seemed to cure phthisis, simply because patients labouring under phthisis do continually recover from existing attacks, and in rare instances regain perfect health; whilst, on the other hand, many cases stated to be phthisis are merely sympathetic functional disorders of the lungs, or real diseases of the lungs of a non-tubercular origin.

PROPHYLAXIS.—Persons who have an hereditary predisposition to phthisis, those who have habitually delicate health, or whose chests, on examination, prove to be unsound, require unusually careful management of their health. During childhood, nourishing and wholesome food, proper exercise, warm clothing, frequent ablution of the skin, moderate application of the mind, and careful attention to the state of the bowels, are necessary: during youth and manhood such exercises as tend to expand the chest, especially fencing; exercise in the open air, especially horse exercise; sponging the chest every morning with cold water, followed by friction; the moderate employment of the voice in singing or in reading aloud; careful avoidance of all excesses, bodily or mental, should be insisted on. All unwholesome employments, and all sedentary occupations, should be avoided. If a choice of a foreign country is to be made, the East Indies is, in all probability, the best.

DISEASES OF THE PLEURA.

PLEURITIS.

PNEUMOTHORAX.

HYDROTHORAX.

PLEURITIS.—INFLAMMATION OF THE PLEURA.

ACUTE PLEURISY.—*Species*.—1. Acute. 2. Chronic.

SYMPTOMS.—This disease is generally ushered in with chills, rigors, and the usual symptoms of inflammatory fever, accompanied or followed by a sense of weight in the chest, which in a few hours becomes acute pain, referred to the side, about the sixth or seventh rib, and thence lancinating to the sternum or scapula. There is a short dry cough. The breathing is extremely anxious,

process should be repeated two or three times a-day, for half an hour each time. The same tar may be used until it becomes thick.

The other substances which have been recommended may be added to an open vessel of boiling water, in quantities varying with the strength of the remedies themselves, the patient holding his head over the vessel and breathing the steam as long as appears desirable. If cough is produced, the remedy has been used in too large a quantity.

frequent, and short; the pain is increased by deep inspiration, or by the act of coughing; it is also increased by lying upon the affected side; frequent, hard, contracted pulse, vibrating under the finger like the tense string of a musical instrument; white tongue, scanty high-coloured urine, hot skin, flushed cheeks, and other symptoms of synocha.

These are the symptoms of acute pleurisy, in their marked form and at the onset of the disease. Sometimes, however, severe and extensive inflammation of the pleura occurs without these well-marked characters. The pain may be more diffuse, less severe, or produced only by pressure between the ribs of the affected side. In most cases the acute pain, as well as the fever, subside on the third or fourth day, and the cough and dyspnœa abate, though the pleura is still in a state of inflammation. *Terminations.*—In resolution; in adhesion; in effusion; in the chronic form.

ANATOMICAL CHARACTERS.—Injection of the subserous cellular membrane, with dryness of the surface of the pleura; effusion of coagulable lymph, or of pus mixed with flakes of lymph; and recent adhesions.

PHYSICAL SIGNS.—These are developed in the following order: 1. Feeble respiratory murmur from diminished motion of the chest. 2. Sounds of friction accompanying the motions of respiration. (These signs may exist before effusion has taken place). 3. Dulness on percussion, first in the most depending part of the chest, afterwards extending gradually over the side affected, and best heard by tapping the pleximeter lightly and abruptly with the fingers. 4. Diminished respiratory movements and murmur. 5. Ægophony and bronchophony. 6. Cessation of the vocal vibration felt by the hand. 7. Cessation of ægophony and bronchophony. 8. Enlargement of the side. 9. Displacement of the heart, liver, mediastinum, and intercostal spaces. 10. Increased motions and sound of respiration on the sound side. (Williams). If absorption of fluid takes place, the physical signs recur in an inverse order; ægophony, for instance, making its appearance afresh when the quantity of fluid is reduced to a thin layer.

CAUSES.—Predisposing.—Debility and the general predisposing causes of the inflammations.

Exciting.—Cold; external injuries, fractures of the ribs, &c.; febrile states of the system; inflammation of the adjoining textures; tubercles in the lung.

DIAGNOSIS.—From pleurodynia by the presence of severe constitutional symptoms; from other diseases of the chest by physical signs! (See Pleurodynia)

PROGNOSIS.—Favourable.—A recent attack met by prompt treatment; the absence of complications; if the disease is not recent, the absence of hectic, and of great debility.

Unfavourable.—Rapid and extensive effusion; the disease ex-

isting on both sides of the chest ; the co-existence of organic disease ; hectic fever and great debility ; dropsical effusion.

TREATMENT.—In the acute form of the disease, the *indication* is to reduce the local inflammation and prevent effusion.

This indication is fulfilled by a full bleeding from the arm to the approach of syncope, and the entire relief of the pain and breathing, followed immediately by full doses of tartar-emetic, brisk aperients, and a strict antiphlogistic diet. The bleeding will rarely require to be repeated, but if the symptoms indicate it, it should not be delayed. It is of little use after the first few days. For slighter degrees of inflammation, cupping and leeches may be prescribed. The tartar-emetic may be usefully combined with calomel. The tartar-emetic keeps up the effect of the bleeding, until the calomel, slightly affecting the system, entirely puts a stop to the inflammatory tendency. Some authors recommend James's powder in lieu of tartar-emetic, but the latter is the surer remedy.

CHRONIC PLEURITIS.

SYMPTOMS.—This is a general consequence of the acute form, but it occasionally begins as a chronic disease. In either case, hectic or remittent fever, a permanently accelerated pulse, emaciation, dyspnœa increased by exertion, and inability to lie on the healthy side, are the principal symptoms. These are apt to alternate with symptoms of the more acute form, such as severe pain, and increased hardness of the pulse.

ANATOMICAL CHARACTERS.—Effusions of various kinds in the sac of the pleura ; coagulable lymph thrown out on the surface, and in various stages of organization, solid secretions, becoming organised, and forming a matrix for various malignant diseases.

TREATMENT.—*Indications*.—I. To promote the absorption of the effused matter. 2. To support the patient's strength.

The first indication may be fulfilled by mercury carried to the extent of affecting the system, or by the continued administration of the hydriodate of potash, aided by such local measures of depletion or counter-irritation as prevent the re-establishment of inflammation. Cupping, or leeches, which are to be preferred, with blisters to the affected side, or the tartar-emetic ointment, will fulfil this indication.

The general strength may be supported by the cautious use of tonics, and in cases of great debility, or where the disease has supervened on fever or erysipelas, by the use of stimulants and a nourishing diet.

These measures will often lead to the absorption of the effused matter, but where this is very considerable, and especially when it consists chiefly or wholly of purulent matter, absorption rarely takes place, and the disease now takes the name of *empyema*.

Absorption cannot take place without more or less affecting the

shape of the chest, for in by far the majority of cases, and in all cases where the effusion has been very considerable, the lung is either permanently condensed by the pressure, or bound down by firm adhesions. As the fluid, then, is absorbed, the walls of the chest must fall in, and this shrinking of the diseased side may be ascertained by measurement. The depression first shows itself in the upper part of the chest, but as the absorption proceeds, extends to the whole of the affected side. The shoulder falls, and remains more fixed than that of the sound side, the ribs are closer together, the scapula approaches the spine and is more prominent, the spine itself is often concave towards the same side; the contents of the abdomen, too, are pressed up into the affected side, whilst the lung of the sound side, expanding beyond its usual limits, displaces the mediastinum and the heart. These changes are accompanied by appropriate physical signs of condensed lung, dulness on percussion, impaired respiratory murmur, bronchophony, vocal fremitus. When the effusion is partial and confined by adhesions, the contraction will also be partial, and the physical signs more limited in their extent. Pleurisy may occur in young people, and lead to great deformity, without much impeding the function of respiration; but when it attacks the adult, it generally leaves behind it some dyspnœa, with a strong tendency to a recurrence of the disease.

EMPYEMA.—This term is applied to a collection of pus in the cavity of the pleura, but the meaning may be extended, without impropriety, to any collection of fluid, the result of previous inflammation of the pleura. The general symptoms are those of chronic pleurisy; and the physical signs those of effusion of liquid, whatever may be its nature. When the effusion is purulent, ulceration is apt to occur in some of the surrounding textures, and an opening is formed into the lungs, through the walls of the chest, or through the diaphragm. The bones may also become carious in consequence of the pressure to which they are subject. When the matter points externally, fluctuation is perceived in the part, and the integument becomes tense during expiration. When an opening takes place into the lungs, a large quantity of matter is discharged during a fit of coughing, and this is followed by great relief to the respiration. If the opening takes place externally, the discharge of matter is increased by strong expiration, as in coughing. It is often advisable to anticipate nature in affording this relief by resorting to an operation.

Paracentesis thoracis.—This operation must be performed with care and due precaution. It should not be delayed too long, as the structure of the lung will, in that case, become so condensed as not to admit of expansion during respiration. If the matter should point in any part of the chest, that part should be preferred for the opening; but if not, the trocar should be introduced somewhere between the third and seventh ribs, and at the side where the intercostal spaces are widest. The grooved needle

should be first introduced, and if there is evidence of fluid in the pleura, the trocar should be cautiously inserted, the skin having been previously drawn upwards, so that the external and internal opening may not correspond. The object is to avoid the introduction of air during the operation; to insure this more effectually it has been recommended to introduce the trocar under water. The matter must not be withdrawn all at once, but by repeated operations. Pressure by means of a bandage may be advantageously employed both during and after the operation. For more minute details, consult works on surgery.

PNEUMOTHORAX.

Air may find its way into the cavity of the pleura in two ways. 1. By communication with the external air, through an opening into the lungs, or through the parietes of the chest. 2. By secretion. The first is the more common cause. The *symptoms* vary with the direction in which the opening takes place, and with the previous condition of the pleura. When, in consequence of superficial ulceration of the lung, an opening takes place into a previously healthy pleural sac, the entrance of air gives rise to dyspnoea, acute pain, dry cough, spasms of the intercostal muscles, a frequent, feeble, and sometimes irregular pulse. These symptoms, which take place more or less suddenly, according to the size of the opening, are soon followed by those of inflammation of the pleura. When inflammation already exists, the presence of air not only tends to increase it, but converts the otherwise inodorous pus into a highly-offensive discharge.

PHYSICAL SIGNS.—Unusually clear, tympanitic, sound on percussion, with great indistinctness or total absence of respiratory murmur on the affected side, with increased distinctness of the respiratory murmur on the sound side; and *metallic tinkling*, or *amphoric resonance*. When there is liquid as well as air in the sac of the pleura, the physical signs are, dulness on percussion as high as the level of the fluid, that level shifting with change of posture; *metallic ringing* heard after change of position and coughing; and *succussion* on sudden motion.

PROGNOSIS.—Generally unfavourable. In some instances life is prolonged for many months.

TREATMENT.—This depends upon the stage of the disease, and the state of the patient. The sudden rupture of the lung is generally followed by symptoms of collapse and irritation, which may require stimulants and opium; when inflammatory symptoms come on, antiphlogistic measures must be prescribed, proportioned to the severity of the symptoms and the patient's strength. General blood-letting will rarely be admissible; we must therefore resort to local depletion by cupping or leeches, and counter-irritation. Tartar-emetic may be given in nauseating doses, and the bowels

should be kept free by gentle aperients. When extreme dyspnœa is present, an opening must be made to give exit to the air, and this should be done at a part of the chest below the level of any liquid which it may contain. The operation may be repeated if necessary.

HYDROTHORAX.

This term is used to designate an effusion of *serum* into the sac of the pleura, empyema being employed to distinguish effusions approaching in consistence to the character of pus and the result of pleuritis.

SYMPTOMS.—In most cases the first symptom which shows itself is œdema of the lower eyelids, followed by swelling of the feet and ankles. This is soon followed by dyspnœa, increased upon exertion; and most considerable during the night, when the body is in the horizontal posture; distressing sense of weight and oppression at the chest; the countenance is pale: sometimes, however, it has the asthmatic purple tinge, and wears a peculiar and striking expression of anxiety; the urine is in small quantity; great thirst; anasarca of the upper extremities; the pulse is irregular, often intermitting for two, sometimes for three strokes; palpitation of the heart, sometimes so great as to be both seen and heard; cough, with expectoration generally tinged with blood; in describing his complaint the patient frequently mentions his having the sensation of breathing through water; difficulty of lying upon one side; and when the disease exists in both cavities of the chest, the patient is incapable of lying down at all, and is obliged to be supported by pillows in an erect position; his sleep is disturbed by dreadful dreams of fire, of drowning, of falling down precipices, &c.; and frequently he awakes with a sense of suffocation, suddenly starts from his bed, rushes to the open window for air, and is some time before he recovers his recollection; the arm of the side in which the water is collected is generally cold and torpid, and often affected with numbness.

PHYSICAL SIGNS.—For these, see pleuritis and empyema.

CAUSES.—Organic disease of the heart, extensive chronic disease of the lungs, causing a mechanical impediment to the circulation of the blood. The disease is probably never idiopathic; when inflammation of the pleura exists, it leads to the effusion, not of pure serum, but of mixtures of serum and coagulable lymph, or of pus.

PROGNOSIS.—Very unfavourable, as it indicates increasing severity of the organic disease which has given rise to it, and is in itself a formidable complication.

TREATMENT.—*Indications.*—1. To reduce any existing inflammation. 2. To promote the absorption of the effused fluid.

The first indication may be fulfilled by local depletion, by cup-

ping or leeches, by counter-irritants, and by small doses of tartar-emetic. The second indication requires hydragogue cathartics, as elaterium and castor-oil; or diuretics, as digitalis, squills, acetate of potash, spiritus ætheris nitrici, infusum scopariæ, &c. The choice of the remedies must depend upon the patient's strength and state of health. If great debility is present, diuretics are preferable to drastic purgatives, and if the debility be extreme, the stimulant diuretics should be preferred. An operation is less likely to be attended with benefit in cases of hydrothorax than in those of empyema, but it may be resorted to when the urgency of the symptoms requires it.

CHAPTER X.

DISEASES OF THE PRIMÆ VIÆ, ORGANS OF DIGESTION AND CHYLOPOIETIC VISCERA.

1. Diseases of the mouth and fauces.
2. Diseases of the stomach.
3. Diseases of the intestines.
4. Diseases of the stomach and intestines.
5. Diseases of the liver, pancreas, and spleen.
6. Diseases of the peritoneum.

DISEASES OF THE MOUTH AND FAUCES.

STOMATITIS . . .	Inflammation of the mouth.
GENGIVITIS . . .	Inflammation of the gums.
GLOSSITIS . . .	Inflammation of the tongue.
CYNANCHE TONSILLARIS	Quinsey.
CYNANCHE MALIGNA .	Putrid sore throat.

STOMATITIS.—INFLAMMATION OF THE MOUTH.

It is impossible to give a general description of stomatitis, because each of the tissues which enter into the conformation of the parietes or walls of the mouth, may become the special seat of inflammation, and the disease varies with the tissue which is the seat of the disease. The following varieties of stomatitis are recognized by Billard, from whose work the description is taken.

- Stomatitis, erythematous,
 ——— with alteration of secretion, (*muguet*),
 ——— follicular, (*aphthæ*),
 ——— ulcerous,
 ——— gangrenous, (*gangrene of the mouth*.)

1. *Erythematous Stomatitis*.—The congested state of the lining membrane of the mouth in new-born infants disposes it to become the seat of erythematous stomatitis, which is generally characterised by redness and heat, and sometimes by dryness of the mouth and tongue. It often co-exists with inflammation of the stomach and bowels, and is rarely accompanied by fever in very young infants, though this symptom is common to infants from the seventh to the ninth month. This inflammation may be confined to a part, or extend to the whole mouth, and even to the lips, which swell, excoriate, and sometimes become the seat of *herpes labialis*. When the disease persists for a long time, it often causes profuse salivation, especially in infants under the seventh month. In such cases the flow of saliva is often very abundant.

TREATMENT.—Simple erythematous stomatitis readily yields to emollient gargles and a milk diet; and when it is complicated with inflammation of the stomach and bowels, (*gastro-enteritis*), it yields to the remedies which remove that inflammation.

2. *Stomatitis, with alteration of the Secretion—Muguet—Millet*.—This species is often confounded with another, *aphthæ*, or thrush, though very easily distinguished from it. It presents three different aspects; 1, in the form of very small white points spread over the tongue and inside of the mouth; 2, in the form of larger or smaller patches; 3, in the form of a membrane, which covers the entire tongue and inside of the mouth. Sometimes the points or patches are yellow or reddish, which colour is caused by the contact of bile or a sanguineous exhalation from the mucous membrane affected.

The pointed, creamy, and membraniform excretion, is generally preceded by erythematous inflammation of the surface of the tongue, or lining membrane of the mouth. When this inflammation has continued one, two, or three days, we observe on the sides of the tongue and lips small white points or papillæ, which cover those of the membrane, to which they adhere. M. Billard has most carefully examined such excretions, and never found them under the epithelium, the surface of which is always their seat. They consist, therefore, of a morbid secretion on the surface of the membrane.

This is the first form of the disease, and is always preceded by inflammation of the mouth. If the inflammation stops, the secretion which accompanies it is suspended, the little white spots disappear, and the disease is considered *distinct* or *benign*. But the inflammation very often advances, the white spots unite and form

a large patch, either on the surface of the tongue, lips, or cheeks, or they cover the whole lining of the mouth. These patches thicken, exfoliate, or detach themselves, leaving an inflamed surface beneath. When the whole of the mouth and palate is covered with membrane, the disease is termed *confluent* or *malign*. The papillary form usually occupies the tip and sides of the tongue; that with patches is seen on the internal surface of the lips and cheeks, and the membraniform species of the disease is situated on the base of the tongue and palate. We can explain the causes of these different forms or aspects of the disease. The papillary muguet is situated at the tip of the tongue, or rather on its numerous papillæ; these secrete drops of mucosity, which speedily become concrete. As the papillæ and villosities of the buccal mucous membrane are larger on the palate, base of the tongue, and cheeks, the mucus is secreted in a sheet or layer, concretes in the same manner, and assumes the membraniform appearance above mentioned.

The disease is most common to infants; it may extend along the whole alimentary canal from the mouth to the anus, and also into the lungs and along all the mucous membranes. The mucus is more tenacious or adhesive than usual, similar to what we observe in chronic bronchitis, or winter cough of aged persons. The disease is sometimes seen in adults. Infants at the breast are more subject to it than those of a more advanced age. Perhaps there is something in the constitution of very young infants which predisposes them to this modification of inflammation. It is most common to delicate infants who are crowded in the same place, and to those who are improperly fed with artificial food, or deteriorated breast-milk. The disease is more frequent in France than in England, and prevails, more or less, at all seasons.

M. Billard, who has investigated the disease better than any of his predecessors, informs us, that it did not always prevail with an equal degree of intensity at the Foundling Hospital of Paris, (*Hospice des Enfants Trouvés*.) Thus during the quarter ending in January 1826, he observed out of 290 patients, thirty-four cases of muguet; in the April quarter, out of 235, thirty-five; in the July quarter, out of 213, one hundred and one; and in the October quarter, out of 189, forty-eight.

CAUSES.—The disease does not appear to be contagious, as MM. Baron and Billard have frequently observed healthy infants drinking from the same cup as the diseased, without contracting the disease.

Predisposing.—Early infancy; debility.

Exciting.—The congregation of a great number of infants in the same place.

SYMPTOMS.—When the disease is mild or partial, there is scarcely any fever; but in the severe forms there is hot and dry skin, urgent thirst, frequent pulse, and other symptoms of fever. This

is particularly the case when the disease extends to the stomach and bowels; or along the mucous membrane of the windpipe to the lungs. When the palate, tonsils, larynx, and trachea are affected, the voice is hoarse, and the cry dull.

It appears by the statements of M. Billard, that muguet of the mouth is often complicated with other inflammations. Out of fifty fatal cases of muguet of the mouth occurring in infants, two were affected with inflammation of the cerebro-spinal apparatus, four with inflammation of the skin, twelve with inflammation of the respiratory and circulatory system, and in thirty-two, the digestive apparatus was inflamed. It follows from these facts that inflammation of the digestive apparatus is the most frequent complication of muguet, whilst the other inflammations are merely accidental. This conclusion is also confirmed by the fact, of the strong sympathy between the mouth and other parts of the digestive organs. Among the thirty-two cases in which the digestive organs were inflamed, there were ten in which the stomach was free from disease; in six the large intestines, and in four the small, were more or less inflamed. As to the other twenty-two, they presented inflammation of the œsophagus or gullet, of the stomach, and of some portion of the small or large intestines.

TREATMENT.—When the disease is simple, distinct, or benign, the mouth should be washed frequently in the day with a piece of lint wetted with gum-water. M. Guersent employs a mucilaginous decoction with a fourth part of Labarraque's solution of the chloride of lime, and he prefers this to solutions of borax and sulphate of zinc. He also recommends it in clysters in preference to lime water, which often irritates the intestines. (*Dict. de Med. in 21 vols., art. Muguet.*) If this plan fails, we may use gargles with alum. All gargles should be sweetened. The bowels should be regulated.

When the disease is confluent or complicated, (*black thrush*,) with inflammation of the digestive tube, or any other important organ, it should be combated with the proper means for such concomitant malady. This also applies to inflammations of the cheeks and gums, followed by more or less abundant concretions.

Stomatitis folliculosus.—*Aphthæ.*—*Thrush.*—The disease appears in the form of small white specks or points, offering sometimes a coloured spot in the centre, slightly prominent, and often surrounded by a very slight inflammatory circle, upon the internal surface of the lips and cheeks, on the pillars and vault of the palate, or on the inferior and lateral parts of the base of the tongue. These follicles are either isolated and few in number, or multiplied and spread on all parts of the mouth. They can sometimes be felt with the finger before they can be distinctly seen. They are not often confined to the mouth, but extend into the œsophagus, stomach, and intestinal tube." (*Billard, Traité des Maladies des Enfants.*) The inflammation of the follicles may be very slight, and continue

for some time without inducing any serious disease, or they may undergo the following alterations :—

The follicular spots may enlarge and preserve the primitive round form, they may soften in the centre, and give out a white or puriform matter. This is the second stage or ulcerated period of aphthæ. The elevated points are not tubercles, vesicles, or pustules, as authors have alleged ; but, according to M. Billard, they are evidently the muciparous follicles, as their seat, constant form, and central orifice demonstrate. They are perfectly analogous to those which we see in the stomach, small intestines, the cæcum, and colon.

When an inflamed follicle bursts, it is no longer prominent, it is a superficial round ulcer, with its edges tumefied, and almost always surrounded by an inflammatory circle. It often happens that the centre and edges of this ulceration secrete a pultaceous, whitish matter, adherent like a crust, which is sooner or later detached, and falls into the saliva of the infant.

Isolated aphthæ are generally situated on the internal surface of the lower lip, the frænum, or bridle of the tongue, the internal surface of the cheeks, and upper parts of the gums, when the teeth have not pierced them.

If aphthæ are numerous and contiguous, their edges approximate, the creamy matter they excrete extends from one to the other, and forms a layer, more or less extensive, and more or less thick. It is in this case that aphthæ may be confounded with muguet, but we can always distinguish them, on recollecting the history of the development of the inflamed follicles, and that a solution of continuity or breach of surface does not exist in muguet ; besides, the excretion which accompanies aphthæ always succeeds ulceration, and is always observed on the internal surface of the lips and cheeks ; whilst the white specks in muguet appear upon the lateral parts, and towards the tip of the inflamed tongue, and extend to the surrounding parts.

It sometimes happens that aphthæ become covered with a brown crust, which is produced by the escape of blood from the ulcerated surface beneath it ; and this has been mistaken for angina maligna, and gangrene. This error would lead to dangerous practice, the use of stimulants, such as ammonia, wine, quinine, &c., instead of leeching, purgatives, and antiphlogistic remedies. The result would be that simple ulcerations might be speedily converted into gangrene, which would very much endanger life. There is good reason to suppose that Van Swieten, Rosen, Underwood, and many others, have made this mistake.

When the apthous inflammation is slight, and when it readily yields to remedies, the ulcerations rapidly heal without leaving any trace behind them.

CAUSES.—Aphthæ are not peculiar to infants : adults are also liable to them. This led Bateman to propose the division, *aphtha*

lactantium, aphtha adultorum. He was right; the disease may attack infants at the breast, as well as adults. The disease appears in the latter, when the last stage of phthisis arrives, and also in many other chronic diseases. The disease is most common in feeble, lymphatic, or scrofulous infants. When the lymphatic system predominates, it is readily excited by improper food, by vitiated air, and by the crowding together of a large number of infants. Such is the result of the researches of Raulin, Lapeyronie, Baudelocque, Auvity, Sanponts, and many others. It therefore follows, that the follicular apparatus of the whole alimentary canal acquires an increase of vital energy at the same time as the lymphatic system; hence arises this disposition of infants to inflammation of the follicles, and to the alterations which succeed it in different portions of the digestive tube.

Aphthæ are exceedingly common in new-born infants, more especially when spoon fed, or when applied too often to the breast. It occurs as early as the third day, is common during the first month, and less frequent towards the period of the first dentition. It has been remarked by Underwood, Billard, and others, that there is no fever accompanying aphthæ, though the mouth may be so hot and parched as to irritate the nipple, and oblige the infant to take it with repugnance or precaution.

When aphthæ are distinct, there is little inconvenience during the first period of their developement; but it is not so when they are confluent. We then observe that the infant becomes pale, emaciates rapidly, has diarrhœa, and vomits everything it takes. This results from the extension of the disease to the œsophagus, stomach, and intestines. There are also occasional eructations of the odour of sour milk.

When aphthæ extend to the intestinal tube, there are griping pains, and diarrhœa, and the discharges from the bowels are so acrid as to irritate the parts about the anus, which become erythematous, red and covered with white specks, similar to the primary disease in the mouth. Aphthæ may also appear on the mucous membrane of the vagina.

Aphthæ of the mouth are accompanied by pain, as is shown by the cries of the infant, its insomnia or want of sleep, its peevishness, and disinclination to irritate the mouth by taking food. When the disease extends to the throat, and causes swellings of the tonsils, and inflammation of the lining membrane of the windpipe, the cries of the infant are remarkably altered, and it is this that has led M. Gardien to say, that infants manifest their pains more by hoarseness and wheezing than by real cries.—(*Traité Complet d'Accouchemens, &c.*)

SYMPTOMS.—These consist of an eruption of small white specks, single or confluent, appearing on the tongue, lips, cheeks, gums, uvula, palate, and tonsils. They usually soften in the centre, and discharge a glutinous mucus, which forms a thick whitish crust,

adhering at first most tenaciously, and falling off without inducing an eschar on the parts beneath. In some cases, the lining membrane of the mouth and throat, and the surface of the tongue, become covered with patches of a loose ragged membrane, hanging from these parts, and of a dull white, greyish, or reddish colour. There is in some cases difficulty of mastication, deglutition, and respiration; and the disease may extend to the œsophagus, stomach, and throughout the whole alimentary canal, in which case mucus is evacuated in large quantities by vomiting and stool; and at other times, to the trachea and bronchiæ, when mucus is expelled by coughing. Aphthæ often fall off in the space of ten or twelve hours, more generally they remain for many days, and frequently a separation and reproduction take place several times before the termination of the disease. In severe cases the ulcers assume a livid colour, and become gangrenous; in others the surface of the tongue between the ulcers is of a bright red colour. The disease is most common to children in early infancy, though it may appear at any subsequent period of life. It was formerly considered endemic, and sometimes contagious.

At the commencement of the disease the infant experiences a disinclination to the breast, and is fretful whenever it is applied. Its appetite is bad, and its motions are depraved, though in some cases there is scarcely any indisposition. In others there is much feverishness and irritability, the mouth becomes hot and tender, the nipples of the nurse become painful and sometimes excoriated or chapped, from the contact of the infant's mouth. The disease is slight when confined to the mouth; but when it extends to the œsophagus, stomach, and bowels, there will be frequent vomiting and diarrhœa, followed by irritation and excoriation of the rectum and anus, which become covered with spots like those in the mouth. It does not follow, however, that in this last case the internal surface of the mucous membrane throughout the whole digestive tube is affected, as dissection has shown the contrary; and the sympathy between the mouth and lower bowel would account for the affection of the latter, though the intervening portion of the tube might be free from the disease, just as we observe picking of the nose and lips excited by worms in the rectum.

CAUSES.—*The predisposing causes* of aphthæ are debility, exposure to impure air, use of improper food, a lymphatic temperament, cold, moisture, and debility.

The exciting causes are irritation of the mouth, by allowing the infant to take the breast or to suck a prepared teat or shield too often, and very frequently derangement of the bowels.

TREATMENT.—*Indications.*—1. To moderate or remove the inflammation. 2. To produce a separation of the aphthæ and to heal the superficial ulcers.

The first indication will be accomplished by frequently washing the mouth with lint or soft sponge firmly tied to a small piece of

wood, or whalebone, and warm water alone, milk and water, decoction of marsh mallows, linseed, or barley, or by any other mild mucilaginous fluid; and also by applying the vapour of such decoctions, or of warm water, to the interior of the mouth. The bowels are to be opened with appropriate medicines, as manna, magnesia, or castor oil. It will also be necessary not to lose sight of the state of the general health of the infant, which may result from impure air or improper alimentation. Infants badly nursed or deprived of sufficient food become rapidly feeble; and we should therefore remove all causes of debility which affect the glandular and follicular systems, always attending to the state of the digestive organs, and taking care not to irritate them by stimulants or the injudicious employment of tonics. These means are sufficient for the cure of the benign form of the disease.

When the aphthæ remain stationary, and are surrounded by inflammatory circles, a leech or two applied to each cheek, with a warm bath, will be necessary, in addition to the above-mentioned remedies, to combat the inflammation. The warm bath will determine the blood to the trunk and extremities, lessen it in the different parts of the mouth, and thereby diminish the inflammation by which the aphthæ are produced.

If after the inflammation is subdued, the aphthæ remain adherent, we should use stimulant gargles to detach them. We thus fulfil the second indication of treatment. Borax and honey, or mel boracis, is an old remedy, but one much too stimulating, more especially as it is in general applied too rudely with the finger covered with a piece of muslin. A better application is composed of one drachm of borax, one ounce of honey, and half-a-pint of water, and this should be gently and frequently employed in the manner already mentioned. Others prefer equal parts of honey of roses and barley-water, with a few drops of dilute sulphuric acid. It is often beneficial to touch the ulcerated surface with a piece of sulphate of alumen, with a view of exciting a new action in the ulcerated parts, and to dispose the inflamed surfaces to cicatrise. Alum is an old remedy, and was first employed by Aretæus in the treatment of chronic inflammations of the mouth and pharynx. This medicine was lately recommended by Mr. Mackenzie of Glasgow, and M. Bretonneau of Tours, to detach the effusion of the lymph on the soft palate and pharynx in the first stage of croup. It is always necessary to employ it with caution in aphthæ, and to alternate it with emollient gargles, so as not to exceed the degree of irritation which we wish to obtain with this medicine. If used with reserve and proper caution it accomplishes the same result as borax and sulphate of zinc, which are much more stimulant. We should also employ a proper solution of chloride of lime or soda in a mucilaginous fluid, as recommended in muguet; a drachm of the solution of either chloride may be mixed with a pint of barley-water, and properly sweetened.

When the infant is irritable and deprived of sleep, it should have an anodyne, as syrup of poppies, sedative solution of opium, the preparations of morphia, henbane, &c., in appropriate doses.

The bowels may be opened with castor oil, almond oil, manna, magnesia, or calomel; and when the disease is solely confined to the mouth, and continues for several days, it will be necessary to give a course of alterative medicines, such as three or four grains of the hydrargyrum cum cretâ at night, and a tea-spoonful of castor oil every second or third morning. Alterative powders composed of a grain of hydrargyrum cum creta, or half a grain of calomel, with three or four grains of rhubarb, and two of aromatic powder, may be given once or twice a-day with great benefit. The diet of the nurse should be mild and nourishing, and all stimulating articles avoided. All these remedies will sometimes fail, and in such cases change of air is the last alternative. The country or sea air usually acts very favourably in all cases of chronic diseases in children. A nourishing diet, suited to the patient's age is also necessary.

When the stomach and intestines are implicated, the treatment must be that of gastro-enteritis. If the aphthæ terminate by gangrene, they are to be treated by the means which will be mentioned in the article Gangrenous Stomatitis, or Aphthæ. If they are complicated with, or replace, a cutaneous disease, by warm baths, frictions on the skin, and the means already advised. When diarrhœa is present, it is to be treated as stated when describing that disease.

Ulcerous Stomatitis.—This species of stomatitis is caused by inflammation of the mucous membrane of any of the parts which compose the mouth, cheeks, and throat; and is a different disease from aphthæ.

It appears as the result of inflammation or ramollissement of the mucous membrane, and is not preceded by any aphthous appearance.

The treatment should be antiphlogistic, viz. leeching, purgation, warm bath and counter-irritation; and when ulceration is established, the remedies used for aphthæ are necessary. Slight escharotics are useful in obstinate cases, and if gangrene supervene, we should have recourse to the remedies for that disease which are given in the last stage of typhus.

These ulcers appear on and under the tongue, on the cheek, and soft palate, arch of the palate, and roof of the mouth, and, according to M. Billard, are often fatal. We frequently see them in adults whose digestion and general health are bad, and also towards the termination of certain chronic diseases.

Pustulous Stomatitis.—M. Billard employs this term to characterise the inflammation of the buccal mucous membrane, which is developed during the progress of small-pox, and which gives rise to pustules analogous to those on the skin. The treatment is that of small-pox.

Gangrenous Stomatitis.—This was termed gangrenous aphthæ by Dr. Underwood and subsequent writers, and is graphically described by M. Billard. Gangrene of the buccal mucous membrane, or of the soft parts that form the cavity of the mouth, may succeed the different forms of stomatitis already described, but particularly the follicular species of that disease.

When aphthæ terminate in gangrene, their edges assume a burned, torn, and soft appearance; they present a brown eschar, which when detached, leaves an open surface, of a vermilion and granulated aspect. The eschar is sometimes covered with a soft pultaceous substance, of a brown colour, and with an evident gangrenous odour. The surrounding parts become swollen, are of a violet colour, and are soft and easily depressed. The mouth of the infant, which is generally open, allows the escape of the saliva; the face is pale; there is great prostration of the vital powers, and an absence of fever. The pulse is extremely feeble; the skin is cold, pale, and insensible. After some time, vomiting, diarrhœa, tumefaction of the abdomen, and sometimes hiccup, supervene.

Gangrene consequent on aphthæ is extremely fatal, as it is accompanied by great prostration of strength. The indications of *treatment* are to support the strength and correct the state of the affected parts. The first indication is fulfilled by aromatic spirit of ammonia, wine, quinine, animal and vegetable jellies; the second by touching the gangrenous parts with a solution of chloride of lime or soda, or with sulphuric, nitric, or muriatic acid, by means of a capillary glass tube. A mucilaginous fluid, acidulated with some of the chlorides or acids just mentioned, may be applied to the gangrenous parts of the mouth with a piece of soft sponge, or some lint tied on a piece of wood or whalebone. Some advise the application of a solution of alum, others prefer the nitrate of silver, or the fused potass.

There is another form of *gangrene of the mouth*, which is not preceded by inflammation. This disease is well described by some modern French physicians. MM. Baron, Guersent, Jadelot, and Isnard, have most graphically described it. The first and last of these authors have treated of it the most successfully.* Van Swieten, in his learned Commentaries on Boerhaave's Aphorisms on Diseases of Infants, has described gangrene and destruction of the gums; but the disease under notice extends to and affects the mucous membrane, and the parietes or structures that compose the cheeks.

The hands, feet, and external genital organs of female infants, may be attacked with gangrene, and so may the soft parts that compose the mouth. Infants who are feeble at birth, or affected with chronic or severe diseases, are most liable to it.

* Baron, Mem. sur une affection gangréneuse de la bouche. Bullet. de la Faculté, 1816. Isnard, Dissertation sur une affection gangréneuse particulière aux enfans. Paris, 1818.

According to MM. Baron and Billard, there are two forms of this disease. The first presents a circumscribed œdematous swelling, characterised by an oily appearance of the skin, and by a central point, which is more or less hard, over which there is a dark red spot either on the internal or external surface of the cheek. In cases of young infants there is no fever. An eschar forms on this central spot from within outwards; the mucous membrane becomes disorganized; all the soft parts of the periosteum mortify, and fall off in shreds, mixed with a sanguineous dark fluid; the parietes of the cheeks and gums are destroyed, are expelled from the mouth, and exhale a fœtid odour. This is the second degree.

This disease must not be confounded with gangrene of the mouth, accompanied by malignant pustule, which commences on the cheek; or, as M. Rayer has remarked, the first differs from the malignant pustule, as the gangrenous inflammation commences in the interior of the mouth, and extends subsequently to the skin. This form of gangrene often succeeds small-pox, measles, and scarlatina, and the face and extremities are œdematous at the same time. A similar disease to this attacks the external genital organs of female infants, and they often die of gangrene of the vulva. Dr. Percival and Mr. Kindar Wood, of Manchester, have accurately described this gangrene, and their account of it will appear in the chapter on diseases of the organs of generation.

TREATMENT.—The treatment must be modified according to the stage of the disease. When there is œdema of the cheek, it is to be treated like that of other parts, by purgatives, diuretics, diaphoretics, cold applications, as spirit lotion, or one composed of hydrochlorate of ammonia with nitrate of potass. When the œdema is circumscribed, it may be removed by frictions with the liniments of ammonia, and if the part become red a leech or two should be applied.

When these remedies fail, and the disease advances, the affected part becoming purplish or black, and there is erosion of the cheek internally, it will be necessary to cauterize the central point of the tumefaction, by means of a wire at a white heat introduced through a crucial incision made on the external surface of the cheek. M. Baron prefers this method to chemical cauteries, as these destroy too much surface and cause greater deformity. Fomentations and emollient cataplasms are necessary after these applications, and the mouth ought to be washed with a mucilaginous acidulated gargle, to detach the eschar and moderate the inflammation. This plan often arrests the progress of the disease much better than constitutional remedies. A weak solution of the chlorides of lime or soda are very efficacious.

The constitution should, at the same time, be supported by the use of beef-tea, chicken-broth, milk, light wine, in small quantities and diluted with water. The best wines are Malaga, Bucellas, or

Sherry. It is always to be remembered that though there is great debility, the digestive tube is often the seat of irritation or inflammation, and therefore stimulating medicines or drinks will only increase it. If there is no symptom of gastro-enteritis, no pain on pressing the abdomen, no vomiting, a cautious use of stimulants is indicated.

GENGIVITIS.—INFLAMMATION OF THE GUMS.— PAINFUL DENTITION.

DISEASES OF THE FIRST DENTITION.—Dentition or teething is a natural function, and in infants in perfect health unproductive of pain or disease. In general, however, infants suffer more or less severely during dentition, from irritation in the stomach and bowels, often followed by diseases of the head and chest. Irritation in the digestive apparatus will extend to the gums, or irritation in any part of the body may derange the whole economy.

It is generally accompanied by an increase of saliva, the infant drivels, the gum is red, hot, painful, and swollen. The infant puts its fingers, or whatever it can grasp, into the mouth, and presses its gums upon it, which excites absorption and promotes the cutting of the teeth. Pressure, however, is not borne when true inflammation is present, but only when there is the natural excitement, pruritus, or itching of the gums. In some cases there is intense inflammation or congestion of the gum, in others there is hæmorrhage into the alveolar processes, or ulcerations; but these cases are of very rare occurrence. In other instances there is general redness of the mucous membrane of the mouth, with all the characters of erythematous stomatitis, fever, vomiting, and diarrhœa. In other cases, severe aphthæ, or gangrene, supervenes.

The general symptoms are disturbed sleep, fretfulness, with more or less disturbance of the stomach and intestines. In severe cases there may be determination of blood to the head, inflammation of the brain or its coverings, (cerebritis, meningitis,) water in the head, inflammation of the throat, œsophagus, stomach and bowels, diarrhœa, cough, and inflammation of the lungs, bronchi, or pleura.

The *treatment* of the local complaints of the first dentition, ought to be simple. It consists in the application of emollient, mucilaginous, and refrigerant lotions to the gums; friction, and incision of the gums with a lancet. Lint dipped in cream, the white of egg with syrup of violets, or rose-water, may be applied to the gums. Others have added a small quantity of laudanum. This is the chief ingredient in all patent vegetable syrups for cutting of the teeth. It requires to be used in very small quantity, not more than two or three drops at a time; for it may be swallowed with the saliva, and narcotise or poison the infant. When there is

heaviness and constant tendency to sleep, congestion of the brain may be suspected, and a leech may be applied at the angle or affected part of each jaw, or behind each ear. The infant should be placed in a warm bath, and a cap or napkin, wetted with cold water, applied to the head while the infant is in the bath. If this be omitted, the bath may do as much harm as good, by increasing the determination of blood to the head. The cold drives the blood from the head, while the heat diffuses it to the rest of the body; and in this way the brain is relieved. In such cases the bowels should be properly regulated. When there is fever, and it is accompanied by great thirst, barley-water, cold water, milk and water, or toast and water, should be given freely.

When there is inflammation of one or more points of the gums, leeches and incision are necessary. Van Swieten has given a very wise direction as to incision. It is not necessary, he says, to incise or cut the gum until it is evidently elevated by the tooth, and is hard, red, and painful; for if the tooth is deep in the gum, it cannot be forced to make its appearance by incision; this cicatrises, the cicatrix or scar is harder than the tissue of the gum, and will give more resistance to the advance of the tooth than the gum itself. The practitioner will therefore, in such a case, compromise his reputation, if he hazard incision until the tooth is pressing on the upper part of the gum. I have known one case, says Van Swieten, in which the tooth did not appear for eight months after the incision (*Morbi Infantum*). It must be obvious that cutting the gum, while the tooth is undeveloped and is buried in the jaw, is a useless and injudicious practice; because the operation cannot possibly favour the growth of the tooth. Yet the operation is recommended by one of our most eminent surgeons, on the ground that a cicatrix being a new part is more readily absorbed than the gum. Incision, then, ought not to be practised unless the gum is swollen, hot, and painful, in consequence of the pressure of the tooth against it. In making the incision prematurely, the appearance of the tooth, so far from being accelerated, is retarded, on account of opening the capsule of the tooth before the latter is perfectly ossified.

The mode of incising the gum deserves attention. The head of the infant is to be held, while the operator opens the mouth and separates the jaws. He then introduces a bistoury, three fourths of whose edge is covered with lint, and makes an incision parallel to the alveolar margin; and then, separating the jaws still more, he makes another incision transverse to the first. These incisions should be made down to the tooth—the gum ought to be completely divided, and no flap or bridle allowed to remain. This crucial incision disgorges the congestion or inflammation of the gum, and removes the irritation caused by the pressure of the hard tooth on the irritated nerves of the gum which are subjected to it. This operation is by no means so painful as is generally imagined by

mothers. Some infants show no sign of suffering. But in other instances they scream loudly. In a few seconds they fall into a tranquil sleep, from which they sometimes awake apparently in perfect health, even after having been in convulsions, up to the moment at which the incision was practised.

Some writers have lauded this operation in the most extravagant terms, as having miraculously saved the lives of numerous infants: others condemn it equally strongly. When there is cerebral congestion, convulsions, spasmodic cough and breathing, excessive diarrhoea, inflammation of the fauces, or throat, or of the stomach and bowels, there can be little doubt of the propriety of the operation.

The gums are subject to swelling, ulceration, and gangrene, both in the infant and in the adult. When these affections occur in the adult they are generally parts of other more general diseases of the system, as scurvy, or the mercurial disease; in young children they are more commonly idiopathic.

GLOSSITIS.—INFLAMMATION OF THE TONGUE.

Inflammation of the whole tongue is a rare disease, except as the consequence of profuse salivation or the application of strong irritants. More commonly it is of limited extent, appearing, at first, as a hard tumor on the upper surface. This tumor suppurates slowly and leaves a deep ulcer, which sometimes penetrates the tongue. It owes its origin, in most instances, to derangement of the stomach and bowels, and is cured by purgatives with the local application of nitrate of silver. Ulceration sometimes takes place on the side of the tongue from the irritation of a decayed tooth. In this case the cause of irritation must be removed by filing or removing the tooth. *Scirrhus* of the tongue is known by the peculiar hardness of the tumor, the irregular ulceration, the acute lancinating pain, and the cachectic state of the constitution. *Syphilitic* ulcerations of the tongue occasionally occur and require a course of mercury or iodide of potassium, with the local application of nitrate of silver.

TONSILLITIS.—CYNANCHE TONSILLARIS.—QUINSEY. INFLAMMATORY SORE THROAT.

SPECIES.—1. *Acute*. 2. *Chronic*.

ACUTE TONSILLITIS.

SYMPTOMS.—The characteristic symptoms of inflammatory sore throat, are unusual redness, frequently accompanied with white spots on the posterior surface of the throat; great difficulty or im-

possibility of deglutition; the return of drinks or aliments by the nostrils; heat and dryness of the throat, and, after some time, an expectoration of viscid, ropy, whitish or yellowish phlegm; and, finally, acute pain in the eustachian tube and ear, sometimes alteration of the voice, and at the same time a difficulty of articulating sounds. In some cases the voice is altered or suppressed, and there is complete hoarseness. The constitutional symptoms generally make their appearance with the first blush of inflammation in the throat, and in some cases they precede it. They consist of pyrexia ushered in by cold chills, and pain in the back and limbs, with a very frequent, full, and soft pulse. As the disease advances, the febrile symptoms often subside, or change their character with the degree and nature of the inflammation. They are those of inflammatory fever during the first stage, those of mild hectic during the stage of suppuration.

The *duration* from five to seven days.

TERMINATIONS.—It may terminate by resolution, suppuration, ulceration, or gangrene. When the tonsils suppurate, the abscess bursts into the mouth in most cases, and it may be opened with a sharp-pointed bistoury. It often becomes chronic, the affected parts are enlarged and indurated, and this state may persist, in grown persons—especially in those of a scrofulous habit—for weeks or months. In some cases the tonsils are so enlarged as to impede deglutition and respiration, and to require tracheotomy.

Each of these terminations is characterised by peculiar symptoms. Thus we presume that resolution will take place when the disease is slight and properly treated, when the respiration is not much impeded, and when there is expectoration; but this is not to be expected in young infants; these do not expectorate, for when they bring up phlegm into the throat, by coughing, they immediately swallow it. Suppuration is to be feared when the disease is prolonged and does not yield to remedies, when the local pain is acute and throbbing, or when there are rigors or cold shiverings without any evident cause. An abscess is indicated in tonsillitis, when there is swelling, a sense of fluctuation, on pressure made with the finger, a whiteness of some part of the tumor, and, finally, by purulent expectoration and a cessation of all the symptoms.

Gangrene is to be dreaded, if the fever is intense, and the pain extremely violent, without any sign of resolutions, suppuration, or metastasis; the countenance is sunken; the extremities cold and covered with a clammy perspiration; the pulse is small, soft, frequent, and weak, and there is a fœtid odour issuing from the mouth. We often observe this train of symptoms in the worst form of scarlatina.

CAUSES.—It attacks children and adults of both sexes, but rarely occur safter forty years of age; it sometimes prevails, as an epidemic, in spring and autumn—seasons remarkable for the vicissitudes of the atmosphere; and it is also observed in some countries more than

others. Infants are most commonly affected when suddenly exposed to the impression of cold air, after having been in a warm temperature, or when they repose in moist situations while in a state of perspiration. The sudden application of cold to the feet, the action of a current of cold air on the nape or front of the neck, cold drinks, while the body is heated, or in a state of perspiration, the deglutition of acrid or stimulating substances, walking in a contrary direction to a cold wind, long and loud crying, or singing; everything that suddenly suppresses transpiration or habitual evacuations, and everything which directly irritates the air-passages, may excite the disease.

Patients who have once suffered from it are very liable to its recurrence on any exposure to cold.

TREATMENT.—The *treatment* of acute tonsillitis must be more or less active, according to the severity of the symptoms. When the disease is slight in very young infants, there is scarcely a necessity for using medicine. A moderate diet, a mild aperient, confinement to bed, with warm drinks, are generally sufficient to effect a cure.

When the infant is one or two years old, and suffers from pain during deglutition, evinced by its crying and raising the hand to the throat, the respiration laborious or difficult, and the tonsils so swollen as to be felt externally, there is inflammation, which requires active treatment. The common practice is, to apply hartshorn and oil, on flannel, to the throat, and this causes such counter-irritation as frequently to arrest the progress of the disease.

If the bowels be opened with some mild aperient, and the infant's diet diminished, a cure is mostly effected. It is seldom necessary to apply leeches, unless the habit is robust. Most cases are cured without them. Some advise blisters, or a mustard-poultice, to the throat; but these are seldom necessary in cases of children under three years of age. Others recommend emetics, brisk purgatives, and pediluvia, with a view of reducing the vital power; but these, except the foot-bath, are rarely required in the treatment of young infants. The application of warm emollient cataplasms to the neck is advantageous.

When suppuration takes place, the abscess may burst into the mouth, but this seldom occurs in early life. It is scarcely ever necessary to open the abscess with a bistoury; but should it point externally, we may, after the use of poultices, give vent to the matter with a lancet. In some cases the abscess is situated too low in the pharynx, or in the larynx, to admit of an artificial opening, and must be left to itself. In many cases it was not discovered until after death.

In cases of adults the disease requires active measures.

The *indications* are those for the treatment of inflammation in general.

Emetics are extremely useful in the beginning, before the febrile

symptoms are very violent. The timely exhibition of an emetic often checks the complete formation of the disease.

When the disease is not checked, the antiphlogistic regimen and diet must be enforced, and the inflammation attacked:

1. By blood-letting, general or local.
2. By blisters to the throat and back, and rubefacients.
3. By purging.
4. By diaphoretics, such as recommended against inflammatory fever.
5. By inhaling the steam of warm water, alone, or impregnated with vinegar, camphor, or æther.
6. By sedative or slightly-stimulant gargles, which facilitate the separation of viscid mucus from the fauces.

If suppuration ensue, emollient cataplasms, warm emollient gargles, frequently inhaling the steam of warm water, and early incision, either internal or external.

If a tendency to gangrene, the means enumerated under the head *Cynanche Maligna* are to be used.

If danger of suffocation, scarifications of the swollen part, inhalation of æther, bronchotomy.

The strength of the patient should meanwhile be supported by nutritious clysters of animal broths, thick gruel, or a solution of starch.

CHRONIC TONSILLITIS.

Chronic enlargement and induration of the tonsils often follows an acute attack of tonsillitis. It is also of frequent occurrence in cachectic constitutions, and in the chronic forms of dyspepsia. Sometimes, also, it is prevalent during epidemics of scarlatina. The disease is generally removed by improving the general health. When, however, it does not yield to constitutional remedies, excision may be practised with advantage. The same remedy is recommended in chronic relaxation of the uvula. The ointment or tincture of iodide may also be applied externally with advantage.

Ulceration of the tonsils may likewise occur in disordered states of health, but it is more commonly one of the secondary effects of syphilis. The disease is generally slow in its progress, but, if not speedily removed, attacks the surrounding textures, extending into the nostrils and fauces, and ultimately attacking the larynx itself. The disease is effectually treated by the iodide of potassium given in five-grain doses three or four times a day. This is to be preferred to the preparations of mercury which were formerly in use. A gargle of the chloride of sodium may, at the same time, be used with much advantage. The general health must be carefully attended to, and the strength must be supported by a nourishing and generous diet. The decoction of sarsaparilla is generally given at the same time with the iodide of potassium.

CYNANCHE MALIGNA.—PUTRID SORE THROAT.

This disease was described as an epidemic by Dr. Fothergill about the middle of the last century. It principally attacked infants, children, and adolescents, who were delicate or enfeebled by former diseases. This form of angina is occasionally epidemic, and rarely sporadic. According to some it is contagious, as it attacks several children in the same family; and according to the best modern writers, it is scarlatina maligna.—See Scarlatina.

SYMPTOMS.—The first symptoms of the disease are giddiness or pain in the head, cold shivering, alternating with heat of the skin, stiffness of neck, restlessness, flushed face, redness of the eyes, hoarseness, sore throat, nausea, vomiting, and sometimes diarrhœa. On inspection, the throat is observed of a vivid red or rose colour, especially the posterior pillars of the palate, the tonsils, and whole fauces. This redness soon deepens, and is interspersed with dark brown specks. The tongue becomes covered with a thick brown fur, the inside of the lips is beset with vesicles, and a thin acrid fluid escapes from the mouth and nostrils, irritating or excoriating the contiguous parts, and in some cases a similar fluid is discharged from the anus; there is now diarrhœa; the fever advances with increased prostration of strength; the pulse is small, frequent, and irregular; delirium, coma, and great difficulty of respiration supervene; and, in some cases, the face, neck, throat, chest, hands, and fingers become swollen, and present an erysipelatous tint; and there is a scarlet eruption all over the body, which disappears by desquamation of the cuticle.

This occurs on the second or third day. The tongue is usually intensely red, the inflammation may extend along the mucous membrane of the fauces, nostrils, and Eustachian tubes, and be followed by a purulent discharge from the nostrils and ears. The pulse is small and frequent, there is great prostration of strength, the lips and gums are covered with a brownish fur, there is a fœtid odour from the throat, and all the symptoms of typhus or putrid fever manifest themselves.

On the fifth or sixth day the scarlet eruption disappears, leaving the skin of a brown colour; the cuticle peels off in small scales all over the body, and in larger portions from the palms of the hands and soles of the feet.

Should the symptoms improve, the patient regains his appetite and strength; but it often happens that the convalescence is tedious, there is languor and debility, stiffness of the limbs, frequent pulse, disturbed sleep, loss of appetite, great thirst, and scanty urine. These symptoms are rapidly succeeded by anasarca alone, or combined with ascites or hydrothorax. Sometimes these dropsies occur so early as the tenth day; in other cases three or four

weeks after convalescence. Malignant or putrid sore throat, and malignant scarlatina, are now very generally considered the same disease, and are treated in the same manner. Some writers describe them separately; but it has been found, on due consideration, that the symptoms, pathology, and treatment of both, are precisely the same.

PROGNOSIS.—The *favourable* termination is announced by the moderation of the symptoms, and by their remission on the fourth or fifth day. The fever diminishes, the state of the throat is improved on the appearance of the eruption, the cuticle desquamates to a greater or less extent, in most, but not in all cases, and the sleep and appetite return.

The *unfavourable* termination is expected when the throat is of a deep red, ash, or purple colour, speedily succeeded by sloughs and deep ulcerations, accompanied by salivation, or a discharge of a corrosive, offensive fluid, some of which is swallowed, irritates the stomach and bowels, and may in adults and young persons induce violent diarrhœa. These symptoms are attended by great prostration of strength, delirium or coma, difficulty of deglutition and respiration, great anxiety of the countenance, the eruption of a dark colour, and in patches on the second day; or it does not appear at the usual time, or for several days afterwards; which state is often followed by cerebral congestion, the lips, throat, and genitals becoming gangrenous, or passive hæmorrhages issuing from the nostrils, mouth, bowels, or bladder.

In other cases the fever continues after the desquamation; there are glandular swellings, discharges of purulent matter from the nostrils or ears, anxious difficulty of respiration, stridulous voice, indicating the extension of the inflammation to the larynx and trachea; acute pain in the ear, with deafness, the saliva tinged with blood, or of a dark colour; the skin continuing dry, and covered with a fresh eruption, and there is also an increase of fever.

MORBID APPEARANCES.—On dissection, the fauces or throat, larynx, or trachea, are found intensely inflamed, ulcerated, or gangrenous; and as the respiration was difficult, preventing the return of blood from the head, and through the lungs, we find the brain or lungs congested or inflamed. This form of the disease is most dangerous, and often destroys several children in schools, and sometimes in a day or two, three out of four, in the same family. It is erroneously stated, in some works on the practice of medicine, that scarlatina maligna is seldom fatal, though every observant practitioner can attest the contrary. Common inflammatory sore throat usually yields to antiphlogistic treatment, such as already described, and terminates by resolution, suppuration, or induration. Gangrenous or malignant sore throat, on the contrary, is much more intense, has a tendency to terminate by superficial or deep-seated ulcerations, sloughing, and the other symptoms already enumerated. The disease is so sudden in its progress that deple-

tion or leeching can seldom be employed, and according to most practitioners, are injurious.

TREATMENT.—The indications of treatment are, 1, to prevent the tendency to gangrene by supporting the strength of the system; 2, to promote the separation of the sloughs, and preserve the healthy state of the fauces.

To fulfil the first indication, the use of wine, bark, quinine, ammonia, and nutritious diet is necessary; in fact the same remedies should be employed as in the last stage of typhus or adynamic fever.

The second indication will be accomplished by the employment of stimulant, tonic, and astringent gargles, such as infusion of capicum, of roses acidulated, solutions of the chlorides of lime and soda, of muriatic acid, of myrrh, or watery extract of cinchona.

These may be injected into the throat with a small syringe, or applied by means of a piece of sponge or lint securely tied to a piece of wood or whalebone.

When the sloughs are formed they are often removed by the frequent use of some one of these gargles, of which, perhaps, the chloride is the best; but should these fail, the diseased parts may be touched with the linimentum æruginis, a strong solution of alumen, or sulphuric or muriatic acid, in the proportion of thirty or forty drops in an ounce of honey, the muriate or nitrate of mercury, or the nitrate of silver. During the whole course of the disease the strength ought to be supported with animal jellies, chicken broth, beef-tea, and vegetable jellies, such as arrow-root, sago, tapioca, &c. with a due proportion of wine, or ardent spirit of any kind diluted with water.

If diarrhœa supervene, it is treated with astringents combined with opium, as directed in the description of that disease.

Hæmorrhages will, in general, be restrained by the use of the dilute acids or acetate of lead.

It is highly beneficial to sprinkle the apartment and bed-clothes with a weak solution of chloride of lime, in the proportion of one drachm, or about a small tea-spoonful, of the powder in half a pint of water. This solution is preferable to that of the chloride of soda, which gives out a more unpleasant odour, impedes the respiration, and induces a sense of suffocation. To obviate the inconvenience of this odour there should be free ventilation, or a current of pure air must be occasionally admitted into the apartment. When the heat of the body is intense in the first stage of the disease, it is to be moderated by sponging the body with cold water and vinegar, or affusing cold water over the naked body. Dr. James Home, of Edinburgh, employed this remedy in measles, scarlatina, and small-pox, both before and after the appearance of the eruption. When the lower extremities are cold, they ought to be immersed in warm water during the cold affusion. The bowels should be opened moderately; the cold affusion may be continued for six or eight minutes, provided the temperature of

the body is higher than natural. When the patient is of a full habit, we may employ venæsection during the first two days; but in some cases there is a well-marked tendency to typhoid symptoms, even on the first day, and detraction of blood is totally inadmissible. Some practitioners advise an emetic at first, in preference to all other remedies, and after its operation they order purgatives in divided doses. These last should be prescribed with caution, on account of the tendency to diarrhœa in this disease. A purgative, however, is necessary, and generally useful at the commencement of the disease, but it is not free from danger when great debility or sloughing has taken place.

The malignant sore throat is more sudden and dangerous during some seasons than in others, and will require the application of leeches to the throat, which may prevent gangrene. We also observe one child affected with inflammatory sore throat which, if neglected, or not treated with leeches, purgation, &c., will speedily end in the malignant or gangrenous; while we often see another child in the same, or in an adjoining house, in the same condition as the former; but by leeching, purging, &c., a cure is effected without any appearance of gangrene.

Malignant sore throat is a most fatal disease, both to children and adults, and often destroys a great number of the former in schools.

Some of the German writers, among whom is Hahneman, extol belladonna, as a preventive of scarlatina. The medicine is employed as follows:

R. Extracti belladon. gr. ij.; Aquæ destillatæ ℥j: Misce.

The dose is from one to five drops four times a day, for children under six years of age, and to those who are older, from six to ten drops.

Dr. Macmichael has written in favour of this remedy; but it is not much depended upon at present.

DISEASES OF THE STOMACH.

GASTRITIS	.	.	Inflammation of the stomach.
DYSPEPSIA	.	.	Indigestion.
GASTRALGIA	.	.	Pain in the stomach.
PYROSIS	.	.	Water-brash.
HÆMATEMESIS	.	.	Vomiting of blood.
Carcinoma of the Stomach.			

GASTRITIS.—INFLAMMATION OF THE STOMACH.

SPECIES.—1. *Acute*. 2. *Subacute*.

1. ACUTE GASTRITIS.

SYMPTOMS.—An acute fixed pain and sense of burning heat in

the region of the stomach; sudden and great prostration of strength; wiry, hard, contracted, and rapid pulse, which soon becomes small, irregular, and intermittent; extreme anxiety; frequent hiccup; violent and painful vomiting; the pain is aggravated by taking food, and by pressure; great thirst, and desire for cold drinks; sometimes an erysipelatous eruption in the fauces, extending along the alimentary canal; tongue red at its point and margins, or over its entire surface, and finally becoming parched and glazed.

The disease terminates either—

In resolution:—when the pulse becomes more soft and full, and the other symptoms gradually disappear.

In gangrene:—marked by a violent exacerbation of the symptoms, followed by a sudden cessation of heat and pain; the pulse becoming more rapid and intermitting; the utmost prostration of strength, flaccidity and coldness of the præcordia, delirium, hiccup, cold extremities; death.

In suppuration:—preceded by a remission of pain; increased sense of weight and anxiety; severe rigors.

CAUSES.—The sudden application of cold to the body generally, to the extremities, or to the stomach, as in drinking cold fluids while the body is preternaturally warm; the repulsion of eruptions; the operation of acrid or poisonous substances taken into the stomach; the translation of gout and other diseases; indigestible food; violent passions of the mind; abuse of spirituous liquors; or the ingress of acrid bile, as in common or spasmodic cholera.

When the symptoms are slight, the mucous membrane of the stomach alone is affected; but in intense gastritis all the coats of the organ are implicated.

DIAGNOSIS.—*From enteritis*.—By the seat of the pain, as ascertained by pressure; by the peculiar sense of burning heat in the epigastric region; by the more severe vomiting and hiccup.

PROGNOSIS.—*Favourable*.—About the third or fourth day the pulse becoming more soft and full, and diminishing in frequency; the pain gradually ceasing; the urine depositing a sediment; diarrhœa.

Unfavourable.—The disease continuing after the expiration of a week, with severe rigors, followed by a sense of weight in the region of the stomach. The symptoms marking the accession of gangrene.

ANATOMICAL CHARACTERS.—The external membrane of the stomach is usually natural; sometimes this viscus is distended with air; but occasionally it is contracted. The mucous membrane of the stomach is sometimes studded with red dots, or covered by patches, arising from the effusion of blood into the substance of the membrane itself; at other times a uniform redness is diffused over the whole extent, being particularly conspicuous, and of a deeper shade, around the cardia and pylorus.

Occasionally the redness follows the course of the blood-vessels, which are injected and arborescent; this colour is of a vivid red or of a darker shade, almost brown; both shades are alternately mixed or intimately blended one with the other. In some cases an effusion of gas takes place beneath the mucous membrane.

Gangrene is rarely met with; ulceration is also unusual, and seldom penetrates as far as the muscular coat. Softening is a common consequence. When the mucous follicles are affected, they resemble small reddish pimples.

When contraction of the stomach accompanies inflammation, the rugæ of the mucous coat are very prominent, and of a deeper tint than the surrounding parts.

TREATMENT.—*Indications*.—To reduce the inflammatory action in the stomach, and diminish its irritability:

1. By general and topical blood-letting.
2. The use of the warm-bath; even until fainting come on.
3. Fomentations to the abdomen.
4. Blisters or other counter-irritants to the region of the stomach.
5. By keeping the bowels open with emollient clysters; purgatives by the mouth should be avoided.
6. By mucilaginous diluents in very small quantities and often, especially gruel, linseed-tea, or barley-water, in which gum acacia is dissolved.

The patient should drink freely of cold or iced water, and cold applications may be placed over the epigastrium. Where there is constant sickness, small doses of morphia or hydrocyanic acid are of great service.

SUBACUTE GASTRITIS.

This is by far the most common form of the disease. Its *symptoms* are pain in the epigastrium increased by pressure, and *immediately* on taking food, with constant nausea or sickness, the stomach rejecting food *as soon as* it is swallowed, or after a short interval. The tongue is sometimes red at the tip and edges, and furred in the centre; at others morbidly red over the entire surface; but in many cases perfectly clean. The bowels are generally costive, but sometimes diarrhœa is present, when the disease is called gastro-enteritis. This form of the disease is often accompanied by a dry cough.

CAUSES.—Constipation; an occasional increase of dyspepsia; unwholesome diet.

TREATMENT.—A few leeches to the epigastrium in the more severe cases, followed by a blister or mustard poultice. In the less severe forms of the disease, the counter-irritant alone is required. The diet must be carefully restricted to gruel, arrow-root, or sago, made with water or milk, to the entire exclusion of solid food. A mucil-

laginous mixture with a few drops of tincture of hyoscyamus may be given three times a day; and the bowels must be kept open by the compound rhubarb or aloetic pill, given every night, or every alternate night, as required.

DYSPEPSIA.—INDIGESTION.

SYMPTOMS.—Want of appetite; distention of the stomach; flatulent eructations; general debility, languor, and aversion to motion; dejection of spirits; spasmodic pains in the region of the stomach; nausea; acid eructations; sometimes rumination; sense of oppression and sinking after eating; heart-burn; irregularity of appetite; either obstinate costiveness, or diarrhœa; small low pulse, quickened upon the slightest exertion; palpitation; flushed countenance after a meal; the tongue dry, and generally white in the morning; pale urine, depositing a red (lithic acid) or a white sediment (the phosphates), with an oily pellicle on the surface; cold extremities; sallow countenance; various affections of the senses; depraved vision, &c; pain in the head and breast; dry skin; sometimes, however, profuse diaphoresis or salivation; disturbed sleep, frightful dreams, hectic fever, symptoms of hypochondriasis.

CAUSES.—Everything which debilitates the system in general, or the stomach in particular; narcotics, as opium taken in immoderate quantities, spirituous liquors, tea, tobacco, &c.; the frequent use of warm relaxing liquids; sedentary life; imperfect mastication; certain depressing affections of the mind; too flatulent or farinaceous a diet; excessive evacuations; the too powerful operation of emetics and purgatives; diseases of the liver; hysteria; hypochondriasis; aliment taken into the stomach in too large quantities; excess in venery; exposure to moist and cold air; deficiency in the secretion of bile, saliva, or gastric juice.

PROXIMATE CAUSE.—Disordered functions of the digestive system.

DIAGNOSIS.—*From hypochondriasis.*—See Hypochondriasis. Dyspepsia is the most common cause of depression of spirits.

TREATMENT.—*Indications.*—I. To remove those causes which are obvious and continue to operate.

II. To palliate urgent symptoms.

III. To restore the tone of the stomach, and prevent the recurrence of the disease.

The first and most important step to be taken in the cure of dyspepsia is to point out to the patient the indispensable necessity of changing such habits and pursuits as may have tended to give rise to the disease, and continue to aggravate it: until this has been effected, remedies will be found of no avail.

The cure will then consist,

1. In the occasional exhibition of a gentle emetic, or, what is preferable, an aperient, to remove the crudities from the stomach and bowels, indicated by nausea, sense of weight and oppression, and eructations of imperfectly-digested food, and costiveness.

2. In correcting morbid acidity, by alkalis and absorbents alone, or united with laxatives.

3. In aperient medicines regularly administered so as to relieve the bowels without inducing hypercatharsis.

4. In the use of mercurial preparations when the evacuations are clay-coloured, or when there is hæmorrhage from the stomach or intestines.

5. In removing diarrhœa, should it accidentally occur, by a strict regulation of the diet.

6. In restoring the tone of the stomach by bitters combined with astringents and aromatics; the mineral acids; chalybeates; by keeping the extremities warm; cold bathing; by the use of mineral waters, more particularly those of Buxton and Seltzer; by a diet consisting of light animal food, carefully avoiding the more indigestible foods and flatulent vegetables; by abstaining from malt liquor, and employing soda water, weak brandy and water, or water mixed with the least acescent wines, as Madeira or Sherry, as common drink; and, lastly, by warm clothing, more especially about the feet and legs.

The various bitter infusions of the pharmacopœia may be successively tried in obstinate cases; and the combination of quinine with aloetic purgatives is highly advantageous. The chalybeate preparations are also valuable remedies.

Dyspeptics should masticate their food properly, take a small quantity of fluid at each meal, exercise in the open air, refrain from business, go into the country, avoid late suppers, and sleep on a hard mattress.

When acute or chronic gastritis is present, the patient cannot tolerate warm or spirituous fluids—tea, coffee, ardent spirit diluted with warm water, aggravate the symptoms, while cold water, porter, ale, &c. are preferred. In these cases the treatment must be that of gastritis.

The treatment of dyspepsia must, in many cases, be tentative, and will depend on the symptoms which happen to be present. Some of the more marked symptoms, as gastralgia and pyrosis, have received distinct names (for the appropriate treatment see the diseases themselves).

GASTRALGIA.—GASTRODYNIA.—CARDIALGIA.

SYMPTOMS.—Acute pain in the epigastrium, occurring at a variable interval of from half an hour to three hours after a meal, generally relieved by pressure, and by food. It is associated with other symptoms of dyspepsia, and is often terminated by pyrosis.

DIAGNOSIS.—From subacute gastritis, by the pain in gastralgia coming on at an interval after taking food, but in subacute gastritis following directly upon the meal. By the pain in gastralgia being relieved, or not increased, by pressure, whilst in gastritis it is increased. By vomiting if it be present following directly upon the meal, and consisting of ingesta, in gastritis; at an interval, and usually consisting of clear fluid, in gastralgia.

CAUSES.—The common causes of dyspepsia; strong and sudden mental emotions, flatulence, the abuse of tea, coffee, and warm liquids.

TREATMENT.—*Indications.*—1. To subdue the irritability of the stomach. 2. To avoid the occasional causes. 3. To improve the general health.

1. The remedies which answer the first indication are the trisnitrate of bismuth, hydrocyanic acid, morphia, creosote, henbane, stramonium, belladonna, hops, nitrate of silver, and chalybeates and tonic infusions. The trisnitrate of bismuth, in mild cases, is the best remedy; the stronger sedatives may be required in the more severe forms of the disease. The nitrate of silver, chalybeates, and tonic effusions, are likely to be most serviceable when there is relaxation of the mucous membrane of the stomach. Smoking tobacco or stramonium is often attended with benefit. In one case, in which there was some tenderness in the upper part of the spine, the tartar-emetic ointment rubbed into the seat of pain, cured severe gastralgia, attended with distressing vomiting, after the trisnitrate of bismuth and hydrocyanic acid had failed. (G.)

2. The second indication can only be fulfilled by attending to the patient's history of the effect of different kinds of food and drink upon his symptoms. These effects vary in every case. In one patient the disease will disappear on leaving off the use of tea, another will derive the same benefit from abstaining from potatoes.

3. The improvement of the general health may be effected by regular living, early rising, cold sponging followed by friction, or the cold bath, and by change of air. The state of the bowels requires careful attention.

PYROSIS.—THE WATER-BRASH.

SYMPTOMS.—The disease usually comes on in the morning or forenoon, when the stomach is empty; commencing with ardent pain at the pit of the stomach, with sense of constriction, as if that organ were drawn towards the back.—The pain is increased by an erect position, and therefore the body is bent forward.—After a short time an eructation takes place of a thin watery fluid in considerable quantity; sometimes of an acid taste, often quite insipid.—The eructation is frequently repeated, and at length gives relief to the pain, and puts an end to the fit. It is generally accompanied by gastralgia.

CAUSES.—*Predisposing.*—It principally attacks those of a middle age; females more frequently than males; and generally the unmarried; people in low life, who live much on milk and a farinaceous diet, rather than those in better condition; fluor albus.

Exciting.—Prolonged abstinence; violent emotions of the mind.

TREATMENT.—Pyrosis requires the removal of the exciting causes, and the exhibition of antispasmodics, especially æther, opium, musk, castor, volatile alkali, nux vomica, the smoking or chewing of tobacco, and the occasional use of the mineral alkali with absorbents, which should be given as recommended in the treatment of dyspepsia. Nitrate of bismuth is often a very effectual remedy. Nitrate of silver, as recommended by Dr. James Johnson. Tonic effusions, a diet consisting chiefly of animal food, and the prohibition of such articles of diet as have been found to disagree. Warm purgatives regularly administered. The improvement of the general health.

HÆMATEMESIS.—VOMITING OF BLOOD.

An hæmorrhage of dark-coloured, grumous blood from the stomach, in a greater or less quantity, mixed with alimentary matter, and preceded by a sense of weight and obtuse pain or anxiety in the region of the stomach.

CAUSES.—The general causes of hæmorrhage, as plethora, suppression of evacuations, &c.; tumors compressing the liver or spleen; external violence; obstructions in any neighbouring viscus; rupture of a blood-vessel. The fluid is inhaled from the mucous membrane, which is congested, with patches of a red or livid colour.

PROGNOSIS.—Hæmatemesis seldom proves fatal from the loss of blood, but it often induces very considerable weakness. When the bleeding is symptomatic of some other disease, the prognosis must depend on the probability of that disease being cured.

TREATMENT.—In most cases rest, a bland farinaceous diet, cold liquids, and small doses of hydrargyrum c. cretâ to act upon the liver, followed by gentle aperients, are sufficient to cure the disease.

If accompanied by symptoms indicating an inflammatory diathesis, bleeding, and the antiphlogistic regimen, with digitalis.—If not, tonics and astringents; sulphuric acid with opium.

Iced water, or lemon or any water ice, a small quantity at a time, and pounded ice to the epigastrium.

When the hæmorrhage has ceased, infusion of roses with excess of sulphuric acid may be given regularly every four or six hours, and the bowels should be kept open by proper doses of the sulphate of magnesia, or soda, or the soda tartarizata in the almond mixture. When the disease is caused by suppression of the hæ-

morrhoidal or catamenial flux, leeches should be applied to the anus or vagina, together with other appropriate remedies for such diseases.

The tinctura ferri muriatis *m. xx, ad xxx*, omni horâ, in a small wine-glassful of water.

The union of decoctum cinchonæ with acidum sulphuricum. Quinine.

Alum, in the dose of ten grains every four hours.

Epispastics to the abdomen, if there be pain, and sinapisms to the legs.

If the existence of scirrhus tumors can be ascertained, hydrargyrum, conium, iodine, and other remedies recommended for such diseases. When vomiting of blood is caused by rupture of a large vessel or tumor, all medicines will fail to restrain it. When the disease occurs in delicate or scorbutic habits, tonics and quinine are the best remedies.

CARCINOMA OF THE STOMACH.

SYMPTOMS.—Pain in the epigastrium, of a burning, gnawing, or lancinating character; nausea; acid or bitter eructations; vomiting of ingesta, of mucus, of blood, or of a grumous or sanious matter; constipation; a fulness in the epigastrium, with a circumscribed tumor; great emaciation, and the hue and expression of countenance indicative of the cancerous diathesis.

MORBID ANATOMY.—The most common form of the disease is that of scirrhus, and its most common seat the pylorus. The stomach generally contracted when the disease occupies the cardiac extremity; greatly expanded and hypertrophied when the pylorus is affected. The disease may assume all the forms described in the Introduction (p. 46).

DIAGNOSIS.—The only pathognomonic signs are the local tumor and the peculiar complexion of the patient. In advanced stages of the complaint, the extreme emaciation and the sanious discharges will assist the diagnosis. The disease, too, rarely occurs before 40. The part of the stomach which is affected may be generally inferred from the symptoms. When the cardia is the seat of the disease, the pain and vomiting come on immediately after taking food; when the pylorus is the seat of the disease, these symptoms come on later.

CAUSES.—*Predisposing.*—Cancerous diathesis. *Exciting.*—Long-continued dyspepsia. All causes of inflammation or congestion in the stomach. Depressing passions? Men are more frequently affected than women.

TREATMENT.—A bland and nourishing diet, such as the stronger soups, thickened with arrow-root, jellies, farinaceous puddings, &c. The digestive fluid; nutritive enemata. Leeches, to subdue occasional inflammation; narcotics and sedatives, to allay pain;

anodyne plasters, fomentations, and embrocations, externally ; rest.

DISEASES OF THE INTESTINES.

ENTERITIS.	.	.	Inflammation of the Intestines.
DIARRHŒA.	.	.	Purging.
DYSENTERIA.	.	.	Dysentery.
MELÆNA.	.	.	Hæmorrhage from the Bowels.
TORPOR INTESTINORUM.	.	.	Constipation.
COLICA.	.	.	Colic.
COLICA PICTONUM	.	.	Painters' Colic.
TYMPANITES	.	.	Drum Belly.
HÆMORRHOIS.	.	.	Piles.
VERMINATIO.	.	.	Worms.
TABES MESENTERICA.			
INTUS-SUSCEPTIO.			

ENTERITIS.—INFLAMMATION OF THE INTESTINES.

SYMPTOMS.—Acute pain in the abdomen, increased upon pressure, and shooting in a twisting manner around the umbilicus ; obstinate costiveness ; tension of the abdomen and flexion of the inferior extremities ; tenesmus, or vomiting, as the inflammation happens to be in the superior or inferior portion of the intestine ; the vomiting is generally bilious, or dark, fœtid, and, in some instances, stercoraceous ; pyrexia ; frequent, hard, contracted pulse ; great prostration of strength ; high-coloured urine.

This disease consists in inflammation of the peritoneal coat of the intestines, which generally involves the muscular coat at the same time.

Its terminations are,

In resolution,—known by a *gradual* diminution of the symptoms, and a free evacuation of the bowels.

Ulceration,—which is very uncommon, and only known by the febrile symptoms remitting, by occasional pains and shiverings, purulent evacuations from the bowels and tabes.

Gangrene,—marked by *sudden* cessation of pain and anxiety, the patient becoming calm and collected, while the countenance assumes a livid, and indescribably cadaverous hue ; suppression of urine, hiccup, subsultus tendinum, delirium, convulsions, death.

CAUSES.—Local irritation or obstruction, irritant poisons, incarcerated hernia, volvulus, colic, indurated fæces.

DIAGNOSIS.—*From gastritis*.—See Gastritis.

From colic.—By the one being accompanied with fever, the other not ; by the peculiar pulse above described ; by the pain in enteritis being increased by pressure, and in colic alleviated.

From hepatitis.—See Hepatitis.

PROGNOSIS.—*Favourable.*—Gradual remission of pain and other symptoms; the abdomen becoming less tender to the touch; the pain changing its seat, and not confined to a particular part; the belly no longer obstructed, a warm equable sweat, the urine depositing a sediment, the pulse becoming more natural.

Unfavourable.—The symptoms continuing, with occasional shivering or weight in the parts, which indicate the formation of an abscess. But the most unfavourable, and by no means uncommon termination is in gangrene. This event, in some cases, takes place in a few hours from the commencement of the disease.

TREATMENT.—*Indications.*—I. To allay the inflammatory action in the bowels.

II. To keep the bowels open.

These *indications* will be answered:—

I. By general and topical blood-letting, regulated according to the age, extent, and period of the disease, as in the other phlegmasiæ.

2. By the warm bath and fomentations.

3. By the frequent exhibition of purges, of which the best is calomel in combination with opium in the dose of two or three grains of the former, with a grain of the latter, repeated at intervals of one, two, or three hours for three or four times in succession, and followed at an interval of one or two hours from the last dose by a full dose of castor oil. The use of purgatives must be accompanied by strict and active antiphlogistic treatment.

If these purges fail in opening the bowels, the more active must be employed, and also purging clysters in large quantities. A drop of croton oil may be applied to the tongue, or two drops may be used in an enema.

When the vomiting is incessant and invincible, there is reason to suspect intussusception, and then six or eight ounces of quicksilver should be swallowed, and this remedy is perfectly safe in cases of vomiting which defy all ordinary remedies. The late Dr. Babington used it successfully.

4. By saline diaphoretics with mucilaginous drinks similar to those ordered in gastritis.

The late Dr. Armstrong, Dr. Kirby of Dublin, and Mr. Bates, recommend large opiates, by the mouth and rectum, in all abdominal inflammations, as the best remedy. Dr. A. gave three grains of opium after the first bleeding, a grain after the second, and a grain after the third bleeding, an interval of six hours being left between each; while Mr. Bates advises a large opiate by the mouth, and ʒj or ʒij with starch by the rectum; he relates numerous successful cases. When mercurial ptyalism occurs, the abdominal inflammation is generally arrested. The French apply blisters and sinapisms to the feet.

Enteritis may become chronic, and in such case the antimonial ointment or a blister should be repeatedly applied to the abdomen or lower extremities.

When the coats of the stomach and intestines are affected at the same time, the disease is called gastro-enteritis. It is never witnessed, except as the effect of irritant poisons. The symptoms are those of gastritis and enteritis combined.

Inflammation of the mucous membrane of the stomach and intestines, or the so-called English cholera, is a disease confined entirely to the mucous membrane, and not to be confounded with the more severe affection attacking the peritoneal covering of the stomach and bowels.

DIARRHŒA.—LOOSENESS, OR PURGING.

CHARACTER.—Frequent and copious discharges by stool, accompanied by much griping; each dejection is usually preceded by a murmuring noise, and flatulence in the intestines, together with sense of weight and uneasiness in the lower belly, which cease on the discharge taking place, but are again renewed before the succeeding one ensues. There are frequently sickness, nausea, and vomiting; the countenance is sometimes pale, at others slightly flushed; thirst; dryness of the mouth; furred or morbidly-red tongue; the skin dry; and if the disease continue, great emaciation succeeds.

CAUSES.—*Remote.*—The application of cold to the surface of the body; perspiration suppressed by any cause; passions of the mind; acrid indigestible aliment; acid fruits; acidity; oily and putrid substances; the abuse of active purgatives; previous constipation; erythematic inflammation; worms; retrocedent gout or rheumatism; diminished action of the absorbent vessels of the intestines; congestion of the mucous membrane.

DIAGNOSIS.—*From dysentery.*—By being unattended either with inflammation, fever, contagion, or tenesmus; by the absence of blood from the stools.

The state of the mucous membrane is not the same in all forms of diarrhœa. In some cases there is inflammation, with consequent increase of secretion, in others congestion from a sluggish circulation through the liver; in others, again, ulceration of the intestines. Diarrhœa may also be caused by the presence of ill-digested food, by substances belonging to the class of purgatives, by scybala in the intestines, and by any obstacle to the absorption of chyle, or to its flow through the lacteals.

TREATMENT.—When the diarrhœa is recent, the treatment is extremely simple. If the motions are frequent, scanty, and accompanied by some degree of tenesmus, a gentle laxative, as castor-oil, combined with five or ten drops of tincture of opium, is indicated. If the discharge from the bowels be abundant, whatever may be its appearance and character, all that is required is to restrict the patient's diet to gruel, arrow-root, or sago, made with or without milk, to the total exclusion of all solid matter. If the

disease should not yield to this simple treatment, in one, two, or three days, it will be necessary to continue the diet, and to administer small doses of hydrargyrum c. cretâ three times a day, in combination with a few grains of Dover's powder. One or two grains of hydrarg c. cretâ, with from three to five grains of Dover's powder is a sufficient dose. In the diarrhœa of children at the breast, from half a grain to a grain of hyd. c. cretâ, with a little sugar, or when the child is restless, with two grains of the pulv. cretæ c. c. opio, will soon effect a cure. This treatment is applicable to all forms of diarrhœa, with the exception of that which consists in a discharge of an abundant grumous matter, closely resembling coffee-grounds, and probably consisting of blood altered in its appearance and character. For this form of the disease the remedy usually prescribed is sulphate of copper in the dose of a quarter to half a grain, with from half a grain to a grain of opium every three or four hours. When this has failed, I have employed the nitrate of potash in ten-grain doses with the best effect. (G.)

The diarrhœa which accompanies ulceration of the mucous membrane of the intestines, and which is so distressing a symptom of the advanced stages of phthisis pulmonalis, is often removed by the regulation of the diet, and the administration of small doses of hydrarg. c. cretâ. If these fail, the astringents in common use, such as chalk. kino, alum, hæmatoxylum, simaruba, liquor calcis, the aromatic confection, tannin, the sulphates of zinc and copper, may be tried. In diarrhœa, from functional disorder of the intestines, these remedies are unnecessary and often injurious. A bland farinaceous diet in recent cases, and small doses of hyd. c. cretâ in chronic ones, form the most simple, the most reasonable, and the most effectual treatment.

If there should be much tenderness of the abdomen on pressure, leeches followed by warm fomentations will be necessary; if much griping, starch injections with opium will be useful.

DYSENTERIA.—DYSENTERY.

SYMPTOMS.—The disease sometimes comes on with cold shiverings and other symptoms of fever; at others, the local affection is first perceived; costiveness; unusual flatulence in the bowels; severe griping pains; frequent inclinations to go to stool; tenesmus; cramps of the limbs; loss of appetite; nausea; vomiting; febrile heat, and frequency of pulse; frequent discharge of a peculiarly fœtid matter from the anus, varying in appearance, being sometimes pure mucus, or mucus mixed with blood, pure unmixed blood, pus, or a putrid sanies, proceeding from ulcerated or gangrenous parts; and often films of a membranous appearance, or small sebaceous masses, floating in a large quantity of liquid matter. Masses of indurated fæces are likewise sometimes passed by stool. Great emaciation and debility; quick and weak pulse;

sense of burning heat, and intolerable bearing down of the rectum; hiccup; and not unfrequently a fatal termination ensues. In some cases a considerable portion of mucous membrane is evacuated by stool, which is a bad sign, though recovery may happen in such cases. A tenaceous secretion resembling that occurring in croup, has often been mistaken for a portion of the intestine.

CAUSES.—Remote.—A specific contagion. All those causes capable of inducing spasm and ulceration; much moisture, succeeding quickly to intense heat, especially in autumn; excessive use of spirits; fatigue; unwholesome and putrid food; noxious exhalations and vapours; vitiated intestinal secretions.

ANATOMICAL CHARACTERS.—The ileo-cæcal valve and neighbouring parts are inflamed and often ulcerated; sometimes there is partial or general colitis, the colon, in chronic cases, may be contracted, greatly dilated, or completely mortified. In tropical dysentery, the whole of the abdominal viscera are found inflamed. The small intestines are much distended in some cases, and the intestinal mucous membrane has been inflamed in its whole extent, except in the rectum.—*Cheyne, of Dublin.*

PROGNOSIS.—Favourable.—A gentle diaphoresis; the stools becoming yellow and less frequent; the strength little impaired; sediment in the urine; the disease arising from common causes.

Unfavourable.—The disease having become habitual by long continuance; violent and distressing tenesmus and tormina; vomiting, hiccup; aphthæ; difficult deglutition; convulsions; cold extremities; delirium; cold and partial sweats; the tongue preternaturally red and dry; the pain suddenly ceasing; great prostration of strength; the fæces extremely fetid; petechiæ; involuntary evacuations; intermitting pulse; the disease being complicated with others; as with affections of the liver, with intermittent fever, encephalitis, arachnitis, gastro-enteritis, &c.

TREATMENT.—Indications.—I. To remove the concomitant fever.

II. To evacuate the matter contained in the intestines.

III. To lessen irritation, and to restore the tone of the intestines.

To fulfil the first indication, the type of the fever must be ascertained.

If it is synocha, and the inflammatory diathesis prevails, blood-letting and the antiphlogistic regimen must be resorted to; but this will seldom be necessary, for the fever mostly assumes a putrid tendency, when the treatment proper for typhus will be required.

Many physicians have resorted to bleeding, when there is pain in the abdomen on pressure, not only with a view of reducing the fever, but also of unloading the mesenteric vessels. Leeches are sometimes necessary. The extent, however, to which the remedy ought to be carried is a point of the utmost importance. “Nothing

but the mitigation of pain and the extinction of fever, should form the limit to its employment.—*O'Brien on Dysentery.*

Blood-letting is seldom required in this country.

If it assume the intermittent form, cinchona and tonics must be resorted to.

The second indication requires,

1. An emetic of ipecacuanha or antimonium tartarizatum.

The free use of opium or Dover's powder to allay spasm; and then the evacuation of the bowels by means of castor-oil will generally remove this disease in a short time. The acetate of lead with opium is an effectual remedy, when there is intestinal hæmorrhage.

2. Cathartics.—Of this class of medicines rhubarb has been very much preferred; the submuriate of mercury with opium in small repeated doses has also been highly approved; and where there is a tendency to inflammation, or the dejections manifest a total absence, or an inspissated, or ill-conditioned state of bile, no other cathartic will be so effectual.

The refrigerant saline cathartics alone, or conjoined with manna, have been long employed, especially by the army physicians, with the greatest advantage.

The sulphas sodæ, and the phosphas sodæ, may be used in the same doses as the sulphate of magnesia.

A small dose of opium forms a useful addition to lessen the irritation which they occasion.

The oleum ricini, combined with tincture of opium, is a very excellent purge.

Ipecacuanha, administered in such doses as not to prove emetic, but to act on the bowels, is also a very effectual cathartic in dysentery. Mr. Twining, of Calcutta, has lately used it in this manner with success. Dover's powder is more valuable.

3. Large emollient clysters:

℞. Amyli ʒij. ; Aquæ ferventis fʒxvj. T. opii ʒss : Fiat enema bis terve die injiciendum.

Extract of opium, in the quantity of two grains, introduced as a suppository into the rectum, is often retained when clysters will be discharged.

Clysters of mutton-broth, beef-tea, milk-and-water, arrow-root, and these in small quantities, or otherwise they will be speedily expelled.

4. Emetic and purgative medicines combined.

℞. Magnesiae sulphatis ʒj. ; antimonii tartarizati gr. j. ; infusi sennæ fʒvj. ; syrupi rosæ fʒss. : Fiat mistura, cujus adhibeantur cochlearia tria magna pro re nata.

To fulfil the last indication, several remedies are used.

1. Mucilaginous demulcents; as solutions of gum acacia and tragacanth, in milk; preparations of barley, arrow-root, linseed, salep, and the like.

2. Fomentations and embrocations to the abdomen.

A strong decoction of poppy-heads or the anodyne embrocation.

Great relief will be produced by anodyne liniments applied over the painful part of the abdomen, such as warm camphorated oil with morphia.

3. Mucilaginous clysters with opium, or suppositories of opium.

The starch clyster, with half a drachm of laudanum, every six or eight hours, and to be used cold when there is a sense of burning heat in the colon or rectum. Injections of iced water?

When there is flatulent distention of the abdomen, we may employ assafoetida, turpentine, and tobacco enemata.

4. Diaphoretics, especially Dover's powder.

5. Opium; alone, or united with antimony, nitrate of potass, or tonics, according to the type of the fever.

Dr. Cheyne, of Dublin, states that he administered four or five grains of opium to arrest the inflammation, and then exhibited balsam of copaiba with farinaceous food, with astonishing success.

—*Dublin Hospital Reports*, v. iii.

Dr. Abercrombie has found the following medicines extremely beneficial: decoction of cusparia, nitric acid, and laudanum. The abdomen should be swathed with flannel, and the patient should wear woollen socks or stockings: when there is urgent diarrhœa the French apply leeches round the anus.

Antimonials: as recommended by Sir John Pringle.

Tonics and astringents, at a more advanced period of the disease, when the frequency of the dejections seems rather to proceed from a weakened and relaxed state of the bowels than from any remains of inflammation; especially quinine, quassia, cusparia, cinchona, calumba, cascarilla, simarouba, verbascum, catechu, kino, nux vomica, arnica, hæmatoxylum, liquor calcis, bignonia capriolata, baked bread, nitrous acid with opium.

The cinchona, cascarilla, and other tonics above mentioned, may be made into an infusion in like manner; and formed with the tinctures into draughts or mixtures.

R. Acidi nitrici diluti ʒij. ; tincturæ opii fʒiss. ; aquæ destillatæ fʒxiv. : Misce : capiat æger cochleare minimum quater in die, ex cyatho parvo decocti hordei.

This is an exceedingly valuable remedy.

R. Extracti hæmatoxyli, ʒj. ; misturæ cretæ ʒiv. ; tincturæ catechu, fʒij. ; spiritûs myristicæ, fʒj. ; syrupi zingiberis, ʒj. : Misce : cujus sit dosis cochlearia tria magna tertiâ vel quartâ quâque horâ.

There has been much difference of opinion with respect to the propriety of administering cinchona in dysentery. It is more particularly serviceable in those cases where the attendant fever assumes the remittent form, or where the disease is complicated with typhus, or with intermittent or remittent fevers. Sir John

Pringle recommends the cinchona to be joined with serpentaria virginiana, and Dr. Akenside gave it combined with a cathartic.

In Clinical Reports, published by Drs. Graves and Stokes, it is mentioned that strychnine in doses of one-twelfth of a grain in a pill, twice a day, was highly beneficial in the Meath Hospital, or County of Dublin Infirmary. They used it on the recommendation of Rummel, a German.—*Hufeland's Journal*, June, 1825.

The sulphate of copper, at first tried by Dr. Sutton, of Greenwich, then by Dr. Granville, and afterwards by Dr. Elliotson, in diarrhœa, is a valuable astringent. The former combined it with opium; the latter gave it in the epidemic cholera of the year 1832, in the dose of half a grain every half hour.—Elliotson's Clinical Lectures, *London Medical and Surgical Journal*, 1832, v. ii. p. 523, No. 43, Nov. 24.

On the continent, the nux vomica, arnica montana, bigonia capriolata, and sulphur, in large and frequent doses, are the favourite remedies.

Dr. Thomas, during a residence in the West Indies, was in the habit of recommending a strong decoction of logwood, with the bark of the pomegranate and cherry-tree, as an astringent drink, from which his patients seldom failed to experience a good effect.

The means above mentioned will be found totally inadequate to the cure of chronic dysentery, if a dusky sallow hue of countenance, tenderness upon pressure in the region of the liver, and a clayey appearance of what fæces happen occasionally to be voided, manifest the presence of a diseased and obstructed state of the liver. In such cases *mercury* is the only remedy; and this should be pushed to such an extent as to keep up a gentle affection of the mouth until the symptoms begin to be mitigated.

Every kind of food which tends to putridity should be avoided, also spirituous liquors; and the strength should be supported by light preparations of barley, rice, sago, Indian arrow-root, flour, panada, and gelatinous broth.

In dysentery of warm climates, Dr. James Johnson and Sir G. Ballingall opposed the use, or rather the abuse, of mercury. In some cases, an immense quantity of calomel, 974 grains, more than sixteen drachms, were exhibited unsuccessfully. Mercurial salivation, according to Dr. Cheyne, of Dublin, and Dr. Mackintosh, is not a cure for the disease. In chronic dysentery we should employ sulphate of copper and acetate of lead with opium, as well as sulphate of zinc. Four ounces of mutton-suet boiled in milk and strained, is an old and valuable remedy. It may be used twice a day.

MELÆNA.—HÆMORRHAGE FROM THE BOWELS.

Hæmorrhage from the bowels commonly occurs in persons subject to chronic dyspeptic complaints, and especially to disorders of

the liver. Like hæmatemesis, it attacks those of a cachectic habit. It may occur alone or in combination with hæmatemesis. It is rarely attended with pain, or with severe constitutional symptoms.

RATIONALE.—The blood is supposed by Dr. Ayre to flow from the minute branches of the vena-porta distributed to the liver. It is rarely attended by any morbid changes in the mucous membrane of the intestines.

DIAGNOSIS.—From hæmorrhoids by the absence of soreness and tenesmus, and generally by the more abundant flow of blood.

TREATMENT.—The disease always yields to small doses of hydrag. c. cretâ, with opium, or Dover's powder. A bland mucilaginous diet should at the same time be prescribed. For the treatment of an allied disease, viz. diarrhœa with dark coffee-ground evacuations, see Diarrhœa.

TORPOR INTESTINORUM.—CONSTIPATION.

The causes of constipation are either structural or functional.

The *structural* causes either narrow the intestines or entirely obliterate the passage. In the one case purgative medicines act, though with difficulty; in the other case, the mechanical impediment must be first removed. Among the *functional* causes of constipation are the absence of irritating matter from the diet, a deficiency of bile, want of proper exercise, spasmodic action of the muscular fibre, or paralysis of some part of the gut.

The *treatment* of constipation depending on alterations of function will depend upon the character of that alteration. If the food is deficient in indigestible matter, we must supply it by brown bread or fruits; if the bile is wanting, we must stimulate the secretions of the liver by mercurial preparations in small doses; if the habits are sedentary, we must enjoin proper exercise. The other functional disorders will be noticed under the head of Colic.

Habitual constipation is best treated by aloetic purgatives; by the compound rhubarb pill, with small doses of the extract of conium; by jalapine, or by such combinations of aperients as shall be found to agree best with the patient. Where the torpor of the bowels is still greater, and especially where there is a large accumulation of hardened fæces, purgative enemata are required, consisting of gruel with castor-oil, oil of turpentine, Epsom salts and infusion of senna, &c. If the enemata should return without bringing any scybalous matter away, a large quantity of warm water, or of air, should be injected through a long flexible tube introduced into the sigmoid flexure of the colon, as recommended by Dr. O'Beirne.

A stream of cold water poured from a height on the abdomen has sometimes relieved obstinate constipation. When the stomach is irritable, croton-oil may be rubbed into the skin of the abdomen or inside of the thigh.

The management of constipation alternating with diarrhœa requires some care. Whenever diarrhœa is present, purgatives should be at once omitted, and they should not be resumed till it has ceased. This caution is especially necessary in nervous or other diseases, of which constipation is the cause, for these diseases are as much relieved by gentle aperients, as they are increased by hypercatharsis.

In obstinate constipation, careful inquiry should be made after mechanical obstructions, such as hernia, or intus-susceptio.

COLICA.—COLIC.

SYMPTOMS.—Severe pain in the abdomen, retraction of the umbilicus, with a peculiar sense of twisting, occurring in paroxysms, and relieved by pressure; obstinate costiveness; flatulence; nausea and vomiting; with a pulse little increased in frequency, are the early symptoms.

These symptoms may subside after the operation of a purgative, or they may continue to increase in severity, the pain becoming more fixed, and increased by pressure, the constipation more obstinate, the vomiting more urgent, the matters discharged sometimes consisting of bile, and more rarely of stercoraceous matter.—Symptoms of local inflammation follow, and these, if not subdued, generally terminate in gangrene, indicated by the subsidence of the pain, frequent hiccup, prostration, cold sweats, and the facies Hippocratica. These are the symptoms of ileus or the iliac passion.

CAUSES.—Among the causes of the less severe and fatal forms of colic may be mentioned, cold applied to the surface of the body, especially to the lower extremities and abdomen; austere, acrid, or indigestible aliment; redundancy of acrid bile; collections of indurated fæces, or of calcareous concretions, in the alimentary canal; flatus; certain metallic poisons, as lead; hysteria; translation of gout; the imprudent use of astringents in diarrhœa and dysentery; worms; all these increased by a constitutional irritability of the intestines.

ANATOMICAL CHARACTERS.—Death rarely takes place from simple colic. The intestines, if free from mechanical obstruction and consequent inflammation, are found firmly contracted in one part, and extremely distended in that immediately adjoining it; the muscular fibre of the contracted portion being in a state of spasm, whilst that of the distended part is paralysed. In the more severe cases, or those of ileus, the morbid appearances are,—
 1. Contraction of the bowels from former disease of their parietes.
 2. Gall-stones or intestinal concretions, blocking up the intestines.
 3. Intus-susceptio. 4. Internal herniæ, caused by bands or loops of false membranes, or by the protrusion of the gut through openings in the diaphragm, omentum, or mesentery. 5. The pressure of tumors within the abdomen. 6. Severe inflammation without mechanical impediment to the passage of the fæces.

DIAGNOSIS.—*From enteritis.*—By the peculiar twisting pain and retraction of the navel; by the absence of fever in the early part of the disease; by the pain in enteritis being increased, in colic alleviated, by pressure; by the irregular contraction of the abdominal muscles. The same characteristic symptoms distinguish it from inflammation of other abdominal viscera. From muscular pains of the abdomen by the effect of percussion with the points of the fingers. This produces sudden and severe pain when the muscles are affected, but has no effect in colic. In muscular pain, too, the sudden removal of pressure causes acute suffering.

PROGNOSIS.—*Favourable.*—The pain remitting or changing its situation; discharges of wind and fæces, followed by an abatement of symptoms.

Unfavourable.—Violent fixed pain; obstinate costiveness; sudden cessation of the pain, followed by more frequent hiccup, great watchfulness, delirium, syncope, cold sweats, weak, tremulous pulse; the pulse becoming peculiarly hard (see Enteritis); and the pain, before relieved, being now much increased, upon pressure; all the symptoms indicating supervening inflammation and mortification, from the accession of which the chief danger arises.

TREATMENT.—*Indications.*—I. To remove the causes, and procure evacuations.

II. To relax the spasm by opiates.

Evacuations must be procured,

1. By cathartics; at first by the more mild; as rhubarb, magnesia, sulphate of soda or magnesia, oleum ricini: if these prove ineffectual, calomel united with extractum colocynthis compositum, especially where there has been bilious vomiting.

One or two drops of the oleum crotonis, seldom fails in producing evacuations.

2. Copious clysters; the common emollient, or this with colocynth, or the purging salts, or muriate of soda.

A copious injection of cold water has, in some instances, been followed by the desired effect. Should these be unsuccessful, recourse may be had to the injection of an infusion of tobacco.

3. Cold water dashed upon the extremities; or ice, snow, &c., applied in a cloth, or bladder, to the abdomen, have sometimes procured evacuations, in cases where everything else had been unsuccessful.

4. Indurated fæces in the rectum at times require to be removed after being previously broken down, with the finger, or with an appropriate instrument.

The second indication requires,

1. Bleeding, if the concomitant strength of constitution and fulness of vessels, with strong pulse, are present; but it is seldom necessary. In severe cases, it relieves spasm, and prevents inflammation.

2. Carminatives and antispasmodics; opium in large doses, cordial and opiate confection, cardamoms, &c.

3. Warm-bath ; hip-bath, and fomentations to the abdomen.
4. Blisters, and warm-plasters, or hot turpentine frictions.
5. Opiate clysters.
6. If there be great irritation of the stomach, with frequent vomiting, the saline medicine in an effervescing state.
7. Colic from the presence of flatus is often relieved by some aromatic cordial, or a small portion of brandy.

In most cases the following line of treatment may be adopted. Having ascertained that there is no concomitant inflammation, and no mechanical obstruction which can be detected ; and, at the same time, that the pain is not merely muscular, two or three grains of calomel, with half a grain or a grain of opium, according to the previous duration of the constipation and the severity of the symptoms, should be given every one or two hours for three or four times in succession ; the last dose being followed by an ounce of castor-oil. If the bowels are not relieved by this treatment, a large clyster containing a drachm of the tincture of opium may be thrown up, either by means of the common clyster-pipe or through the flexible tube. Should the bowels still continue unrelieved, and there are still no symptoms of inflammation, the same medicines may be repeated till a free evacuation takes place. The pain may in the meantime be relieved by fomenting the abdomen with flannels wrung out of hot water or poppy fomentation. If signs of inflammation show themselves, or existed from the commencement, that inflammation must be promptly reduced by antiphlogistic measures. (See Enteritis.) For the removal of mechanical obstructions, the remedies appropriate to those obstructions.

COLICA PICTONUM.—LEAD COLIC.—PAINTERS' COLIC.

SYMPTOMS.—Those of colic from other causes, the pain generally coming on more gradually, and being often accompanied with pains in the limbs, or with weakness, or complete paralysis of the hands or forearms.

DIAGNOSIS.—From colic arising from common causes, by the history of the case, the employment, and generally by the blue line at the margin of the teeth, indicating the action of lead on the system.

PROGNOSIS.—Generally favourable. Five fatal cases in 500. (Andral.)

TREATMENT.—Calomel and opium in successive doses, followed by a full dose of castor-oil, purgative enemata, with hot fomentations ; and when the pain is extremely severe, leeches to the abdomen. (See Colic.)

TYMPANITES.—DRUM BELLY.

SYMPTOMS.—The disease sometimes comes on suddenly; at others it is more slow in its progress, and preceded by unusual flatulency, borborigmus, and a frequent expulsion of air upwards and downwards, attended with colic pains; the abdomen becomes considerably distended, tense, and elastic; costiveness; dysuria, and in some instances even ischuria; impaired appetite; thirst, heat, emaciation, hectic fever; not unfrequently dropsy or gangrene. The abdomen, on percussion, sounds like a drum or bladder filled with air.

The air is, in almost all cases, contained in the stomach and intestines, its most common seat being the arch and sigmoid flexure of the colon. In very rare instances air passes into the sac of the peritoneum, in consequence of ulceration of the bowels. Tympanites is of common occurrence in typhoid fever, and is then styled “meteorismus.”

CAUSES.—Loss of tone in the intestinal canal; errors in diet; abuse of spirituous liquors; suppression of customary evacuations; a crude vegetable diet; hysteria; gangrene.

DIAGNOSIS.—*From Ascites.*—By the absence of fluctuation, and by the sound being clear instead of dull.

TREATMENT.—*Indications.*—I. To evacuate the air.*

II. To prevent its again accumulating.

To fulfil the first indication, recourse must be had to,

1. Antispasmodics and carminatives; opium, æther, oleum anisi, assafoetida, radix armoraciæ, tinctura capsici, cardamoms, ginger, alum, oil of turpentine, tincture of rhubarb.

2. Warm purgative medicines and clysters.

3. The application of cold to the abdomen, of ice or snow, or of warm stimulating plasters.

4. Friction with warm stimulating liniments.

5. Encircling the abdomen with a tight bandage.

6. In the tympanites intestinorum, advantage is occasionally obtained by the introduction of a fistula or elastic tube into the rectum, and suffering it to remain for some time.

7. In the other species, paracentesis with a very small trochar or lancet has been recommended.

The second indication requires,

1. Tonics; such as are recommended against dyspepsia.

2. Regular exercise.

3. Carefully avoiding all food of a flatulent nature.

4. The occasional use of stomachic aperients.

* Dr. O'Beirne passes an œsophagus tube into the sigmoid flexure, and allows the escape of gas. He relates cases of this disease in typhus, malignant uterine phlebitis, peritonitis, and strangulated hernia, in which a cure was effected. On Defecation.—Graves and others confirm this statement.

HÆMORRHOIS.—THE PILES.

SPECIES.—1. *Hæmorrhoids tumens* : from external tumors.

2. *Hæmorrhoids procidens* ; from protrusion of the anus.

3. *Hæmorrhoids fluens* ; bleeding piles, internal, without external tumor or protrusion of the anus.

4. *Hæmorrhoids cæca* ; blind piles, with pain and tumor of the anus, without effusion of blood.

CHARACTER.—Small tumors on the verge of the anus, or a number of varicose veins surrounding it : itching, weight, tension, and a sense of bearing down, or pungent pains in the fundament or perineum ; more especially upon going to stool ; pain in the back or loins ; vertigo ; head-ache ; discharge of blood from within the anus ; frequent desire to go to stool ; varicose or enlarged veins ; hard tumors, sometimes indolent or painful ; excoriation or erythema about the anus.

CAUSES.—Habitual costiveness ; plethoric state of the vessels ; hard riding ; excesses of various kinds ; the suppression of some long-accustomed evacuation ; the use of strong aloetic purgatives ; pressure of the abdominal viscera on the hæmorrhoidal veins ; pregnancy.

ANATOMICAL CHARACTERS.—The veins may be enlarged, the cellular tissue thickened, or the morbid growth may resemble parenchymatous or erectile tissue.

PROGNOSIS.—The only unpleasant consequence in general to be apprehended from piles, is the presence of inflammation, which may induce suppuration, and consequent fistula. When a venous plethora exists, which is often the case in old age, bleeding piles are salutary, and their suppression is often followed by apoplexy, or hæmorrhage from other parts. Piles often relieve affections of the head, chest, abdomen, and uterus, and, when suppressed, cause disease in these parts. Dr. Graves observed pulmonary apoplexy succeed suppressed piles.—*London Med. and Surg. Journ.*, vol. ii. p. 715.

TREATMENT.—*Indications*.—See the general treatment of Hæmorrhage. When the hæmorrhage is considerable, so as to occasion great debility, recourse must be had to astringents, both locally and internally.

The best way to stop the hæmorrhage when extremely profuse, is by pressure. Various means have been recommended, as introducing a pig's or sheep's gut, and filling it with water. Pressure, by dossils of lint or the finger, is to be preferred.

Local astringents ; as alum, gall-nuts, &c.

Ice applied by introducing a small piece into the rectum.

If these are insufficient, astringents should be directed internally.

The best are the acetate of lead and opium.

If the pile is an enlarged vein, and this becomes strangulated

by the spasm of the sphincter ani, it should be compressed and flattened with the finger and passed into the rectum. This plan may be repeated frequently. A T bandage may become necessary. The hip-bath facilitates the reduction of strangulated piles.

When the tumors about the anus are painful, and when inflammation attends, leeches should be applied, and cooling lotions of solutions of lead or cold poultices.

The inflammation often runs high, and produces a considerable degree of fever. The antiphlogistic diet is then necessary, and the means recommended against synocha.

In all cases of hæmorrhoids the bowels should be kept loose, as the irritation of hardened fæces, both before and during their passing over the piles, creates much distress. Oleaginous purges are most serviceable, though sulphur is most generally resorted to.

When, instead of being inflamed, the tumors are relaxed and flaccid, and at the same time irritable, astringent applications should be used, as galls, oak-bark, balsam of copaiba, and cold; and astringents taken internally are likewise beneficial.

The introduction of a piece of tallow candle, which is allowed to melt in the rectum, affords great relief. A suppository of simple cerate and opium is also a good remedy.

When, in consequence of long continuance of the disease, the rectum has become much affected and weakened, and excrescence or fistulas are threatened, Dr. Ward's paste has been of great service. Tonics and chalybeates are necessary in debilitated constitutions.

CONFECTIO PIPERIS NIGRI.

R. Radicis enulæ campanæ; piperis nigri, singulorum ℥ss; seminis fœniculi dulcis; mellis despumati, āā ℥j: fiat pasta, de qua sumat æger quantitatem nucis moschatae bis terve die.

If the tumors close the anus, we must introduce a common candle, an oiled bougie, tents, or a piece of sponge well oiled. Patients affected with piles should sleep on a hair mattress, sit as little as possible, and if sedentary or literary, pursue their avocations in the erect posture. The bowels should be opened daily either by coarse bread, or the electuary of sulphur, or castor-oil.

When these means fail, the tumors may be removed by excision.

Half a pint of cold water injected into the rectum twice or thrice a day, and retained as long as possible, is a most effectual remedy.—(G.)

VERMINATIO.—WORMS.

The human primæ viæ are infected by five kinds of worms.

1. *Ascaris vermicularis*: the small white thread or maw-worm.

2. *Ascaris lumbricoides*: the lumbricus teres, or long round worm.

3. *Trichuris*: the long hair-tailed thread-worm.

4. *Tænia osculis marginalibus*: the solium, or tape-worm.

5. *Tænia osculis superficialibus*: the broad tape-worm.

The ascarides have usually their seat in the rectum, and are of frequent occurrence in children; the lumbrici occupy the small intestines, and sometimes the stomach; the trichurides the cæcum; the tæniæ the whole track of the intestines, more especially the ileum.

Worms mostly produce symptoms of colic, and very frequently other symptoms, as variable appetite; fœtid breath; picking of the nose; hardness and fulness of the belly; sensation of heat and itching in the anus; preternaturally red tongue, or alternately clean and covered with a white slimy mucus; grinding of the teeth during sleep; short dry cough; frequent slimy stools; emaciation; slow fever, with an evening exacerbation; irregular pulse; sometimes convulsions or fainting fits.

Worms appear more frequently in those of a relaxed habit; those whose bowels contain a preternatural quantity of mucus or slimy matter; in those who live on vegetable food; in the dyspeptic; the eating of unripe fruit is a frequent cause of their production.

They are evolved from ovula that exist in the human body, and in no other situation.

1. The most esteemed remedies against ascarides and trichurides are purgatives of the submuriate of mercury, scammony, aloes, rhubarb, spigelia, cowage, tin; also assafœtida, lime-water, tobacco. The ascarides are easily removed by any common purgative.

R. Scammonii gr. iij; hydrargyri submuriatis gr. ij; sacchari purificati gr. vj; fiat pulvis ex quovis vehiculo crasso sumendus.

R. Extracti aloes spicatæ; extracti tanaceti, āā ʒss; olei rutæ mʒij: fiant pilulæ xij, quarum sumat æger duas nocte maneque.

R. Radicis spigeliæ ʒvj; aquæ ferventis Oj: macera per horas duas: R. hujus infusionis ʒxij; tincturæ cardamomi f.ʒj; syrupi zingiberis ʒj; fiat haustus nocte maneque sumendus.

Assafœtida or tobacco enemata.

R. Liquoris calcis Oj: fiat enema omni nocte injiciendum.

R. Limaturæ stanni ʒj; electuarii e senna f.ʒij; Syrupi zingiberis q. s.: fiat electuarium molle, de quo sumatur cochleare unum minimum quovis mane.

R. Camphoræ ʒj; olei olivæ f.ʒij: solve pro enemate urgente prurigne adhibendo.

A decoction of the geoffræa inermis, or cabbage-bark, is a remedy much used, according to Dr. Wright, in the West Indies.

These remedies are of little use unless we improve the digestive functions.

2. Against the tæniæ most of the drastic purges before prescribed

have been resorted to. Madame Noufer's remedy is occasionally used with success.

The panacea of mercury in Noufer's nostrum is the submuriate; and the male fern is the polypodium filix mas of Linnæus, and aspidium filix mas of Smith.

4. Turpentine has been given with most success, and of late its use has become general. The best way to give it is alone, in the dose of half an ounce on an empty stomach, to be followed after an interval of two hours by an ounce of castor-oil, or a full dose of any brisk aperient. It produces a slight vertigo, and a sense of warmth and heat in the œsophagus and stomach, like to that produced by a glass of brandy; but these are very transient. Three or four evacuations are mostly produced by half an ounce.

TABES MESENTERICA.

This name is given to a tubercular or scrofulous degeneration of the mesenteric glands, which sometimes occurs without any disorder of the functions of the alimentary canal, but, in by far the majority of cases, follows upon long-continued irritation or ulceration of the mucous membrane of the intestines.

The *symptoms* are extremely obscure, when the disease is idiopathic; but when it is the result of disease in the intestinal canal, it is characterized by the symptoms of infantile remittent fever. The only certain sign of this complication is the enlargement of the glands felt through the parietes of the abdomen.

CAUSES.—*Predisposing.*—The scrofulous or tubercular diathesis; the age of infancy and childhood; improper food, bad air. *Exciting.*—Irritation of the mucous membrane of the intestines from scybala, from worms, or from improper food.

TREATMENT.—This will depend upon the existing complications and on the condition of the bowels which have preceded and produced it. Purgatives regularly and perseveringly administered in constipation; a strict regulation of the diet in diarrhœa; food adapted to the age and strength of the child; and, where great debility is present, tonics;—the treatment, in fact, of infantile remittent fever. (See p. 180. See also Diarrhœa.) The affection of the glands itself requires gentle friction, with oil or stimulating liniments two or three times in the day. In extreme cases, iodine ointment may be used for this purpose. The treatment of infantile remittent fever, aided by frictions to the abdomen, will often remove considerable enlargements of the mesenteric glands, and restore the patient to perfect health. As these glandular enlargements occur in children of a tubercular diathesis, the chest should be carefully attended to, and directions should be given for the careful attention to the future health of the patient.

INTUS-SUSCEPTIO.

SYMPTOMS.—Those of colic. The history of the case is most commonly as follows. After a violent straining at stool, a sudden attack of severe colic or ileus, followed by constant desire to go to stool, violent tormina and tenesmus, discharge of a small quantity of bloody mucus, and the symptoms of enteritis. These symptoms are not decisive, but the existence of the disease becomes more probable after the failure of attempts to evacuate the bowels.

ANATOMICAL CHARACTER.—One portion of the intestines enclosed within another. A natural cure is sometimes effected by adhesion, suppuration, gangrene, and separation of the enclosed portion of intestine.

TREATMENT.—That of colic and enteritis combined. Crude mercury, or small shot swallowed to the extent of two or three pounds, have been recommended. An operation, too, has been performed with success, an incision being made into the abdomen, and the strangulated portion of the intestine liberated.

DISEASES OF THE STOMACH AND INTESTINES.

GASTRO ENTERITIS MUCOSA.	.	English Cholera.
CHOLERA MALIGNA.	.	Malignant Cholera.

GASTRO ENTERITIS MUCOSA.—ENGLISH CHOLERA.

SPECIES.—1. *Cholera spontanea*; occurring in warm weather without any manifest cause.

2. *Cholera accidentalis*; from acrid matter in the stomach and intestines.

SYMPTOMS.—Nausea, pain, and distension of the stomach and intestines; quickly succeeded by a violent and frequent vomiting and purging of bilious or feculent matter, and, when this has been discharged, of mucus; frequent, small, sometimes unequal, pulse; much thirst and heat, followed by cold sweats; great anxiety, spasmodic contractions of the extremities, and sometimes universal convulsions; hiccup, and sometimes death, within the space of twenty-four hours. In very severe cases, blueness of the surface.

CAUSES.—Excessive heat, or sudden transitions from heat to cold; the autumnal season; food of difficult digestion; rancid food; the colder fruits; such as cucumber, melon, &c.; active and violent purgatives; poisons; violent passions of the mind; marsh miasma; catarrh.

PROGNOSIS.—*Favourable.*—A gradual diminution of the symptoms, especially of the vomiting; succeeded by sleep, or a gentle

moisture on the skin. The disease, when protracted to the third or fourth day, seldom proves fatal.

Unfavourable.—Spasm of the extremities; convulsions; great prostration of strength; cold, clammy sweats; anxiety; short hurried respiration; continual hiccup; intermitting pulse; fetid vomiting; great distension of the abdomen.

SYMPTOMS.—An immediate restriction of the diet to farinaceous substances to the entire exclusion of solid food, is sufficient even in severe cases to affect a cure. A mucilaginous mixture, with twenty drops of tincture of hyoscyamus, may be given at the same time. When there is great prostration of strength, the same diet with stimulants and opium, warmth to the surface and feet, and mustard sinapisms to the extremities. When the disease has subsided, the usual diet must not be immediately resumed, but the patient should be confined for a few days to a less strict farinaceous diet. Tonics may be necessary for the restoration of the patient's strength.

Calomel has been recommended, but is unnecessary and may be injurious. Rest to the stomach and bowels is the rational treatment, and this is secured by the diet prescribed.

CHOLERA MALIGNA.—EPIDEMIC, SPASMODIC, ASIATIC, BLUE, PESTILENTIAL OR MALIGNANT CHOLERA.

Vomiting and purging of watery matters without any appearance of bile; spasms in the inferior extremities and abdominal muscles extending through the body, speedily followed by sinking of the vital powers, and sometimes by lividity of the face, extremities, and entire surface of the skin. This species of cholera was described by Sydenham, in 1669, as epidemic in this country, with the exception of the lividity. It was observed by Mr. Thackrah, of Leeds, in 1825. It appeared in Bengal in 1817, and spread over all Asia; visited Poland, Russia, England, Scotland, France, Ireland, and the United States of America in 1831-2. The Indian cholera was described by Curtis, 1782, Paisley, Sonnerat, Guddlestone, 1782, and by Dr. James Johnson and many others.

This disease appeared at Jessore, in the centre of the Delta, and gradually spread through all parts of India, where it is now endemic. Dr. Copland gives the following account of its progress.

“During 1818, it visited, in an easterly direction, the Burmese empire, the kingdom of Arracan, and the peninsula of Malacca. In 1819, it appeared in the isle of Penang, in Sumatra, Singapore, the kingdom of Siam, Ceylon, and the isles of France and Bourbon. During 1820, it reached Tonquin, Cambogia, Cochin-China, Southern China, Canton, the Philippines, &c. In 1821, it visited Java, Bantam, Madura, Borneo, and numerous other

places in the Indian Archipelago. In the years 1822, 1823, and 1824, it appeared at Tonquin, Pekin, Central and Northern China, the Moluccas, Amboyna, Macassar, Assam, and various other Eastern countries and islands. During 1827, it prevailed in Chinese Tartary. In all these countries and places its prevalence and fatality were unprecedented in medical history.

"In July, 1821, it reached, in its western course, Muscat in Arabia, and during the remainder of the year visited various places in the Persian Gulph. In the following month it appeared in Persia, and during 1822 and 1823, 1829 and 1830, it prevailed in several of the principal cities of that empire. It broke out in Bussorah and Bagdad in July 1821, and in 1822 and 1823, ravaged most of the populous cities of Mesopotamia, Syria, and Judea.

"In 1822 it reached to within 150 miles of the Georgian frontiers of Russia, and in 1823 appeared at Orenburg and Astrachan, beyond which it seems not to have extended until August 1828 and 1829, when it reappeared at Orenburg the capital of the province of that name, situated on the Tartar frontier, about 400 miles north of the Caspian, and about 1000 miles north of the places where it prevailed extensively in 1822. Its prevalence and fatality in this province were great, upwards of a tenth of the inhabitants having been seized, and about a fourth part of those attacked having died of it. At the same time that the disease appeared in Orenburg, it was raging in several Persian provinces and Tartar tribes in central Asia, from which it was supposed to have been introduced into Orenburgh. At the commencement of 1830, the disease had entirely ceased in the Russian dominions; but, towards the beginning of autumn, it broke out with increased violence on the Georgian frontier of Persia, having appeared, in June, in the Persian province of Ghilan, on the southern shore of the Caspian, from the various southern ports of which it extended northwards along the westward Caspian shore until it reached Baku, Tiflis, Astrachan, and numerous other towns, in its progress into the heart of the Russian empire. After attacking a number of places, it has continued to spread westward and northward through Russia, Poland, Moldavia, and Austria; visiting Moscow, Warsaw, and other places in Poland, and extending, in May 1831, to Riga and Dantzic, and in June and July, to St. Petersburg and Cronstadt: early in October, to Berlin and Vienna, and subsequently, to Hamburgh, &c." It appeared at Sunderland, 24th October, 1831, and in London on the 16th of January 1832.

According to Sir William Russell and Sir David Barry, who were sent by the British government as medical commissioners to observe cholera in Russia, the disease is in all essential points identical with the Indian malady, but is in some degree modified. (Despatch to the Home Secretary of State, July 7, 1831.) In subsequent despatches, the disease is considered contagious.

Dr. Hamett, the British medical commissioner sent to Dantzic, reports to the government the occurrence of 776 cases in different localities, in which there was no trace of contagion; and that 1932 persons, of all ages, besides many others, were shut up in cholera dwellings, for at least twenty days, during the first two months of the epidemic, and escaped the disease. Mr. Gibson, our consul, declares the disease appeared at a time when it was not suspected to be within a hundred miles of Dantzic; and without there being the slightest trace of communication with any foreign means of infection. These reports were partially suppressed, as opposed to the Central Board of Health of London, a body composed of Sir W. Pym, Sir W. Russell, Sir D. Barry, and others, who were contagionists.—See *Hamett's Reports*, 1832.

But the Central Board of Health also comprised several members of the privy council, and, in consequence, an act of parliament was rapidly passed through both houses, declaring epidemic cholera contagious and of Asiatic origin; authorising the establishment of parochial and local boards of health, and enforcing quarantine. The first effect of this act was to increase the number of contagionists, and to excite universal terror through this kingdom and the civilized world. Nevertheless, nine-tenths of the faculty, who were daily observing the disease, were non-contagionists. Several of their opponents joined them daily, and at length the whole profession were opposed to contagion, except those connected with boards of health.

The appearance of the disease at Sunderland was ascribed to importation from Hamburgh; but this was by no means proved, and the disease had appeared in the vicinity previously. It had appeared at Leeds, in 1825, as already stated. The first case that occurred in London was that of a soldier of the grenadier guards, named Webb, (Jan. 1832,) who was seen by Dr. James Johnson, Dr. Gilkrest, and others, who had declared it cholera; but it was not admitted by the Central Board of Health, as it could not be traced to contagion. These gentlemen, with the surgeon and assistant surgeon of the regiment, have since publicly declared that Webb had as genuine cholera as any they had subsequently observed.

The official board decided that the first case occurred in February, in a man who had been scraping a Sunderland coal vessel on the Thames. But as this favoured the doctrine of importation, other cases were proved to have existed previously in the street in which the labourer in the coal-smack had resided. The Medical Society of London, and the Westminster Medical Society, were at first divided, but soon became non-contagionists with scarcely an exception. The Cholera Boards were abolished in 1832.

Cholera appeared first in Paris in March, and the physicians and surgeons of the Hôtel Dieu, after the most careful observation,

declared that it was not contagious. The subscribers to this resolution were Petit, Husson, Magendie, Honore, Sanson, Gendrin, Recamier, Dupuytren, Breschet, Gueneau de Mussy, Cailiard Baillie, March 31st, 1832. The medical officers of the hospital St. Louis next agreed with their colleagues of the Hotel Dieu, and signed a resolution to that effect, April 6th, which was signed Alibert, Biet, Emery, Jobert, Lugol, Monry, Gerdy, and Richerand. The officers of La Pitie arrived at the same conclusion, April 30th; Serres, Clement, Parent du Chatlet, Lisfranc, Louis, Andral, Bouillaud, and Velpeau. The Westminster Medical Society made a similar declaration, April 28th. Dr. Barker, the secretary to the Dublin Board of Health, declared that the disease was not imported into the Irish capital. The Edinburgh Board of Health advocated contagion; but Professor Lizars and Dr. Sanders, and most of the ablest practitioners, were strenuous non-contagionists. Notwithstanding the general, indeed the almost universal, opinion that the disease was epidemic but non-contagious, the contrary declaration of the government Board of Health, aided by an act of parliament, had most influence with the public, and with foreign countries.

Quarantine was rigidly enforced in London and most of our ports; but the disease, like all epidemics, spread in despite of human intervention; and after our trade and commerce were most seriously injured, the disease being in full force, quarantine was abandoned. For a full account of the history of the disease, see *London Medical and Surgical Journal*, 1832, vols. i. and ii. For an able examination of the question of contagion, see *libr. Pr. Med. Art. Cholera*, Dr. George Budd. The conclusion at which the author arrives is, that malignant cholera is not propagated by contagion.

SYMPTOMS.—The symptoms almost always show themselves during the interval between sunset and sunrise, beginning sometimes suddenly, at others after slight uneasiness and some degree of diarrhœa. The diarrhœa more or less intense, with feculent dejections at first, but speedily assuming the appearance of rice-water or gruel, flying pains, or sense of coldness in the abdomen, as if purgative medicine was about to operate; countenance pale, no appetite, nervous agitation, diminished muscular power, nausea or vomiting, slight or severe cramps in the legs, arms, abdominal muscles, and loins; small, weak pulse; cold, clammy, or moist skin; thirst, and urgent desire for cold water: these symptoms varying in intensity, may appear successively or simultaneously. In some cases the patient is struck down almost lifeless; in others the disease steals on for eight or ten days. When it came on suddenly, in addition to the above symptoms, the cramps commenced in the fingers and toes, and rapidly extended to the trunk; the eyes were sunk, and surrounded by a dark circle; vomiting and purging of white coloured matters, mixed with flocculi; features

contracted and sharpened, wild and confused expression of countenance. The face, extremities, and sometimes the whole surface of the body, assumed a leaden, bluish, or purplish hue, varying in the degree of intensity; the extremities were shrunk and contracted, nails blue, pulse thready or imperceptible at the wrist, arm, axilla, temple, or neck; skin cold and damp, a great restlessness; inexpressible pain in the epigastrium, loud moaning or groaning, incessant restlessness or jactitation, difficult, oppressed respiration; inspiration effected with great difficulty, expiration short and convulsive, voice plaintive or nearly suppressed, speech in a plaintive whisper; tongue white, cold, and flabby, temperature often as low as 79° or 77° ; convulsions recurring at short intervals, occasionally almost tetanic, or replaced by a constant tremor. The secretions of bile, saliva, tears, and urine, are entirely suppressed, and there is an earthy or cadaverous odour exhaled by the body. Death generally takes place in from six to twenty-four hours, the patient retaining his faculties to the last.

TERMINATIONS.—In recovery; in prolonged gastric irritation; or in secondary fever, of the typhoid character.

MORTALITY.—About one half of the cases. Less in the young than in those advanced in life.

PROGNOSIS.—*Favourable Symptoms.*—In cases about to terminate favourably, re-action gradually takes place, and all the symptoms improve; the cramp ceases, the dejections contain bile, urine is secreted, the voice and pulse return, there is an increase of animal heat in the extremities and surface of the body, and improvement of countenance, circulation, respiration, and muscular strength. Youth and previous health are favourable circumstances.

Unfavourable.—Delirium; sordes on the teeth, lips, and gums; increased prostration of the vital powers; coldness and blueness of the surface; collapsed countenance; small, irregular, and thready pulse; oppression and difficulty of respiration; involuntary evacuations; subsultus tendinum; convulsions. Advanced age and previous debility, or ill health, are unfavourable circumstances, and the disease was more fatal in females than in males.

ANATOMICAL CHARACTERS.—Congestion of the lungs and brain: blood black, oily, and dissolved, both in the arteries and veins; brain and its membranes congested, serum in brain and spinal marrow; the abdomen, on being opened, often emits a foetid odour; fluids, like those vomited and passed from the bowels, detected in the alimentary canal; flatus; intestinal mucous membrane covered with a tenacious substance, and of a dark or scarlet hue, either partially or generally; stomach and bowels paler than natural; gall ducts may or may not be contracted. The gall-bladder is much distended with viscid bile. The pancreas, spleen, and kidneys are in their ordinary state, or gorged with blood. The urinary bladder is always contracted and empty. The vena porta

and all the large abdominal veins are loaded with black blood resembling tar in appearance. The brain and its membranes may be healthy or congested.

TREATMENT.—There is no disease for which such a variety of remedies was proposed, or in which all remedies so completely failed, as in the epidemic cholera of the year 1832. After all that has been written on the subject, we know no remedy for the disease. Emetics, venæsection, warm and hot air-baths, exhausted air-bath, frictions, with every form of stimulating liniment, internal stimulants, as in the last stage of fever.

Saline medicine, saline injections into the veins, vapours and gases by inhalation, in immense quantities.

Calomel, galvanism, nitric acid applied to the nucha, actual cautery along the spine; large opiates, strychnine, acetate of lead in combination with opium, copious libation of cold water, were all employed with little, if any, success.

During the prevalence of the cholera in London, cases of diarrhœa were unusually prevalent, and as the disease often sets in with diarrhœa as its first symptom, it is probable that a judicious treatment of slight diarrhœa may contribute to diminish the number of cases of cholera. In treating such cases, the common remedy for diarrhœa, viz. a strict mucilaginous diet, must be combined with strong stimulants frequently administered. (G.)

DISEASES OF THE LIVER.

ICTERUS	.	.	.	Jaundice.
HEPATITIS	.	.	.	Inflammation of the liver.
BILIARY	CONCRETIONS.			

ICTERUS.—JAUNDICE.

SPECIES.—I. *Icterus calculosus*.—With acute pain in the epigastric region, increased after meals, with discharge of bilious concretions or gall stones.

2. *Icterus spasmodicus*; without pain after spasmodic diseases, or affections of the mind.

3. *Icterus hepaticus*; without pain after diseases of the liver.

4. *Icterus infantum*; occurring in infants shortly after birth.

SYMPTOMS.—Languor; inactivity; loss of appetite; sense of uneasiness or pain in the right hypochondrium; heat and pricking of the skin; bitter taste in the mouth; the tunica conjunctiva of the eye is perceived to become of a yellow colour, and soon afterwards the whole surface of the body; the urine is high-coloured.

and tinges linen yellow; nausea; vomiting; obstinate costiveness or diarrhœa; the stools are of a clay colour, but in some cases like the urine high coloured; the pulse is generally slow, yet sometimes, especially where the pain is acute, it becomes quick and hard, and there is a feverish heat, and dryness of the skin. Should the disease be long protracted, petechiæ and maculæ sometimes appear in different parts of the body; the skin, before yellow, turns brown, or livid; even passive hæmorrhages and ulcerations have broken out, and the disease has in some instances assumed the form of scurvy.

CAUSES.—Biliary calculi in the gall bladder, or its duct; inspissated bile; spasmodic contraction of the ducts themselves, often from passions of the mind; pressure upon the ductus communis choledocus; either by collections of hardened fæces, or by tumors of neighbouring viscera, as of the pancreas, of the mesenteric glands, of the pylorus, of the stomach, &c.; diseases of the liver itself, as inflammation, partial scirrhus, &c.; the active operation of some poisons and purgatives; morbid redundance of bile.

DIAGNOSIS.—The characteristic symptoms which distinguish this from every other disease are, the yellow colour of the skin, more especially observable in the tunica conjunctiva of the eye; the bitter taste in the mouth; the yellow tinge communicated to linen by the urine; the white or clay-coloured fæces; added to the sense of pain or uneasiness in the right hypochondrium.

PROGNOSIS.—*Favourable.*—The disease having arisen from a cause that admits of easy removal; as spasm, accumulated fæces, the temporary pressure during pregnancy, &c. &c.; the strength and appetite little impaired; the disease suddenly appearing; cessation of local pain, followed by bilious diarrhœa.

Unfavourable.—Circumstances leading to the suspicion of the disease having originated in a scirrhus state, either of the liver itself, or of the neighbouring viscera; as the previous irregular life of the patient; long-continued local pain and tumor, &c.; symptoms of hectic; colliquative evacuations; symptoms showing a determination to the head, as vertigo, flushed countenance, headache; supervening anasarca; its being complicated with any other disease.

TREATMENT.—*Indications.*—I. To remove the cause of obstruction to the passage of the bile into the duodenum.

II. To palliate symptoms.

If it arise from calculus, from spissitude of the bile, or spasm, and is attended by much pain or symptoms of fever, recourse must be had to,

1. Cathartics; especially aloes, with castor oil, soap, submuriate of mercury, and tartrate of potass.

2. Gentle emetics, where the local pain is not acute.

Keeping up a constant nausea with small doses of ipecacuanha, often relieves the bile-ducts more effectually than purgatives.

3. The warm-bath ; fomentations and blisters to the right hypochondrium or pit of the stomach.

4. Emollient clysters.

5. Opium, conium, hyoscyamus, tepid diluents, where the pain is evidently spasmodic.

6. The alkalies, soda, potass, soap ; also raw eggs, turpentine with æther, and stomachic bitters, especially taraxacum, calumbo, gentian.

7. Bath and Cheltenham waters.

8. Small doses of mercurial preparations.

9. Nitro muriatic acid.

If the disease arise from inflammation, by the means laid down for the cure of hepatitis.

If from scirrhus tumors, iodine, or mercury, internally, and externally by friction upon the abdomen ; conium, electricity, and other means elsewhere recommended.

If from accumulations of hardened fæces in the intestines, brisk cathartics ; copious enemata ; dashing cold water upon the extremities.

Should the disease assume the scorbutic form, acids, and other remedies adapted to that complaint, must be had recourse to.

In some cases there is a most troublesome itching of the skin, accompanied by somnolence, and frequently the liver becomes disordered or disorganized. Liver disease or abdominal dropsy is a frequent consequence of jaundice ; and patients seem often astonished, after jaundice has disappeared for several years, that the medical practitioner alludes to it.

If the disease is unattended by inflammation of the liver, as evidenced by tenderness on upward pressure in the right hypochondrium, the best remedy is hyd. c. cretâ in the dose of one or two grains, with small doses of opium three or four times a day, or calomel in the dose of a quarter of a grain. These small doses act better on the liver than larger ones. The bowels should at the same time be kept open by gentle laxatives, as castor-oil, or the saline aperients. Other remedies may be administered at the same time according to existing complications.

HEPATITIS.—INFLAMMATION OF THE LIVER.

Species.—1. *Hepatitis acuta.*—2. *Hepatitis chronica.*

SYMPTOMS.—The symptoms of the acute species are pain in the right hypochondrium, increased by pressure, often extending high in the chest, and resembling pleurisy ; incapacity of lying upon the left side ; dry cough ; difficulty of breathing, and shooting pains in the chest resembling pleurisy ; sympathetic pain in the right shoulder, the seat of which generally corresponds with the

part of the liver most affected, being anterior or posterior, according as the anterior or posterior part of the liver happens to be implicated; and when the inflammation occupies the left lobe, then the pain is commonly in the left shoulder; a yellow tinge of the tunica conjunctiva, and sometimes actual jaundice; high-coloured urine; either costiveness or diarrhœa. In some instances there is a deficiency of bile in the intestines, in which case the fæces are of a clay or white colour; sometimes a superabundance, which is then rejected by vomiting and stool.

When the *concave* surface of the liver is affected, the pain is more obscure, and is referred to the back; the breathing is less anxious, the functions of the stomach more disturbed, producing vomiting, hiccup, and other symptoms of gastritis; the respiration is laborious or painful, and should bronchitis, pneumonitis, or pleuritis exist at the same time, the cough and pulmonic symptoms are severe. The term "liver cough" was formerly employed to designate the cough occurring in chronic hepatitis.

When the left lobe of the liver adjacent to the stomach is inflamed there is nausea or vomiting; and when the posterior and inferior portion of the organ near the kidney is implicated there is more or less pain or disturbance in the function of the last-mentioned organ. Abscess of the liver may burst into the stomach and be emptied by vomiting; into the colon or duodenum, and be evacuated by the bowels; through the diaphragm into the cavity of the chest and form empyema; into the lung or bronchial tube, and be expectorated; or into the corresponding muscles of the back, and open in that direction.

Acute hepatitis may terminate in the chronic form, or in various other degenerations.

Hepatitis terminates either in *resolution*, about the fourth, seventh, or eleventh day; or in *suppuration* and abscess.

The attack of *chronic hepatitis* is in general so gradual, and the symptoms at its commencement so obscure, that it is long unattended to. It is marked by symptoms of dyspepsia, loss of appetite, flatulence, sense of fulness and distention of the stomach; at length the health is impaired, there is weight and obtuse pain in the region of the liver, or there is pain referred to the back: the countenance becomes sallow; torpor and inactivity; dejection of mind; the functions of the primæ viæ greatly disturbed; obstinate costiveness; clay-coloured stools, scirrhus, dropsy, jaundice.

CAUSES.—All the causes inducing inflammation, biliary concretions, the irritation of acrid bile, the violent operation of emetics, external injury, passions of the mind, intense heat, intemperance in the use of spirituous liquors, blows over the organ, or falls on the trunk, feet, knees, or breech, which may cause concussion, and consequent rupture of the liver or of its ligaments.

DIAGNOSIS.—*From pneumonitis*.—By the pleuritic pain being less violent, and chiefly confined to the course of the phrenic

nerve; ascending to the top of the shoulder, generally the right; by the pain in hepatitis being increased by pressure, in pneumonia unaffected by it; by the difficulty, in pneumonia, of lying upon the affected side, while in hepatitis pain is occasioned by lying upon the opposite; by the sallowness of countenance; by the cough being generally unaccompanied with expectoration.

From gastritis and enteritis.—By the seat of the disease, discovered by tenderness upon pressure; by the sympathetic pains of the clavicle and shoulder; by the less prostration of strength, and greater fulness of pulse; by the colour of the stools and urine.

From dyspepsia.—See Dyspepsia.

PROGNOSIS.—*Favourable.*—About the third, fifth, or seventh day, bilious diarrhœa; universal and free perspiration, copious sediment in the urine, inflammation appearing upon an external part, hæmorrhage from the hæmorrhoidal veins, an abatement of fever, and of other symptoms.

Unfavourable.—Intensity of pain and fever, the pain confined to a point; continual hiccup, cold extremities, while other parts are extremely hot; obstinate constipation. When hepatitis terminates in resolution, it is mostly in three or four days from its commencement: if it last to the seventh, there is great probability of its ending in suppuration. As soon as suppuration takes place, the pain remits, and there is generally a sense of weight and pulsation in the region of the liver, the former being increased by lying on the left side. These symptoms are attended with frequent and irregular shiverings, and at length with hectic fever. After an abscess has been thus formed, it may point in various directions; the matter may be discharged either into the intestines, the cavity of the thorax or abdomen, or into the bronchi; or an opening may take place externally, either on the abdomen or back, which latter is the most favourable.

Gangrene is a very rare termination of hepatitis: and when it occurs is known by the symptoms of mortification already mentioned.

In the chronic form, an enlargement and preternatural hardness of the organ obvious to the feel; the constitution impaired by previous excesses. It often happens that chronic hepatitis is mistaken for hydatids, scirrhus, calcareous or ossific deposit, and for other incurable diseases.

In chronic hepatitis and other degeneration of the liver, when the organ is enlarged, it presses on the vena porta, obstructs the return of the venous blood from the abdomen, causes congestion of the peritoneum and cellular membrane of the inferior extremities, and induces ascites or effusion into the peritoneal cavity, and anasarca or œdema of the lower limbs. In such cases a cure cannot be effected without the removal of the disease of the liver, which is the cause of the dropsy. Many diseases of the liver, like those of all other organs, are incurable.

TREATMENT.—The *indications* in the *acute species* are the same as in all visceral inflammations.

They are best fulfilled by,

1. General and topical blood-letting.

Most authors and practitioners have observed, that blood-letting ought not to be carried to the same extent in hepatitis as in the other genera of the phlegmasiæ. Some assign as a reason for this, the peculiarity of the circulation through the liver; others, that the organ affected is less essential to life; or that the inflammatory symptoms do not often run so high as in the other inflammations.

General blood-letting is seldom serviceable after the fourth day; but the state of the pulse and urgency of the pain must always direct us with regard to it.

Local depletion by cupping or leeches.

When the hæmorrhoidal or catamenial evacuations are suppressed, the abstraction of blood from the anus is preferable. The leeching should be repeated while pain is urgent.

2. Blisters, applied to that part of the region of the liver in which the pain is.

3. Cathartics, especially sub-muriate of mercury.

4. Saline and antimonial diaphoretics, such as are recommended against inflammatory fever.

When the antiphlogistic plan has been continued for five or seven days, and the symptoms do not abate, the submuriate of mercury must be given frequently. A grain every fourth or sixth hour, will be advantageous.

Should suppuration take place, and an abscess form externally, it must be brought forward as quickly as possible by poultices and fomentations; aided by a generous diet, the use of quinine, cinchona, and bitters; and an early incision is to be made when it points. The use of mercury or iodine may cause its absorption.

The *chronic* species must be treated with,

1. Mercury, both internally and externally applied, in small quantities. The hydriodate of potass, or the proto-ioduret of mercury in very obstinate cases is preferable.

Dr. Elliotson has found iodine given internally, and used externally, most efficacious in reducing enlarged liver, and better than hydriodate of potass. He gives calomel at night at the same time.—*London Medical Surgical Journal*, vol. ii. *Clinical Lectures*, p. 524. The hydriodate of potass was first employed in this country by Dr. Milligen.

2. A continued course of bitter tonics and aperients, as taraxacum, gentian, quassia, or calumba, with soda, are useful, as in Dyspepsia.

3. The *nitric* acid has been frequently of great use when mercury cannot be employed, or when there is a redundancy of bile.

The chlorine or nitro-muriatic acid has of late been used, in some cases with great benefit, both internally and externally.

Removal from a warm to a cold climate is useful, a sea-voyage or a course of chalybeate waters.

The nitro-muriatic acid pediluvia or maniluvia, is a valuable remedy, and acts as an aperient. It is also applied with a sponge over the region of the liver, thighs, legs, and arms. The following is the formula for this acid lotion, which may be used hot or cold :

R. Acidi nitrici ℥ss.; acidi muriatici ℥j.; aquæ puræ Oiv. : probe commisceantur in usum.

When the intestinal canal is healthy, Martinet has found drastic purgatives remove induration of the liver, as if by enchantment, after all other remedies have failed.

BILIARY CONCRETIONS.

SYMPTOMS.—Biliary calculi give rise to no pain or inconvenience unless they occasion some impediment in the gall-ducts. The passing of a gall-stone is accompanied by the following symptoms. Intense pain in the epigastrium, extending to the right hypochondrium and back, occurring in severe paroxysms, with intervals of comparative ease, during which there is a dull heavy pain in the epigastric region. The pain varies with the size of the calculus, and the force of the spasm which it occasions. The general symptoms are an infrequent full pulse, or a frequent and feeble pulse, with profuse perspiration; or if there is inflammation present, the general symptoms of fever. The passage of the calculus from the gall-ducts into the intestine is attended by a sudden remission of the pain.

TREATMENT.—*Indications.*—1. To relieve the severity of the spasm.

2. To reduce existing inflammation.

The first indication is fulfilled by opium, the warm-bath, warm fomentations, or cold applications, emetics, and blood-letting. The *opium* may be given in doses of a grain, or twenty drops of laudanum, every hour, and in a glyster every six hours (forty minims to one drachm in four ounces of starch or gruel). The *warm-bath* should be of the temperature of 100° to 110°, and should be continued till faintness comes on. *Warm fomentations* are generally employed, but it has been recommended to apply pounded *ice* to the epigastrium. *Emetics* have been extolled by some authors and blamed by others. They are admissible in the absence of inflammation, but are scarcely safe when inflammatory symptoms exist.

The second indication is answered by *bleeding*, which is useful chiefly as an antiphlogistic measure; but as it produces debility, it tends to relax existing spasm. It should always be employed in plethoric persons, or in those prone to suffer from inflammatory diseases. It may be followed up by nauseating doses of tartar-emetic.

DISEASES OF THE PERITONEUM.

PERITONITIS.	.	.	Inflammation of the Peritoneum.
ASCITES.	.	.	Dropsy of the Abdomen.

PERITONITIS.—INFLAMMATION OF THE PERITONEUM.

Pyrexia, pain, and tenderness of the abdomen increased by pressure, and the erect posture, with the peculiar signs of other abdominal inflammations.

SYMPTOMS.—The pain may commence in any part of the abdomen; at first it is confined to a certain spot, but soon extends, more or less rapidly, all over the abdominal parietes, and is in general so acute that the weight of the bed-clothes is intolerable, though in other instances it is so slight as to escape notice. It is also increased by pressure. The surface of the abdomen is hot and tender; the pulse is in general small, hard, and contracted, though sometimes full and soft; the countenance is expressive of anguish; the sufferer lies on his back with the thighs drawn upwards and almost flexed on the abdomen; the bowels are constipated; the urine scanty and high coloured; the tongue is white and covered with mucus, and soon becomes dry and brown, its edges and tip being red; the respiration is difficult, particularly during inspiration, and is chiefly performed by the ribs, as the diaphragm and abdominal muscles cannot act without increasing the pain. When the disease advances without control, it often terminates fatally within twenty-four or forty-eight hours, and death is preceded by typhoid symptoms, great prostration of the vital powers, sudden cessation of pain, sharpened countenance, distension of the abdomen by fluid or gas, vomiting of a coffee-coloured fluid, cold extremities and coma.

When the disease attacks puerperal women, the pain commences in the region of the womb, the lochia is diminished and speedily suppressed, the breasts become collapsed, and the secretion of milk ceases. (See Puerperal Fevers.)

When peritonitis occurs in consequence of perforation of the intestine, it is rapid and violent in its progress, and speedily causes death. It is very remarkable, that in transfixion of the bowels by bayonet and sabre wounds, in which the intestines are perforated in several parts, and blood and fæces escape into the cavity of the abdomen, there is but a slight degree of peritonitis, and recovery often happens. (See article "Wounds" in Cooper's Surgical Dictionary, Hennen's Military Surgery, Blundell's Experiments on Abdominal Surgery, &c.)

Morbid Appearances.—Numerous red spots are discovered on

the peritoneum, penetrating its whole thickness, and separated one from the other by parts of the membrane, retaining their natural colour; in some cases the serous membrane is injected or thickened.

Inflammation more generally occupies the covering of the intestines, than the part which lines the walls of the abdomen. False membranes, varying in thickness and softness, according to the duration of the disease, are found spread over the peritoneum; these insert themselves into the intervals of the intestines, and unite them one to the other. The cavity of the abdomen is filled with a whitish milky liquid, of a peculiarly faint or very fetid odour, containing suspended a great number of small albuminous streaks of a white, greyish, or red colour; the contained fluid sometimes consists of a bloody serosity, more or less limpid, particularly if the disease has lasted but a very short time, death having quickly supervened.

Peritonitis sometimes also shows livid patches, and real gangrenous spots. In the chronic form the albuminous concretions possess more solidity, and these bands which unite the intestines often become cellular; finally, peritonitis often gives rise to hard, semi-transparent granulations, and the serosity which then exists in the cavity is limpid, and contains a few albuminous streaks; it resembles whey, slightly turbid.

CAUSES.—Exposure to cold and fatigue; constipation, contusions, wounds, and surgical operations; lithotomy, incision for hernia, fistula in ano, improper use of obstetrical instruments.

PROGNOSIS.—*Favourable* in peritonitis from common and transient causes. *Unfavourable* in that produced by mechanical injury or organic disease.

DIAGNOSIS.—From rheumatism or neuralgic pains of the abdominal muscles by the pain in peritonitis being increased by pressure, whilst that situated in the muscles is relieved, or not increased, by steady pressure; also by the presence of *severe* constitutional symptoms in peritonitis.

TREATMENT.—In recent and acute cases, prompt antiphlogistic treatment, consisting of general bleeding, followed by tartar-emetic combined with calomel and opium in full doses, and at short intervals. If much irritability of stomach is present, the tartar-emetic must be omitted, and calomel and opium must be given alone. In less severe cases, leeches to the abdomen, followed by warm fomentations, and calomel and opium internally.

When peritonitis proceeds from a penetrating wound of the abdomen, the case is formidable, though not invariably fatal.

In chronic cases, leeches in smaller numbers, and calomel and opium, and stimulant embrocations to the abdomen, of which the best is hot turpentine. In case of great debility, these remedies must be combined with stimulants taken by the mouth, and administered in the form of enema.

As soon as tympanites or meteorism appears, we should employ stimulating enemata. The elastic tube proposed by Dr. O'Beirne is to be introduced into the colon, by which the accumulated gas will rapidly escape, and allow the diaphragm to descend, and the respiration to become free, which is most important to the treatment.

When effusion has taken place, and the febrile symptoms have abated, we must resort to those remedies capable of exciting absorption. (See Ascites.)

When antiphlogistic remedies fail in puerperal or ordinary peritonitis, a free use of mercury may effect a cure in the most hopeless cases, even when coffee-coloured vomiting is present. A drachm of strong mercurial ointment is to be rubbed into each axilla alternately every quarter of an hour, and a powder containing a scruple of calomel, five grains of camphor, and a quarter of a grain of morphia, may be exhibited every two or three hours.

Dr. James Johnson was the first who exhibited scruple doses of calomel in the diseases of India; and as much as 500 grains of this medicine have been administered in successive doses in puerperal fever. Dr. Elliotson and Dr. Graves have subsequently advised mercurialization as the most efficient treatment of inflammation of serous membrane.

ASCITES.—DROPSY OF THE ABDOMEN.

SPECIES.—1. *Ascites abdominalis*;—with equal tumor of the whole abdomen, and with evident fluctuation.

2. *Ascites saccatus*;—with partial swelling of the abdomen, at least at the beginning, and with fluctuation not so evident.

SYMPTOMS.—*Of the peritoneal.*—It often comes on with loss of appetite; sluggishness; inactivity; dryness of the skin; oppression of the chest; cough; diminished urine; costiveness; shortly after a protuberance is perceived in the hypogastrium. This, gradually extending, at length occupies the whole abdomen, which becomes uniformly swelled and tense, in a small degree elastic, and communicates to the hand, when struck against it, the sensation of its containing an undulating fluid.

As the distension increases, the difficulty of breathing becomes more considerable; the countenance exhibits a pale or bloated appearance; immoderate thirst; dry parched skin; high-coloured, thick, and scanty urine, depositing a lateritious sediment; the pulse sometimes quickened, sometimes preternaturally slow and soft. The disease seldom continues long without inducing an anasarca state of the lower extremities.

The *encysted dropsy* is seldom preceded, or in the first instance accompanied, with any cachectic state of the system; it is distinctly observed to begin in a particular part of the abdomen, whence it gradually diffuses itself throughout the whole cavity; the

strength of the patient is long unimpaired ; and the appetite and respiration continue good ; until the bulk and pressure of the fluid bring on various constitutional effects, which usually attend the true ascites in its early stages.

CAUSES.—In addition to the general causes of dropsy, (see Anasarca,) certain local affections, as diseases of the viscera of the chest and abdomen ; scirrhusities of the liver, spleen, or pancreas ; enlargement of the mesenteric glands ; loss of tone in the peritoneum after pregnancy, or from atonic inflammation ; local injury.

DIAGNOSIS.—The fluctuation of the contained fluid ; the diminished urine ; the general leucophlegmatic appearance of the patient.

From Tympanites.—(See Tympanites.)

From Pregnancy.—Consult the signs of pregnancy delivered by authors on midwifery.

PROGNOSIS.—*Favourable.*—The urine little diminished, or becoming more copious ; the swelling of the abdomen diminishing ; the skin ceasing to be dry ; the respiration becoming free ; the strength originally little impaired.

Unfavourable.—Great emaciation ; sympathetic fever ; intense local pain ; coma ; the disease having been induced by a diseased state of the liver, brought on by the abuse of spirituous liquors, or by diseases of the other viscera ; the constitution otherwise impaired.

TREATMENT.—*Indications.*—I. To evacuate the fluid.

II. To prevent a second accumulation.

The first is effected by

1. Purgatives, such as are recommended in anasarca.
2. Diuretics, similar to those ordered for anasarca.
3. Friction of the abdomen with antimonial ointment, and iodine.
4. After a fair trial has been given to those remedies, which increase the natural secretions, without effect ; and the pressure and tension of the abdomen become insupportable, recourse must be had to tapping of the abdomen.

The re-accumulation is sometimes prevented,

1. By removing the causes which induced the disease ; and by strengthening the tone of the parts in particular, and of the system in general.
2. If the disease proceed from chronic visceral obstruction, by mercury, administered both internally, and externally by friction to the abdomen ; the union of submuriate of mercury with antimony or squills ; the iodides of potass and iron.
3. If from relaxation, by tonics, aromatics, stimulants ; as directed for anasarca.

In this, as in all other forms of dropsy, it is of the first importance to ascertain the causes of the dropsical effusion. This will gene-

rally consist in chronic visceral disease; and the treatment must vary with the nature of that disease.

ANASARCA.—DROPSY OF THE FLESH.

CHARACTER.—A preternatural collection of serous or watery fluid in the cellular membrane of the whole or part of the body.

SYMPTOMS.—The disease generally commences in the lower extremities, and first shows itself towards evening with a swelling of the feet and ankles, which by degrees ascends, and successively occupies the thighs and trunk of the body. When it has become very general, the viscera are affected in a similar way; the cellular membrane of the lungs partakes of the affection; the breathing becomes difficult, and is accompanied by cough, and the expectoration of a watery fluid. The urine is small in quantity, high coloured, and deposits a reddish sediment; sometimes, however, it is of a pale whey colour, and more copious. Costiveness; insatiable thirst; the skin is generally pale and arid, and when the effusion is in large quantity it becomes tense and shining. The water often oozes through the pores of the cuticle, or raises it in the form of small blisters; the countenance becomes sallow; torpor; heaviness; troublesome cough; slow fever.

CAUSES.—*Predisposing.*—An hydropic diathesis, which is known by a loose flabby fibre, pallid and bloated countenance, the phlegmatic temperament, and scanty secretion of urine.

Exciting.—Certain organic diseases, producing an obstruction to the free circulation of the blood; excessive discharges; suppression of customary evacuations; exposure to a moist atmosphere; the sudden striking in of eruptive complaints; crude and indigestible aliment; drinking large quantities of watery fluids; abuse of spirituous liquors; certain preceding diseases, as inflammation; the exanthemata, especially scarlatina; jaundice, diarrhœa, dysentery, phthisis, gout, intermittents of long standing.

DIAGNOSIS.—*From Emphysema.*—By the swelling in anasarca being œdematous; in emphysema, elastic, and accompanied with crepitus; by the particular state of the urine; and other symptoms above mentioned.

PROGNOSIS.—*Favourable.*—The disease having been induced by causes which admit of easy removal; the strength little diminished; the constitution of the patient previously unimpaired; the appetite remaining entire; the respiration free; no great thirst; a gentle moisture on the skin.

Unfavourable.—Concomitant organic disease; great emaciation; erysipelatous inflammation; much drowsiness; petechiæ and ecchymoses; hæmorrhage; feverish heat; great thirst; and quick small pulse.

TREATMENT.—*Indications.*—I. To evacuate the collected fluid.
II. To prevent its again accumulating.

The collected fluid is evacuated by,

1. Scarifications and punctures.
2. Blisters : antimonial ointment.
3. Friction.
4. Emetics and nauseating medicines, especially antimonium tartarizatum and squills.
5. Cathartics ; of elaterium, gamboge, croton oil, jalap, colocynth, submuriate of mercury, gratiola, crystals of tartar.

The free use of imperial, or a solution of supertartrate of potass is also highly useful.

6. Diuretics : colchicum, squill, acetas potassæ, digitalis, supertartras potassæ, spiritus ætheris nitrici, cantharis, juniperus, armoracia, sinapis, genista, lactuca virosa, tabacum.

7. Diaphoretics ; compound powder of ipecacuanha, camphor, antimonials assisted by tepid diluents ; the vapour-bath ; the copious use of aqueous diluents ; water impregnated with tinctura ferri muriatis.

8. Bandages.

9. Mercury ; so exhibited as just to affect the gums.

The second indication demands,

1. A light nourishing diet, with pungent aromatic vegetables ; garlic, mustard, onions, cresses ; Rhenish wine.

2. Tonics ; cinchona, cascarilla, cusparia, quassia, preparations of steel, as recommended for dyspepsia.

3. The occasional use of diuretics and aromatics.

4. Regular exercise.

5. Cold bathing.

The treatment of anasarca must vary with the cause. If it depend upon visceral disease, the treatment will be appropriate to that disease ; if upon pressure, the compressing cause must be removed ; if upon an inflammatory state of system, antiphlogistic remedies will be required. *Anasarca following scarlatina* is of the inflammatory kind, and is best treated by bleeding, depressing diuretics, and drastic cathartics. In this form of dropsy, as in all others, the urine must be examined, to ascertain the presence or absence of disease of the kidney. (See Diseases of the Kidney.)

If, in spite of remedies, the anasarca increases, and the legs are so swollen as to require immediate relief, the water must be let out by repeatedly introducing a common curved needle under the skin, and subsequently keeping up a uniform pressure by bandages.

PAROTITIS.—CYNANCHE PAROTIDEA.—THE MUMPS.

SYMPTOMS.—After slight febrile symptoms, fulness and soreness at the angle of the jaw, with pain on moving the part. The swelling extends by degrees upwards to the space between the cheek and ear, and downwards to the sub-maxillary gland. On the fourth

day it begins to subside. The disease is frequently accompanied towards its decline, or it is followed by, painful swelling of the breasts or testicles. The disease generally terminates in resolution.

CAUSES.—Contagion; exposure to cold; scarlatina, and other febrile diseases.

TREATMENT.—The application of flannel, friction with stimulating liniments, gentle aperients, farinaceous diet. If much inflammation is present, leeches may be applied. The secondary affection of the breasts or testicles must be treated in the same way.

Sometimes a metastasis of the inflammation takes place to the brain. In this case the treatment will be that of idiopathic affections of the brain.

CYNANCHE THYROIDEA.—BRONCHOCELE.— GOITRE.

SYMPTOMS.—A swelling affecting the entire thyroid gland, or a single lobe of it; at first firm and elastic, but after a time soft, flabby, and containing small portions of a denser consistence. It grows slowly at first, but after a time increases rapidly, extending in all directions, upwards towards the jaw, laterally beyond the limits of the neck, and frequently hanging over the chest. It sometimes attains an enormous size, in which case it may cause serious inconvenience by its pressure on surrounding parts, on the trachea, and on the vessels of the neck.

ANATOMICAL CHARACTERS.—The gland is found surrounded with a large quantity of condensed cellular membrane; the gland itself is hypertrophied either partially or through its whole extent, and presents, when cut into, a congeries of cells, varying in size from that of a pea to considerable cavities. These cells contain fluids of various character and consistence.

CAUSES.—*Predisposing*.—Female sex; the age of puberty; hereditary tendency. *Exciting*.—Unknown. The disease is endemic in localities differing widely from each other in all respects.

TREATMENT.—Iodine in the form of ointment or tincture externally. The iodide of potassium internally. In plethoric subjects, or where there is local inflammation, the previous use of depletion, general or local. Benefit is often derived from the application of leeches. Removal from the district in which the disease originated.

When all other means have failed, and the tumor, by its pressure, occasions great inconvenience, various operations have been recommended. Some have employed setons with benefit. The thyroid arteries have been tied with temporary advantage. The tumor also has been extracted, but the operation is attended with alarming hæmorrhage, and has been followed by fatal consequences.

DISEASES OF THE URINARY ORGANS.

1. Diseases of the Kidneys.
2. Diseases of the Bladder.

DISEASES OF THE KIDNEY.

NEPHRITIS	Inflammation of the kidney.
GRANULAR DISEASE OF THE KIDNEY.	
GRAVEL.	
URINARY CALCULUS.	
HÆMATURICA	Bloody urine.
ISCHURIA RENALIS . .	Suppression of urine.
DIABETES	Immoderate flow of urine.

NEPHRITIS.—INFLAMMATION OF THE KIDNEY.

SYMPTOMS.—Pyrexia ; pain in the region of the kidney, extending along the course of the ureter to the neck of the bladder, to the groin or scrotum, and frequently attended by retraction of the testicle. The pain is deep-seated, circumscribed, or diffuse, acute or dull, sometimes only felt upon pressure, but always increased by firm pressure, by the erect posture, by the sitting posture, by coughing, sneezing, or other strong expiratory movements, and sometimes even by the descent of the diaphragm in ordinary respiration. It is also increased by straightening or stretching the lower extremity on the affected side. Instinct directs the patient to avoid this ; to incline to the affected side, and to bend the limb, thereby relaxing the muscles of the loins. Hence he lies on the affected side, or back, and draws up one or both lower extremities. Nausea and vomiting ; frequent micturition ; dysuria, with partial or total suppression of urine. The urine which is passed, is usually at first bloody, and coagulable by heat and acids, but after a time the blood disappears, and the urine becomes pale, watery, not coagulable, and either neutral or alkaline. Albumen is, however, sometimes present, but in those cases the inflammation is probably complicated with granular degeneration of the kidney. The pulse is full, hard, and frequent at first, but becomes small as the disease advances ; the tongue is covered with a white fur ; there is constipation, tympanites, and wandering pains in the abdomen, with an anxious expression of countenance and depression of spirits.

TERMINATIONS.—In resolution ; in abscess ; or in gangrene ; known by the ordinary symptoms that accompany these terminations of inflammation in other parts. Coma is one of the most common terminations.

CAUSES.—The common causes of inflammation ; acrid diuretics ;

calculi or gravel in the kidney sticking in the uriniferous tubes, ureters, or bladder; external injury; long-continued and violent exercise of the muscles of the back, as on horseback; collections of hardened fæces in the colon; retrocedent or atonic gout; violent exertions, strains, diseases of the urethra, prostate gland, bladder, and ureters.

DIAGNOSIS.—*From lumbago.*—By the seat of the complaint, discovered upon pressure; by the pain following the course of the ureter; by the dysuria and micturition; by the retraction of the testicle; by the pain not being increased upon motion of the muscles.

MORBID APPEARANCES.—On examining an inflamed kidney, we find it of a scarlet or crimson colour; sometimes enlarged, indurated, or infiltrated with pus. The ureters in such cases participate in the disease; they are red, their mucous membrane thickened, and covered with pus; or adherent, so that their canal may be obliterated in some part of its course, above which the tube will be enlarged. This last appearance is often seen when a calculus is passing from the kidney to the bladder, and when it obstructs the ureter.

PROGNOSIS.—*Favourable.*—Remission of pain, fever, and tension, followed by a very copious excretion of high-coloured mucus, or purulent urine; universal equable perspiration; hæmaturia, if succeeded by a remission of symptoms; hæmorrhoids. The prognosis is generally favourable in idiopathic nephritis before the fifth day.

Although nephritis frequently terminates in suppuration, the ulceration formed in the kidneys does not materially affect the health, and generally heals, unless there be a scirrhus or scrofulous diathesis.

Suppuration is always preceded by rigors, sometimes as violent as the cold fit of an ague, and the matter is discharged in one of these ways:—1. Through the pelvis of the kidney into the bladder and urethra. 2. Into the abdomen. 3. Externally. 4. Into the intestinal canal.

Unfavourable.—Pale urine, secreted in small quantity; very frequent micturition; dysuria; sudden cessation of pain, hiccup, delirium, cold extremities, severe rigors, and supervening hectic fever.

The kidney, like all other organs, sympathises with other parts; and when it is irritated or inflamed, it deranges them; as the stomach, the brain, the bladder, the testicles, the skin, the thoracic viscera, &c. It may also happen, that nephritis is unaccompanied by pain in the kidney, while the stomach, the brain, or the bladder may exhibit all the signs of idiopathic disease; moreover, diseases of any of the abdominal viscera will derange the kidney; and it may become disordered by metastasis, especially of gout and rheumatism.

The kidney is very rarely affected with acute inflammation; but

is very liable to chronic diseases, and also to calculi, sand, and gravel.

Acute nephritis, when idiopathic, generally terminates by resolution, and very rarely proves fatal. But when complicated with calculus in the ureter, bladder, or urethra, it generally destroys life. Many illustrative drawings of nephritis, caused by calculus in the kidney, or impacted in different parts of one or both ureters, and enlarging those tubes to the size of small intestines, and of stone in the bladder, of its impaction in the neck of this organ, and in the urethra, and of stricture of the urethra and prostate gland, will be found in the valuable production of Mr. Crosse, of Norwich, on Calculous Complaints. Stricture of the urethra, and disease of the prostate gland, are among the most frequent causes of nephritis in an acute, but especially in a chronic form. Inflammation of the kidney often excites gastritis, gastro-enteritis, or peritonitis; and if both kidneys are affected, a complete suppression of urine takes place, which proves fatal in a few days, by inducing cerebral irritation or congestion. Dr. Laing relates the history of a case in which there was suppression of urine for nine days without proving fatal. When suppression of urine occurs in typhus, the patient is seized with cerebral congestion, and after death a urinous odour is perceived in the brain. Acute nephritis causes such slight derangement in most cases, that it is often overlooked; and hence it is allowed to pass into the chronic state, and a permanent change of function is established, which in some cases will produce lithic acid, or other deposits; an excessive secretion of urea in others; and in more, diuresis or diabetes, or both. These facts are sometimes overlooked; and in the treatment of these diseases, their inflammatory origin is too frequently forgotten. The presence of chronic nephritis, according to M. Rayer, is indicated by the urine becoming alkaline. This assertion still requires confirmation.

TREATMENT.—*Indications.*—The same as in the other phlegmasiæ.

They are to be fulfilled by,

1. General and local blood-letting; the latter either by the use of cupping-glasses, or by the application of numerous leeches to the region of the kidney or perinæum.

2. Oleaginous cathartics of castor-oil, manna, or oil of almonds: frequent emollient clysters.

3. Mild diaphoretics, especially frequent and copious draughts of mucilaginous and diluent liquids, as barley-water, solution of acacia, or gum-arabic, decoction of marsh-mallows, linseed-tea, with a little nitre.

4. When the fever is somewhat abated and the pain excessive, opiate clysters, as starch and laudanum.

R. Decocti hordei fʒvj: tincturæ opii fʒj: fiat enema.

5. The warm hip-bath, repeated according to the violence of the pain; and fomentations to the region of the kidney.

6. A decoction of the dried leaves of the *amygdalus persica*, the peach-tree, drunk in the quantity of a pint a day, has been found useful in this disease.

Anodyne embrocations, as the camphorated oil and morphia applied over the region of the kidney when the acute symptoms have abated, may be tried with advantage. An issue or seton should be inserted in chronic cases. In dyspeptic subjects assafoetida, æther, and opium, often afford relief. The alkalies, as soda, potass, and lime-water, are useful, when the urine contains lithic-acid; and the mineral acids when the phosphates are deposited.

The treatment of nephritis differs very little from that of enteritis, with the exception of the use of blisters. These are generally considered as improper, because they frequently induce strangury, which mostly increases the inflammation of the kidney; but they have been applied with decided benefit in cases where the patients did not usually suffer from strangury.

A tablespoonful of olive-oil in syrup has, according to Martinet, often relieved pain. The *uva ursi* and *pareira brava* in decoction, in the proportion of an ounce of each to a pint of water, are often beneficial. Dose ʒj. twice or thrice a day. Decoction of linseed or flax-seed, may be used freely; for example, a pint or two every day. The balsam of copaiba is very beneficial when all signs of inflammation have disappeared.

R. Olei olivæ ʒss; syrupi simplicis ʒj: fiat haustus tertiâ quâque horâ sumendus.

In the treatment of acute nephritis, Dr. Christison recommends bleeding carried to syncope, followed by opium in the dose of two or three grains, or thirty or forty minims of the tincture. He has seen the disease "abruptly arrested in this way." (*Libr. Pr. Med.* vol. x.) It is important to direct the treatment, not to individual symptoms, but to the inflammation which causes them. Perfect rest should be enjoined, and during convalescence all violent exertions should be avoided. When there is retention of urine, it is important to draw off the urine at stated periods.

GRANULAR DISEASE OF THE KIDNEY.

HISTORY.—Dr. Bright, in his *Medical Reports*, 1827, described an organic change in the kidney of many dropsical patients, consisting (when fully developed) of a deposition of a yellowish granular matter in its texture, with gradual atrophy of its cortical and tubular substance, which changes he invariably found accompanied with an albuminous state of the urine during life. He hazarded the opinion that there were three forms of this disease. In the first, the kidney is soft and of a mottled yellow externally, the cortical part yellowish grey, and the tubular pale. In the second stage the cortical part was converted more or less into a granulated texture, with a copious white interstitial deposit; and

in the third stage these granulations were increased, were of a yellowish, red, or purplish colour, projecting externally, so as to render the surface of the kidney rough, and producing a semi-cartilaginous hardness of the whole gland, the tubular portions being drawn towards the surface. This disease was attended by pain across the loins and upper part of the abdomen, by sickness and vomiting, and by an unusually low specific gravity of the urine. During its progress there was a strong tendency to inflammation of the serous and mucous membranes, and to effusions of blood and serum in the brain. In a subsequent paper in the *Guy's Hospital Reports*, 1836, the complications now mentioned are fully described, as the following heads of cases attest. Albuminous urine; death, with convulsions.—Kidneys degenerated. Death, with convulsion and coma.—Kidneys granulated. Albuminous urine of four or five years continuance; death, with convulsion and apoplexy.—Kidneys degenerated. Albuminous urine; death from peritonitis.—Kidneys diseased.

This pathology is now established. The subsequent researches of Drs. Christison, Gregory, and Osborne, and of MM. Solon and Rayer, have confirmed the accuracy of Dr. Bright's statements. An account was published of eighty-seven cases treated in the Royal Infirmary of Edinburgh, and the granular state of the kidney was observed in every case in which an autopsy was permitted. Dr. Gregory, however, established that dropsical effusion was not an essential, though a frequent symptom, for, out of eighty cases, there were twenty-two in which it was absent.*

Dr. Osborne of Dublin, in his valuable work on dropsies, 1835, describes eighty-four cases with coagulable urine, and powerfully supports Dr. Bright's conclusions. In nine cases the autopsies presented diseases of the kidneys, and the similarity of symptoms, of causes, and of collateral circumstances, proved the existence of the same disease. In numerous cases of dropsies connected with diseased liver, impediments of circulation or respiration, or general debility, which terminated fatally, and in which the urine was examined before death, and found not to coagulate, the kidneys were free from disease; also cases ending fatally, but unconnected with dropsy, in which the kidneys were healthy, and the urine did not coagulate. "In no one instance," says Dr. Osborne, "have I met with coagulable urine without diseased kidneys, or healthy kidneys with coagulable urine."

It is worthy of notice, that Dr. Wells and Dr. Blackall anticipated Dr. Bright. They give the histories of nine cases of dropsy with dissections, in which albuminous urine existed during life, and the kidneys were found diseased; but preconceived opinions on the nature of dropsy prevented these observers from tracing the connexion. Dr. Darwall met with one case of dropsy accompanied

* *Edinburgh Medical and Surgical Journal*, vol. xxxvii.

with coagulable urine, in which the kidneys were perfectly sound. It is also urged that albumen exists in the urine of those in perfect health, after taking indigestible food, or using mercury; but if it exist in such circumstances it does not coagulate by heat. Mr. Hamilton has detected disease of the kidneys in anasarca consequent on scarlatina when the urine was coagulable.*

SYMPTOMS.—The disease may be acute or chronic. The acute is ushered in by rigor followed by pyrexia. The urine is scanty or almost suppressed, occasionally bloody, and loaded with albumen; there is frequent micturition, dull pain in the loins, sometimes shooting to the groins or testicles; nausea, pain in the epigastrium increased by pressure, and in some cases vomiting. These symptoms are followed in one or two days by anasarca.

The *terminations* of the disease are various: sometimes it yields to active treatment, in other instances it subsides into the chronic form; in others, again, it leads to acute visceral disease, such as pleurisy, pericarditis, peritonitis, or pneumonia. In those cases where the urine is very scanty it frequently terminates in fatal coma.

The chronic form may commence with acute symptoms, or it may come on gradually and imperceptibly, the first marked symptoms being frequent micturition and debility. The patient also complains of obscure pains in the loins, increased by pressure; the urine scanty or increased in quantity, of a cherry-red or brown colour, or of a muddy appearance, of low specific gravity, and coagulating more or less by the action of heat and nitric acid; the skin is dry, and there is nausea with urgent thirst. In this state the patient may remain for many months, or even for a few years, till at length some of the secondary disorders make their appearance. The most common of these are dropsy, acute and chronic visceral inflammation, diarrhœa, rheumatism, catarrh, diseased heart, and coma. When the disease proves fatal death is usually preceded by coma.

DIAGNOSIS.—Of the *acute* form.—“The only invariable character is scanty, highly coagulable urine, with more or less fever.” Of the *chronic* form.—“A reduction in the density of the urine, with diminution of its solids, excessive reduction of the colouring matter of the blood, and leucophlegmatia.” (Christison)

COMPLICATIONS AND TERMINATIONS.—Anasarca and ascites; bronchitis, diarrhœa, dyspepsia, constant vomiting; pleurisy, peritonitis, pericarditis, pneumonia; coma; chronic rheumatism; and organic diseases of the heart and liver.

“Of the thirty-six patients, eighteen laboured under bronchitis in different degrees of intensity; eleven had gastro-enteric inflammation, denoted by thirst, vomiting, or diarrhœa; and the two diseases were in six instances combined in the same individuals.

Thus it appears, that nearly two-thirds of the entire number laboured under inflammation of the mucous membrane."—(Dr. Osborne.)

Dr. Gregory mentions that diarrhœa and vomiting were amongst the most constant symptoms, in forty-six out of eighty patients; but they existed "without any distinct sign of inflammatory action."—*Op. Cit.*

If these secretions from the mucous surfaces so constantly co-existing with renal disease, as shown by Dr. Gregory and Dr. Osborne, are channels through which the superfluous excretions, which naturally pass through the skin and kidneys, are evacuated, it follows that the restoration of the functions of the skin will be one of the best means of relieving the catarrh or diarrhœa; and the obstinacy of these symptoms under the use of ordinary remedies during the existence of the primary renal disease is at once explained.

PROGNOSIS.—Complete recovery rare. *Favourable.*—The early stage or previous rare occurrence of the disease; absence of complications; gradual disappearance of albumen from the urine, and its increasing specific gravity; moisture of the skin. *Unfavourable.*—The reverse of these; suppression of urine; coma.

ANATOMICAL CHARACTERS.—Various alterations in the size and structure of the kidneys, of which the following seven varieties are enumerated by Christison. 1. Congestion of the kidney with enlargement, and with or without deposition in its internal structure; 2. A granular deposition into its cortical and tubular textures, sometimes finely granular, sometimes roe-like, and attended with atrophy or absorption of the proper renal tissue; 3. Deposition of a homogenous yellowish-grey matter, with similar atrophy; 4. Disseminated tubercles; 5. Induration of semi-cartilaginous hardness; 6. Atrophy, from disappearance of the proper renal structure, with little or no deposition; and, 7. Mere anæmia, or paleness?

CAUSES.—*Predisposing.*—Intemperance; the sequelæ of scarlatina; the scrofulous diathesis; errors in diet. It occurs in both sexes, and at all ages; at 5, and even under, and so late as 79. (Christison.) Of seventy-four fatal cases recorded by Dr. Bright, nineteen were under 30, fifty under 50, thirteen above 50, and four above 60. *Exciting.*—Mechanical injuries, cold, and intemperance.

Dr. Osborne adduces many satisfactory reasons to prove that the most common cause of this disease of the kidney is a suppression of the healthy secretion of the skin, effected by cold. In twenty-two out of thirty-six cases the disease could be referred to suppressed perspiration. Whenever general perspiration came on spontaneously, or was induced by medicine, the case always terminated favourably.

"The next frequent cause is the abuse of diuretic drinks and medicines. Of thirty-six cases ten occurred in confessed drinkers of ardent spirits."

THE TREATMENT.—This cannot be better described than by quoting at length the directions given by Dr. Osborne.

“When a patient was placed under my care, with general œdema, coagulable urine, and dry skin, I directed him to be kept in bed, in order to maintain warmth of the surface, which is usually disposed to be cold. It has happened frequently that by external heat alone, an improvement both in the quantity and quality of the urine, and a material subsidence of the œdema, have taken place. The first medicine ordered was usually a purgative; and in the choice of this, in order to avoid ambiguity as to its mode of action, I abstained from the use of all those articles which are reputed diuretic; such as compound powder of jalap, or super-tartrate of potash; and I generally employed the senna mixture. I then commenced a diaphoretic course, by administering foot-baths, hip-baths, or general baths; the last either of water or of vapour, according as they appeared to agree best with the individual case, at night as they were going to bed. The patient also took at night eight grains of pulv. Jacob. ver., four of pulv. ipecac. c., and ten grains of confect. aromat.

“The usual drink was barley-water. In case, however, of tendency to stupor, or headache, the Dover’s powder was omitted, or given in smaller doses. In one case, in which no perspiration was produced by the above and other means, it followed the use of the following mixture:

“R. Aq. Acet. ammon. ℥iv; sulphur. subl. ℥j; vini ipec. ℥j; ext. opii aq. gr. ij; aquæ fœnic. dulc. syrup. sacch. empyreumat. utriusque ℥ij, one ounce to be taken every hour.

“When the vapour-bath was not attended with perspiration, from want of reaction on the part of the patient, he was directed to take, while in it, two drachms of the tinct. guaiaci ammoniat.; when, however, (as sometimes happened,) both vapour and water baths produced coldness of the extremities, they were discontinued.

“When there was a continued tendency to coldness of the surface, unaccompanied by feeble action of the heart, the diaphoretic preferred was tinct. guaiaci ammoniat. ℥j; sulphuris loti ℥j; mist. camph. ℥j; Sp. piment. ℥ss., or the following:

“R. Carbon. ammon. ℥ss; mist. camph. ℥vj, an ounce to be taken every two hours.

“In connexion with these remedies, administered in the evening with a view to procure a perspiration during the hours of sleep, warm applications were kept up during the day, and frequently a succession of bags of hot salt was maintained, when the heat of the extremities could not be otherwise preserved. When perspiration was restored in one part of the body, as in the trunk, but not in the limbs, the latter were rubbed several times during the day with an infusion of two drachms of bruised mustard seeds in distilled vinegar, with naphtha, or some other suitable stimulating embrocation.

“Having never failed in removing this kind of general dropsy whenever the entire surface of the body was restored to a perspiring state, it is not surprising that I should bestow the utmost attention on this part of the treatment.

“Next in importance to the restoration of the function of the skin, and indeed in most cases expedient, as contributing to that great object, was bloodletting.”

In some cases cupping or leeching on the loins was employed, with vesication effected by means of lint moistened with tincture of lytta and covered with oiled silk. This acts rapidly, was applied in rapid succession, and the vesication dressed with iodine ointment.

Whenever purgatives were necessary they were administered in the morning, so as not to interfere with the diaphoretics. As relapses are caused by exposure to cold, flannel should be worn next the skin, and frictions and baths employed when the skin becomes dry. When circumstances permit, a residence in a warm climate is advisable.

Bandages should be applied to the legs during convalescence, and exercise should be carried to perspiration, when the strength allows it.

TREATMENT OF COMPLICATIONS.—When the renal disease is complicated with other complaints, additional remedies will be required.

In dry bronchitis, copaiba and tinct. cubeb. in small doses were beneficial; and when expectoration was copious for a long time, and impeded respiration, one grain of acetate of lead and a quarter of a grain of opium diminished the secretion and irritation.

Leeches to the larynx unloaded the bronchial tubes, and caused a cessation of cough and dyspnœa. Irritation of the stomach and bowels was relieved by leeches, warm applications, and a diet of rice and arrow-root.

Dysentery, commencing by tenesmus and general excitement, was most speedily relieved by an enema of twelve grains of nitrate of silver, and eight ounces of water, followed in three hours by another of starch and laudanum.

When pericarditis was urgent, it was relieved by tartarized antimony, and by local and general bleeding.

In valvular disease of the heart, a small quantity of tinct. digitalis, with carb. ammoniæ, camphor, and Hoffman's liquor, was followed by diminution of the heart's action, a sense of general relief, and a refreshing sleep. In diseased aortic valves, a large issue over the region of the heart was most advantageous.

When ascites follows chronic peritonitis or indurated liver, and intractably remains after the general œdema is removed, Dr. Osborne recommends the following measures, which in his hands have rendered tapping seldom necessary. They may be continued when mercury and drastic purgatives are abortive, and the declining strength of the patient forbids such powerful remedies.

“These are the repeated application of leeches to the rectum, so as to unload the vessels of the vena portæ. The application of various stimulants to the abdomen, as, 1st, An ointment composed of equal parts of iodine, mercurial, and cantharides ointments. 2dly, A paste formed of Spanish soap, spread upon linen, and sprinkled over with muriate of ammonia immediately before being applied; which, by the chemical decomposition that ensues, and the consequent gradual extrication of ammonia, produces heat and redness. 3rdly, Sinapisms, suffered to remain till the pain becomes urgent. These have the advantage of healing with great rapidity. 4thly, Frictions of six or more drops of croton oil. These are, however, rather uncertain; in some individuals producing no effect, and in others followed by erysipelas, extending beyond the seat of the application. 5thly, A mixture composed of one part of tincture of digitalis, and two of aqua muriat. calcis; a teaspoonful to be rubbed on the abdomen, morning and evening. This compound appears to excite the absorbents, and increases the discharge from the kidneys, but does not produce any sensible redness of the skin.”

Tinnitus aurium, watchfulness, delirium, stupor, or headache, with increased heat of the head, are formidable symptoms, as death is frequently produced by a low form of arachnitis. Under such circumstances Dr. Osborne recommends, besides bleeding from the temporal artery and by leeches, the free exhibition of calomel, followed by brisk purgatives.

GRAVEL.

SYMPTOMS.—Dull or acute pains, with a sense of heat and heaviness in the lumbar region, with more or less pain or difficulty in voiding the urine, increased by sudden and violent motion, with occasional pain behind the pubes, irritation at the neck of the bladder, and itching or pain at the extremity of the penis. Sometimes there is retraction of the testicles, with discharge of bloody urine or of clots of blood. The urine, even while warm, contains a sandy powder, crystalline grains, or small calculi. The urine is generally rather scanty, high-coloured, and of high specific gravity, acid, of a strong odour, and disposed to become turbid on cooling. The digestive organs are deranged; there is a sense of weight in the epigastrium; there is acidity of the stomach, with flatulence, after any irregularity of diet, as the use of acescent wines, or drinks, or fruits; frequent eructation; constipation, furred tongue, dry skin, restlessness, and feverishness.

The most common form of gravel consists of lithate of ammonia, with or without free lithic acid. Next to this, in point of frequency, is pure lithic acid. The ammoniaco-magnesian phosphate, or a mixture of this with phosphate of lime, comes next in order; then the oxalate of lime. A mixture of these several sorts is not

of uncommon occurrence. The other forms of gravel are rarely met with. For the mode of distinguishing these several varieties, see p. 77, et seq.

CAUSES.—*Predisposing.*—Constitutional and hereditary peculiarities; the periods of infancy, and from the age of forty upwards; high living; sedentary habits; gouty diathesis. *Exciting.*—Cold; blows and injuries to the loins; dyspepsia; the use of water containing calcareous matters; ascendent fruits. In the case of the oxalate of lime gravel, vegetables and fruits containing oxalic acid; organic disease of the kidney or bladder.

TREATMENT.—This varies with the species of gravel discharged. In the lithic acid gravel, a diet chiefly vegetable, and in extreme cases strictly so, diluents, the alkaline bicarbonates, as the bicarbonate of soda in ten-grain doses three or four times a day, gentle exercise, and a regular state of the bowels. The alkaline aerated waters, as those of Vichy, Carlsbad, Vals, Biln, and Tarasp, are highly beneficial in this form of gravel.

When the phosphates are deposited, a more generous diet is admissible, and the mineral acids, as sulphuric, muriatic, and nitric, properly diluted, should be given at short intervals. The mineral waters of Vichy have been shown to be unfit in this form of the disorder. The same attention is also required to the state of the digestive organs, and to the general health. In the oxalic acid gravel, the alkaline carbonates are required. All articles of food containing oxalic acid should be avoided, and saccharine substances should be taken in moderation, or, in extreme cases, avoided. Dr. Prout recommends muriatic acid, and has found it advantageous.

In all forms of gravel strict attention must be paid to the general health; to the functions of the skin, to the avoidance of sudden changes of temperature, and to the state of the digestive organs. Symptoms supervening on gravel must be treated by the remedies appropriate to such symptoms occurring independently of it. Thus, in addition to the treatment of acute and chronic nephritis and other diseases of the kidney already described, it will be sometimes necessary in cases of gravel to employ leeching, fomentations, warm-baths, mucilaginous drinks, enemata, mild or low diet; and to enjoin rest of body and tranquillity of mind.

URINARY CALCULI.

SYMPTOMS.—These will vary with the situation. When the calculi are situated in the bladder or urethra, the case comes under the care of the surgeon; but when they are contained in the kidney or in the ureter, they are beyond the reach of surgical aid, and require medical treatment. The symptoms of calculi in the kidney are those of gravel in its most severe form, or of nephritis; viz. pain in the loins, extending to the groin, testicle, or extremity of the penis, retraction of the testicle, painful and frequent micturi-

tion, and bloody urine. The pain is greatly increased by motion, and relieved by rest. There is nausea and vomiting, restlessness, and slight fever. These symptoms are often suddenly removed by the discharge of a small calculus, often accompanied or followed by that of a large deposit of gravel. The presence of this calculus in the kidney often leads to severe inflammation, and to those diseases of the kidney which are the result of it.

TREATMENT.—That of gravel. The alkaline bicarbonates, much diluted, and with an excess of carbonic acid, form here, as in the case of gravel, the most important remedy. The remainder of the treatment will depend upon the nature of the symptoms.

Symptoms of Calculus in the Ureter.—When a calculus is passing along the ureter, there will be intense pain or colic, or a dull pain along the affected ureter and spermatic cord on the same side, extending to the penis, the testicle, or the inside of the thighs. There is frequently great tenderness on a circumscribed spot of the abdomen corresponding with the seat of the calculus. Constant and often ineffectual calls to pass urine, which is tinged with blood. There is severe nausea and vomiting, with extreme anxiety and intense suffering. These symptoms may pass off suddenly; and in this case a small calculus is sometimes discharged from the urethra. In other instances the calculus remains impacted in the ureter, leading to disease of the kidney, or giving rise to large accumulations of urine and ultimate extension of the pelvis of the ureter and of the walls of the kidney. In this manner the kidney may be transformed into a kind of sac, which may fill the abdomen, and which may contain a variable quantity of urine. A case of this kind was treated at St. John's Hospital, which was supposed to be ascites; tapping was performed. The abdomen again became tense; death took place; and on the autopsy the enlarged kidney nearly filled the abdominal cavity.

In these cases a full dose of morphia, or an opiate enema, will often afford relief. The warm-bath with fomentations on the abdomen and loins, and if the nephritic pain or colic is violent, venæsection, leeching, and counter-irritation are necessary. When these means fail, an opiate suppository often affords relief. The quantity ought not to exceed two grains of solid opium, repeated once or twice in twenty-four hours, its effects on the brain being at the same time carefully observed. Dr. Dewees, in his *Practice of Physic*, 1833, recommends a quantity which would scarcely be safe to use: "Six or eight grains, or even more, according to the emergency of the case, of powdered opium should be made into the form of an elongated pill, with a rich mucilage of gum arabic, and be permitted to dry. When sufficiently hard, it should be forced beyond the sphincter ani into the rectum, and allowed to remain. This may be repeated once in four or five hours, if necessary."

Calculus in the bladder is now consigned to the surgeon, and re-

lieved by the operations of lithotrity and lithotomy. The urgent symptoms caused by it will require the same plan of treatment as in chronic nephritis or gravel.

Nephralgia or neuralgia of the kidney is a disorder common to sedentary persons. It may continue for months or years without any disorganization.

HÆMATURIA.—BLOODY URINE.

SYMPTOMS.—An evacuation of urine, mixed with blood, preceded, when not the effect of injury, by pain and sense of weight, in the loins; pain and heat in the region of the kidney.

CAUSES.—It is most frequently symptomatic of other renal affections—especially of inflammation of the kidney and of calculus. Or it arises from external violence, or great exertion. It may be produced by any of the causes of hæmorrhage, or by excessive venereal indulgence. Sometimes, also, it occurs in the course of purpura nautica, or purpura hæmorrhagica.

DIAGNOSIS.—It is distinguished from the high-coloured urine attendant on many diseases, by the deposit of a coagulum at the bottom of the vessel, and by its staining linen of a red colour.

TREATMENT.—If the disease be the consequence of injury, or the patient be of a full plethoric habit, bleeding, and refrigerants, as in other forms of active hæmorrhage.

The saline purges of the sulphate of magnesia or soda.

Astringents; infusion of roses with an additional quantity of sulphuric acid; uva ursi; soda-water; opium; pareira brava.

If it arise from irritation of the kidney by calculus, together with the remedies proper for that disease, frequent draughts of mucilaginous liquids; as thick barley-water, solution of gum-acacia, decoction of marsh mallows, sweetened with honey; opium; copious emollient clysters.

Should there be concomitant symptoms of debility, powerful astringents; alum; tinctura ferri muriatis; terebinthina; acetate of lead with opium.

When there is pain in the loins, leeches should be applied. If the bleeding is profuse, a cold hip-bath, or cold to the hypogastrium or perineum. If the blood coagulates in the bladder, it gives rise to difficult micturition, and requires catheterism. In such cases, the injection of warm water, decoction of marsh-mallows, or poppies, by means of the double syringe, or a gum elastic bottle, is productive of great benefit. This plan was recommended some years ago by Mr. Jesse Foote, and is now very much employed by Mr. Costello as a preparatory step to his lithotritic operations, and by M. Civiale of Paris, the inventor of lithotrity. Sir B. Brodie describes a most interesting case of great distension of the bladder with blood, which was relieved by tepid emollient injections.—Lectures on Diseases of the Urinary Organs, 1835.

ISCHURIA RENALIS, ANURIA.—SUPPRESSION OF URINE.

SYMPTOMS.—Languor, restlessness, a sense of weariness and weight in the loins and lower extremities, frequent pulse, heat of skin, flushed face, headache, nausea, and vomiting. These symptoms are followed about the third day by drowsiness, œdema of the face or of the limbs and entire body. About the fourth day coma sets in, and death takes place in two or three days more. At the onset of the disease the bladder is found to contain a small quantity of muddy urine; but when the disease is fully formed, there is complete suppression.

In some cases, the kidney continuing to secrete urine, the bladder is empty from some mechanical obstruction to the passage of the secretion through the ureters.

CAUSES.—Pre-existing disease of the kidney, excited into activity by blows or falls, or exposure to wet and cold. The action of certain poisons, as digitalis, corrosive sublimate, and cantharides. Acute inflammation of the kidney.

PROGNOSIS.—The disease is generally fatal, if it does not soon yield to the remedies employed.

TREATMENT.—In acute disease without previous signs of organic disease of the kidney, blood-letting, opiate diaphoretics, as Dover's powder in full doses, the warm-bath, purgatives, and purgative enemata. When the kidneys have been previously diseased, cautious local depletion, with purgatives and diuretics, must be preferred to more active measures. When coma has set in, the disease is generally beyond the reach of remedies.

DIABETES.—IMMODERATE FLOW OF URINE.

SPECIES.—1. *Diabetes insipidus*; with limpid urine, not sweet.

2. *Diabetes mellitus*; with urine of the smell, colour, and taste of honey.

3. *Diabetes chylosus*; urine containing chyle.

DIABETES INSIPIDUS.

SYMPTOMS.—Emaciation, debility, depression of spirits, anxious expression of countenance, thirst, gnawing sensations at the stomach, dyspepsia, white tongue, constipation, dry skin, irritable bladder, greatly increased secretion of urine.

The urine does not always present the same properties. In some cases there is merely an increase of water, the other constituents retaining their normal proportion; in others the urea is in defect; and, in a third class of cases, in excess. To these three forms of diabetes insipidus (or, to speak more correctly, non-

saccharine,) Dr. Willis has given the names *Hydruria*, *Anazoturia*, and *Azoturia*. In the first and second variety the urine is of very low density (in one case of the first form 1001.—Christison); in the third variety the density is high (commonly 1030 to 1035, but sometimes as low as 1020 or 1024).

CAUSES.—Excessive use of liquids, especially of spirituous liquors; hysteria; nervous excitement; granular disease of the kidney; irritation or disease of the bladder or urinary passages. The third variety is not uncommon in young children.

PROGNOSIS.—*Unfavourable* when combined with disease of the kidneys. In other cases it frequently yields to judicious treatment.

TREATMENT.—Moderate use of liquids, abstinence from all substances which possess a diuretic property; tonics, especially the mineral acids, and opium; diaphoretics, warm clothing, the warm bath; a nutritive diet. In the second form of the disease, a due proportion of animal food is necessary; but in the third the diet should consist chiefly of vegetables. Occasional symptoms must be treated by appropriate remedies; when excitement of the circulation is present, moderate bleeding; when great restlessness, opium; in extreme debility, tonics or stimulants; if there is much irritability of the neck of the bladder, demulcents.

DIABETES MELLITUS.

SYMPTOMS.—The first symptom which attracts attention is frequent micturition. The urine, on being examined, is found excessive in quantity, of a pale colour, wanting its proper odour, and containing sugar in greater or less quantity. There is inordinate appetite, generally accompanied by dyspeptic symptoms; excessive thirst; constipation; the tongue is clammy, and red at the edge, or clean, or white with a brown streak down the middle; the gums are red and tender; the throat dry; and the breath has often a sweetish odour, like that of hay; the skin is dry, harsh, and scaly; debility; and rapid emaciation. The mind is generally affected, the power of attention being weakened, and the disposition being rendered melancholy, anxious, and irritable. After the disease has continued for some months, or even for several years, the symptoms continuing to increase, the patient either dies exhausted, or falls a victim to some organic disease.

DIAGNOSIS.—From other forms of diabetes by the saccharine quality of the urine. The other properties of the urine are thus described by Dr. Christison: "In the earliest period, it is not improbable that the urine is characterized by being above 1030 in density, high in colour, and abounding in urea as well as other natural ingredients. Most generally, when first carefully attended to, it is found very pale, scarcely urinous in its odour, little prone to become ammoniacal when long kept, high in density, excessive in

quantity, defective in the proportion of urea, but not in its daily quantity; defective also in its proportion of earthy salts, and abounding in sugar, which communicates a sweet taste, and the property of fermenting with yeast. Should the case, however, have been previously for some time under proper treatment, then the colour of the urine is often less pale, its odour somewhat urinous, and, under long keeping, ammoniacal; its quantity is not so excessive, yet still always superabundant, especially considering its high density; the proportion of urea more abundant, its daily quantity excessive; and sugar also present, though frequently it is not to be detected by the sense of taste. As the disease advances, the influence of treatment here laid down ceases to be so manifest; and less favourable characters previously mentioned recur; and not unfrequently there is also some albumen, which may be separated by coagulation with heat. Lastly, towards the close, where death does not arise from immediate or secondary disorders, the natural condition of the urine is often observed to be restored for a week or even upwards; the quantity, colour, odour, and density being much the same as in health, the urea in the natural proportion, the sugar wanting, and the chief deviation observed from ordinary urine being, that putrefaction ensues with unusual speed." For the mode of detecting sugar in the urine and of ascertaining its quantity, see p. 80.

ANATOMICAL CHARACTERS.—The kidneys generally larger than in health, gorged with blood, flabby, with all the vessels and ducts enlarged. Granular degeneration is sometimes found as a complication.

COMPLICATIONS AND SECONDARY DISORDERS.—Tubercular phthisis is the most common complication; granular degeneration of the kidney; peritoneal inflammation; anasarca; apoplexy.

PROGNOSIS.—*Favourable.*—Short previous duration of the disease, urine not exceeding 12 pints in quantity and 1036 in density, the emaciation not considerable, the appetite and thirst not inordinate, the skin still perspirable, and the mind not much depressed. When the patient is under treatment, the signs of improvement are diminution of the quantity of the urine, without increase, or with diminution, of density, steady diminution in the quantity of solids discharged by urine, increase of weight, diminished appetite and thirst, the skin becoming softer, the eye brighter, the mind clearer and more cheerful, and the body stronger and more active. *Unfavourable.*—Prolonged duration of the disease, great emaciation, prostration of strength, urine profuse and of high density, the solids discharged greatly exceeding the solids contained in the food, intense thirst, inordinate craving for food, the supervention of other diseases, great and sudden prostration of strength.

CAUSES.—*Predisposing.*—Hereditary predisposition. *Exciting.*—Cold; drinking cold water when the body is heated; intemperance.

TREATMENT.—*Indications.*—1. To diminish as much as possible the sources whence sugar can be supplied to the urine. 2. To diminish the secretion of urine. 3. To relieve urgent symptoms.

1. The first indication is fulfilled by a strict regulation of the diet, which should consist principally of animal food, broiled or roasted, with a small quantity of stale and well-fermented bread (16 oz. of bread and 20 oz. of uncooked meat.—Christison), and liquids in moderate quantity: of these, the best are weak beef or mutton tea, milk, pure spring water, or water holding calcareous salts in solution. These should be taken in small quantities at a time, and warm. Gluten bread may be substituted with advantage for common bread.

2. The second indication is answered by reducing the quantity of liquids, by forbidding the use of tea, of spirituous liquors, of acidulated drinks, and of saline aperients; in fact, of all articles of diet or medicine which have diuretic properties; by increasing the secretion of the skin, by warm-baths, Dover's powder, frictions, and warm clothing; by opium in full doses, which medicine diminishes the secretions generally, and at the same time calms existing excitement; and by astringent remedies, as sulphate of zinc and acetate of lead.

3. When there is much fever present, blood-letting may be had recourse to; dyspepsia must be treated by remedies appropriate to that affection (see Dyspepsia); pain in the epigastrium may be relieved by a few leeches; anasarca may be treated by drastic purgatives; affections of the chest by local depletion, counter-irritation, and sedative expectorants; and constipation by resinous purgatives; and debility, when it is extreme, must be met by tonics and stimulants. A great variety of remedies has been recommended for the cure of diabetes; but the foregoing are those most approved. Bleeding has been recommended by Dr. Watt as a leading remedy, and has been carried to a much greater extent than by most authors who have treated of this disease.

DIABETES CHYLOSUS.

SYMPTOMS.—These sometimes resemble those of diabetes mellitus; at others they are very slight, and the patient suffers little inconvenience. The urine is generally abundant, of a milky appearance, and varying in density from 1010 to 1020. A short time after its discharge it sometimes coagulates into a white gelatinous substance, and after a longer interval separates into a clear yellowish fluid and a white clot; at other times a white flaky matter is deposited; or a white cream rises to the surface. The substance which gives this character to the urine approaches in its properties those of fibrin or casein. The disease is of rare occurrence, and of slight importance.

CAUSES.—Obscure. Luxurious living, cold, fatigue, mercury,

long residence in hot climates have been mentioned among the causes.

TREATMENT.—Does not admit of removal; but it may be palliated by blood-letting, spare living, diaphoretics, anodynes, and laxatives.

DISEASES OF THE BLADDER.

CYSTITIS.	.	.	Inflammation of the bladder.
ENURESIS.	.	.	Incontinence of urine.
DYSURIA.	.	.	Difficulty in voiding the urine.

CYSTITIS.—INFLAMMATION OF THE BLADDER.

Species.—1. *Cystitis acuta.*—2. *Cystitis chronica.*

SYMPTOMS.—Pyrexia, acute pain, tension, and tumor in the region of the bladder; pain and soreness, increased upon pressure, above the pubes, or in the perinæum; frequent micturition, painful discharge of urine, in small quantities; or complete obstruction to its passage; tenesmus; vomiting.

In the chronic form, the mucous membrane of the bladder, by repeated or continued irritation, produced by calculus, by stricture, by disease of the prostate, kidneys, or other causes, has become thickened, indurated, ulcerated; and pours out a large quantity of mucus and pus; which, added to the urine, gives to it the appearance of whey. There is often a discharge of blood.

CAUSES.—Mechanical injury; local irritation by calculus; the inflammation of gonorrhœa extended along the urethra; spasmodic or permanent stricture; all the usual causes of inflammation; cantharides; stimulant urethral injections; falls on the abdomen when the bladder is distended.

TREATMENT.—The *indications* in the *acute* species are the same as in the other phlegmasiæ, and are to be fulfilled nearly in the same way:—

1. By general and topical blood-letting, the application of leeches to the perinæum and region of the pubes.
2. By oleaginous purges and emollient clysters.
3. The warm-bath and fomentations.
4. The exhibition of opium with diaphoretics.
5. The other means recommended in nephritis.

The catheter must be passed if necessary, and the instrument may be left in the bladder, unless it cause irritation. When cystitis is caused by cantharides, large doses of camphor and hyoscyamus are valuable, and may be administered by the mouth and rectum.

The *chronic species* yields mostly to stimulants, and injecting the bladder with emollient decoctions.

Chronic disease of the bladder may depend on fungus or ulcera-

tion of the organ, on stricture at its neck, on disease of the prostate gland, ureters, or kidneys; and when it attacks aged persons, and especially if intemperate, it often proves fatal. When persons above the age of fifty are infected with blenorhagia, or, as it was formerly termed, gonorrhœa, the inflammation frequently extends along the whole urethra, to the neck of the bladder, and to the mucous membrane of the organ. Such persons complain of pain in the loins, bladder, and urethra, suffer intense pain, and are frequently destroyed by acute or chronic inflammation of the bladder, or some other portion of the urinary organs.

Emollient or slightly stimulating injections, varying in quantity, according to the capacity of the bladder, should be passed into it, by means of an elastic gum bottle and catheter, twice a-day. Civiale, Costello, and Heurteloup prefer decoction of marsh-mallows with laudanum. In chronic cases, the antimonial ointment should be rubbed over the pubis, or a blister applied, or a seton inserted in the perineum. It is important that the feet be kept warm by appropriate means. For the symptoms and treatment of spasm of the bladder, irritable bladder, diseased prostate, stricture of the urethra, &c. consult works on surgery.

ENURESIS.—INCONTINENCE OF URINE.

Incontinence of urine may arise from mechanical causes or from functional derangements of the bladder. The former class of cases falls under the care of the surgeon; the latter may be cured by medicines, and therefore comes within the province of the physician. Incontinence of urine without organic defect may arise from one of two causes; from violent contraction of the muscular coat of the bladder, the sphincter possessing its usual power, or, from debility of the sphincter, the muscular coat of the bladder contracting with its usual force. In the first case, there is generally some source of irritation within the bladder itself; but in rare instances the muscular fibres are thrown into a state of spasm without obvious cause. The first form of disease is most common in males; the second in females and young children.

TREATMENT.—In incontinence of urine arising from spasm of the muscular coat of the bladder, the most effectual remedies are narcotics or sedatives, administered by the mouth, or introduced into the rectum, in the form of a suppository or enema. A grain of solid opium as a suppository, or half a drachm of laudanum in a starch injection, will generally succeed in relieving the spasm. In severe cases the warm-bath, cupping to the loins, or counter-irritants, must be resorted to. In incontinence of urine arising from debility of sphincter, (a form of disease which is common in young children, leading to frequent micturition in the day, and an involuntary discharge of urine at night,) two or three drops of tincture of cantharides with ten drops of tincture of hyoscyamus, increased

gradually and cautiously, rarely fails of removing the disease. (I have had three cases of this kind within a short interval, which have received immediate benefit, and a speedy cure, from this mode of treatment.—G.) When the urine is perfectly retained during the day, and voided only at night, the disease is rather the effect of habit or sloth, or the result of dreams, than of any debility of the sphincter muscles; and here it may be necessary to resort to other means; such as obliging the child to leave its bed about midnight for the purpose of emptying the bladder, preventing him from drinking liquid in the evening, threatening punishment, or, if all other means fail, keeping up pressure upon the urethra by means of a bougie bound along the course of the urethra.

DYSURIA.—DIFFICULTY IN VOIDING THE URINE.

Dysuria may exist in every degree, from slight and momentary arrest of the flow of urine, with or without pain, to complete retention. Some degree of pain generally attends the abortive attempts to discharge the urine, and, in severe cases, the suffering is of the intense kind. The causes are very numerous; such as acrimony of the urine itself, or irritation or inflammation of the coats of the bladder, whether originating in the bladder itself, or from causes external to it. Thus dysuria is one of the symptoms of gonorrhœa, of inflamed prostate gland, of gravel, of urinary calculus, of cystitis, and nephritis, of inflamed hæmorrhoids, of inflammation of the rectum, or irritation of it by worms, or scybala, of uterine affections, of pregnancy, &c. *Strangury*, an aggravated form of dysuria, is produced by cantharides and other strong irritants. Dysuria is also a symptom of hysteria, and is apt to occur in nervous persons of both sexes. Mechanical impediment to the passage of urine through the urethra, as in stricture, also occasions dysuria.

TREATMENT.—This must depend on the cause. Mechanical obstructions must, for the most part, be removed by mechanical means; existing causes of irritation, whether within the bladder or external to it, must be removed; inflammation, where it exists, must be subdued; and the spasmodic action of the muscles must be relieved by narcotics and sedatives. Among the causes of dysuria, which are external to the bladder, constipation is the most common; and a brisk purgative, or a proper course of aperients, will soon remove the disease. When there is spasm of the muscular coat, it will be necessary to employ the warm bath and opiate suppositories or enemata. The tincture of the muriate of iron, in repeated doses, as recommended by Mr. Cline, and the cold affusion to the pelvis and thighs are also powerful remedies where spasm is present. When the urine is scanty and acrid, diuretics and diluents will be required. Dysuria following long retention of urine is best relieved by the warm bath or warm fomentation to the penis. These latter are of great service in the dysuria attending gonorrhœa.

CHAPTER XII.

DISEASES OF THE FEMALE ORGANS OF GENERATION.

AMENORRHŒA.	.	.	Suspended Menstruation.
DYSMENORRHŒA.	.	.	Painful Menstruation.
MENORRHAGIA.	.	.	Excessive Menstruation.
LEUCORRHŒA.	.	.	The Whites.
HYSTERALGIA.	.	.	Irritable Uterus.
METRITIS.	.	.	Inflammation of the Uterus.

AMENORRHŒA.—SUSPENDED MENSTRUATION.

Species.—1. Amenorrhœa with plethora. 2. Amenorrhœa with anæmia or chlorosis.

Amenorrhœa with plethora.—The general symptoms are those of plethora, and the constitutional treatment that which is recommended under that head. (See Plethora.) When blood is abstracted, it should be taken away at the approach of the menstrual period.

Amenorrhœa with anæmia or chlorosis.—For a description of the constitutional symptoms and treatment of anæmia and chlorosis, see those diseases. Amenorrhœa may be the cause or the consequence of constitutional debility, or, perhaps, to speak more correctly, the suspension of the menstrual discharge is in some cases the first of the train of symptoms constituting those diseases, whilst in other instances it makes its appearance where symptoms of debility have already existed for a considerable period. In either case the existing malady is strongly indicated by the appearance of the countenance, which is either pale and transparent, as if from mere loss of blood; or waxen, sallow, and muddy, as in well-marked chlorosis. In the first case, the general symptoms are those of debility and languid circulation; in the latter, of debility with a cachectic state of the constitution; in the first form the secretions are but little deranged, in the last they deviate more widely from their natural character. Hence the former class of cases will be found to require a less careful attention to the state of the secretions, than the latter; steel is necessary in both, but purgatives will often be unnecessary in anæmia, whilst they will be as strongly indicated in chlorosis. In addition to the general treatment laid down under those heads, (see pp. 211, 214,) it may be necessary to prescribe measures for the restoration of the menstrual discharge. The principal of these measures are the warm hip bath, at the expected

period, aloetic purgatives, electricity, and the remedies styled emmenagogues, of which the chief are savine, hellebore, ergot of rye, and strychnine. Leeches are also applied to the vulva, groins, or breasts, at the menstrual period, with the same view.

Amenorrhœa is sometimes accompanied by vicarious discharges of blood, or of blood slightly altered from its usual character, from the nose, lungs, stomach, or rectum, and from ulcers of the skin. These vicarious discharges are best treated by blood-letting and purging practised a little before the expected period of their occurrence.

The *complications* of amenorrhœa, which are extremely numerous, must be treated by remedies appropriate to these complications, combined with such as restore strength to the system, and tend to re-establish the menstrual discharge.

DYSMENORRHOEA.—PAINFUL MENSTRUATION.

SYMPTOMS.—Pain in the loins preceding the menstrual period by a few hours or days; tenderness on pressure in the hypogastric region, and sometimes over a considerable extent of the abdomen; sense of soreness or acute darting pains, resembling those of colic, and occurring mostly in paroxysms; vomiting; diarrhœa with tenesmus, dysuria. The nervous system is generally more or less affected, and hysteria in a variety of forms is often present. These symptoms increase in severity until the appearance of the menstrual discharge, and then suddenly cease or gradually pass off. The discharge is often, but not always, scanty, and is sometimes accompanied by a tenacious secretion which takes the shape of the internal surface of the uterus.

CAUSES.—*Predisposing.*—Plethora; the nervous temperament. *Exciting.*—Sudden and violent emotions; increased determination of blood to the uterus; sexual intercourse, immediately before the expected flux; all causes which diminish the discharge; irritation from neighbouring parts, as constipation, which is a very frequent concomitant and cause; spinal irritation.

PROGNOSIS.—*Favourable.*—The majority of cases admit of cure, but a few resist treatment, and continue till the cessation of the menstrual discharge.

TREATMENT.—*Indications.*—1. To relieve the urgent symptoms during the menstrual period. 2. To prevent their return by medicines administered in the interval.

1. The first indication is fulfilled, where there is plethora, by the application of leeches or cupping glasses; by tepid, hot, or vapour baths; by opium in full doses. Laudanum and tartarized antimony in minute doses, frequently repeated, and stramonium, are strongly recommended by Dr. Ferguson. (See Libr. Pr. Med. Art. Disordered Menstruation.) Colchicum, acetate of ammonia,

ergot of rye, and many other remedies, have been proposed. The general remedies to be relied on are anodynes, depletions, and warm applications.

2. The second indication is fulfilled by a careful attention to the functions of the stomach and bowels, moderate depletion to meet any irregular determination of blood, and steel in full doses.

MENORRHAGIA.—IMMODERATE FLOW OF THE MENSES.

A flow of the menses is to be considered as immoderate, when it either returns more frequently than what is natural, continues longer than ordinary, or is more abundant than is usual with the same person at other times.

It may be the effect of two different and opposite states of the system; plethora with inordinate arterial vigour; and general relaxation or debility.

SYMPTOMS.—An immoderate flow of the menses, arising from plethora, is usually preceded by rigors, acute pains in the head and loins, turgid flushed countenance, universal heat, and a strong, hard pulse; on the contrary, where the symptoms of debility are prevalent in the system, the pulse is small and feeble, the face pallid, the respiration short and hurried on the slightest effort; the general leucophlegmatic appearance of the patient indicates a laxity of every muscular fibre; the pain of the back and loins are rather aching than acute.

CAUSES.—*Predisposing.*—Plethora; a laxity or debility of the womb, arising from frequent parturition; difficult and tedious labours, or repeated miscarriages; a sedentary and inactive life; indulging much in grief and despondency; living upon a poor, low diet; drinking freely of warm enervating liquors, such as tea and coffee; and living in heated apartments.

The exciting causes of menorrhagia are, violent exercise, more especially in dancing; strokes, or concussions of the belly; strains; violent straining at stool; tight lacing, or other mechanical impediments to the free circulation of the blood; passions of the mind; excess in venery, particularly during menstruation; the application of wet and cold to the feet; organic affections of the uterus, such as scirrhus, polypus, &c.

PROGNOSIS.—Menorrhagia, when it is the effect of plethora, rarely proves fatal; but when it occurs in habits much reduced by previous disease, or is produced by a laxity of the vessels of the organ, is profuse, long-continued, or of frequent recurrence; if the lips, nails, and other parts be pale; if the extremities become cold, and with these symptoms the patient falls into syncope, especially if there be any convulsions of the limbs, the danger is very great. When it arises from an organic affection of the part,

which is frequently the case after the age of forty-five, it is usually incurable.

TREATMENT.—The cure of menorrhagia consists in,

1. Reducing the febrile symptoms when urgent, by general blood-letting, and the means recommended against inflammatory fever; strictly confining the patient to an horizontal posture; and avoiding every exertion both of body and mind.

2. Keeping the body gently open with laxative medicines, such as the sulphate of magnesia in infusion of roses, with an excess of acid, and the addition of twenty drops of tincture of henbane.

3. Administering draughts of acidulated cold liquors frequently, as infusion of roses, lemonade, and the like.

4. The internal use of styptics, especially the acetate of lead, as directed against hæmoptysis, when the febrile symptoms are subdued. The muriated tincture of iron is extremely valuable as an astringent.

5. When symptoms of debility are present, tonic astringents; quinine, cinchona, cascarilla, kino, quercus, and wine.

6. The constant application of astringents to the vagina and hypogastric region; especially ice, very cold water, or vinegar and water. In severe cases, injections, consisting of equal parts of the liquor aluminis compositus and water, will be beneficial, or ice may be passed into the vagina.

In acute and recent cases more active remedies will be required than in the chronic form of the disease, in which more moderate measures continued during a considerable period are indicated. In these cases the improvement of the general health is an important indication.

LEUCORRHOEA.—THE WHITES.

This term was originally applied to a white discharge, consisting of mucus, but it is now applied to any discharge, arising from merely functional causes, whether the colour be white, yellow, greenish, brown, or slightly red. The discharge varies in consistence from a limpid fluid to that of a tenacious ropy mucus, and in quantity from a slight increase of the natural secretion of the part to several ounces in the day. The general health is liable to suffer in a variety of ways. The stomach is generally more or less deranged; the bowels are constipated, or extremely irritable; spinal irritation is often present, and there is pleurodynia, palpitation, and a long train of hysteric symptoms.

CAUSES.—*Predisposing.*—Debility, chlorosis, luxurious living, warm rooms. *Exciting.*—Over excitement of the uterine system, obstruction to the circulation, irritation propagated from neighbouring parts, as from the rectum, or reflected from the spinal marrow. The disease occurs at all ages from 15 to 50, and is not uncommon in children under puberty.

TREATMENT.—It is necessary first to ascertain that organic local disease is absent. The indications, then, are 1. To improve the general health. 2. To arrest the discharge.

1. The general health may be improved by the ordinary means, by strict attention to the diet, and to the state of the bowels, which should be kept free by purgatives regularly administered, by regular hours, change of air, cold bathing, &c. The most useful remedy is steel in full doses or chalybeate waters.

2. For the discharge itself many remedies are recommended. In many cases an alum or zinc injection is sufficient; in some instances, however, the stronger astringents may be necessary, as catechu, cinchona, oak-bark, tannin, or the rind of the pomegranate. Stimulants may sometimes be required, as ammonia, lunar caustic, or lapis infernalis, (gr. 10 to 3i. of water, *Ricord.*) These substances may be used as a wash, or in the form of injection, or they may be introduced into the vagina by means of a cylindrical pessary of sponge. When much irritability is present, opiate injections may be required; and if there is much congestion, or signs of local inflammation, a few leeches may be applied to the neck of the uterus.

The remedies which act on the mucous membrane through the general system are cubebs, copaiba, cantharides, turpentine, alum, and uva ursi.

HYSTERALGIA.—IRRITABLE UTERUS.

SYMPTOMS.—Pain in the loins and round the brim of the pelvis, coming on in paroxysms and increased by exercise or strong mental emotion. The suffering, which is of the most severe kind, generally comes on a few days before or after the menstrual period. It is relieved by the horizontal posture. Pressure on the neck of the uterus gives rise to great pain, and the cervix is found, on examination, puffy and swollen. The general health suffers from the continuance of the pain, and by the confinement which it occasions; the circulation becomes languid, and there is dyspepsia and constipation.

CAUSES.—*Predisposing.*—The nervous temperament; the period of youth and middle age; previous attacks of dysmenorrhœa. *Exciting.*—Undue exertion; long standing, when the catamenia are present; uterine irritation from whatever cause; spinal irritation.

DIAGNOSIS.—From dysmenorrhœa, by the suffering being constant; from prolapsus, by the pain being merely relieved but not removed by the recumbent posture; from metritis, by the absence of enlargement, heat, or throbbing, and by the stationary nature of the complaint. The co-existence of other nervous affections, of spinal irritation, of hysteric symptoms, and the peculiarly nervous temperament, will materially aid the diagnosis.

PROGNOSIS.—The disease does not endanger life, but often continues unabated for a long period.

TREATMENT.—*Indications.*—1. To subdue local pain. 2. To improve the general health.

1. The first indication is fulfilled by rest in the horizontal posture; by the belladonna plaster, or opiate embrocation to the spine; by injections into the vagina of acetate of morphia, (two to four grains in the ounce of distilled water, Ferguson); the warm hip bath, or the steam bath; anodynes or sedatives internally, and cautious depletion.

It is most important to examine the spine, as spinal irritation is very apt to co-exist. In this case, the tartar-emetic ointment rubbed into the back is of great service. (G.)

2. The general health must be improved by a generous diet, fresh air, moderate exercise; and if the patient can bear it, a course of steel and gentle aperients. All causes of debility, such as depletions, active purgatives, and confinement to close rooms, must be avoided.

METRITIS.—INFLAMMATION OF THE UTERUS.

SPECIES.—1. *Acute.* 2. *Chronic.*

SYMPTOMS OF THE ACUTE FORM.—Pain, increased by pressure in the region of the uterus, and in the cervix, on examination per vaginam; pain extending to the loin and thighs; dysuria; a sense of weight and bearing down; swelling of the abdomen and tympanites. These local symptoms are generally accompanied by fever, with nausea and vomiting; and sometimes there are symptoms of hysteria. In the most severe cases the fever is followed by head symptoms, as slight delirium, impaired vision, and a tendency to coma, with extreme prostration of strength and subsultus tendinum.

ANATOMICAL CHARACTERS.—The disease may attack the peritoneal or mucous coats alone, or it may involve the substance of the organ. The morbid appearances in the membranes are those of the serous and mucous membranes in other parts of the body. When the substance is inflamed, the uterus becomes enlarged, œdematous, and softened; in severe cases pus is infiltrated through its tissue; or an abscess is formed in it. Purulent matter may also be found in the veins and absorbents. This is most commonly the case in puerperal inflammation of the uterus.

CAUSES.—*Predisposing.*—Those of inflammation generally.

Exciting.—Suppression or diminution of the menstrual discharge from cold; the use of astringent injections; mental emotions; frequent sexual intercourse; physical injuries; blows and falls; childbirth.

TREATMENT.—The ordinary antiphlogistic measures; general and local depletion, by cupping to the loins, or by leeches to the vulva or groins, or a combination of calomel, opium, and tartar-

emetic in full doses; local fomentations, the hip bath; counter-irritation by mustard poultices or hot turpentine. The dysury may be relieved by mucilaginous drinks, and the bowels should be kept free by gentle saline aperients.

Chronic metritis is a common consequence of the acute form, when neglected or badly treated. It may assume a variety of shapes and lead to a great number of severe structural lesions of the uterus. The most common consequences are ulceration, supuration, membranous inflammation, and enlargement and induration of the mucous follicles and structure of the organ. For a full account of these forms of disease, the reader is referred to works on this class of diseases. (For a short and concise account of them, see *Libr. Pr. Med.* vol. x. Art. Inflammation of the Uterus, by Dr. Simpson.)

CHAPTER XIII.

CUTANEOUS DISEASES.

Class I.—*Dermatites*.—*Inflammations of the skin*.—*Definitions*.

1. *Exanthemata*. *Rashes with Fever*.—Circumscribed or diffused with redness, red patches, with or without interspersed papulæ (pimples) or vesiculæ (small blisters,) between which the skin is of a natural colour: terminating by resolution, delescence (sudden disappearance,) desquamation or exfoliation of the cuticle.

This order comprises six genera—erythema, erysipelas, rubeola, scarlatina, urticaria, and roseola.

Vesiculæ. *Vesicles*. Small, serous, transparent, elevations of the epidermis, or cuticle, becoming opaque or purulent, differing from bullæ, by their smaller dimensions. The effused serosity is deposited between the epidermis and subjacent reticulated body (rete mucosum.) These small blisters may be ruptured, and subsequently absorbed, or effused; and they are sometimes succeeded by a small, thin, lamellated crust or exfoliation, or by superficial excoriations.

The genera of this order are the sudamina or miliary eruptions, herpes, zona, psora or itch, varicella, and eczema.*

3. *Bullæ*. *Blebs*.—Small aqueous tumors caused by an effusion

* Willan includes in this order, variola (small pox,) vaccina (cow pox,) varicella (chicken pox;) but Biet, Rayer, and Green much more properly place these among the pustulæ.

of serosity between the epidermis and subjacent rete mucosum, succeeded by a crust, or sometimes by superficial ulceration.

The genera of this order are, vesicatoriæ, ampullæ, pemphigus, and rupia.

4. *Pustulæ. Pustules*.—Elevations of the cuticle, formed by the effusion of pus or matter, or a fluid not serous, between the cuticle and inflamed body (Rayer), or on the surface, or into the substance of the skin (Green). Pustules dry more slowly than vesicles, form hard, thick crusts or scabs, which may be horny, friable or pulverulent, and frequently cover indurations, excoriations, or deep ulcerations. The varieties of pustules are :—

a. *Phlyzaciūm*, or a pustule of considerable size, surrounded by a hard circular base of a bright red colour, and succeeded by a thick, dark scab, or incrustation.

b. *Psyracium*, or a small pustule, slightly elevated, surrounded by a pink efflorescence; its base often irregular, or but faintly marked, sometimes confluent and terminating in a thin, laminated, circular incrustation.

c. *Achor*, or a small acuminate pustule, filled with straw-coloured gelatinous fluid, surrounded by an irregular efflorescence, but marked between it and its base, by a faint interspace, usually confluent, terminating in a thin, light-brown, irregular crust.

d. *Favus*, or an irregular pustule of a large size, scarcely elevated, containing a more viscid straw-coloured fluid, surrounded by a rose-coloured base, terminating in a yellow, semi-transparent, or cellular crust, and sometimes by superficial ulceration.

The genera of this order are variola, vaccina, varicella, ecthyma, cuperosa, mentagra, impetigo or running tetter, tinea, porrigo, and acne or stone pox.

5. *Papulæ. Pimples*.—These are small, firm elevations of the cuticle, caused by an increased action of the papillæ, containing no fluid in their centre, with a base more or less inflamed, seldom suppurating, terminating usually in scurf, and attended with intense itching. They generally terminate by resolution or desquamation of the cuticle, and very rarely by ulcerations.

The genera of this order are, strophulus, or the red gum, white gum, and the so-called tooth-rashes, lichen, and prurigo.

6. *Tubercula. Tubercles*.—These are small, hard, solid, circumscribed tumors, larger than papulæ, with or without an inflamed base, permanent or persistent, imbedded in the skin, terminating in resolution, partial suppuration, or destructive ulceration.

The genera of this order are, lupus, cancer, elephantiasis of the Greeks, molluscum, and frambæsia.

7. *Furunculi. Boils*.—Solid tumors, larger than tubercles, caused by inflammation of the cellular processes or elongations, which enter into the areolæ of the derm or true skin.

The genera of this order are, furuncle or boil, anthrax or carbuncle, and hordeolum or sty.

8. *Squamæ. Scales*.—These are indurated, opaque, whitish or yellowish laminæ or lamellæ of the epidermis, caused by the inflamed reticular body, or are continually being detached from, and renewed on, the surface of the skin.

The genera are, lepra or leprosy, psoriasis or scaly tetter, pityriasis or dandriff, and according to Willan, ichthyosis or fish skin disease. Biett, Rayer, Green, and other late writers, maintain that the last disease is not caused by inflammation of the rete mucosum, derm, or true skin, but depends on an unusual thickness of the cuticle. They object to its being placed among the inflammatory diseases of the skin. Nevertheless, it bears the closest resemblance to the other squamous or scaly diseases.

9. *Fissuræ. Fissures*.—These are lineal cracks of small depth, and seldom extend to the whole thickness of the skin.

10. *Maculæ. Spots*.—Discoloration of the whole or a part of the surface of the skin, generally congenital and permanent. They may or may not be accompanied by general disorder of the system. This is the eighth order of Willan, Bateman, Biett, Green, &c.: and its genera are—ephelis, sun spots or freckles; nævus or mother's marks; spilus or mole; and, according to Green, the albino state; vitiligo, or a partial degree of this state; chloasma, or liver spot, and lentigo.

M. Rayer excludes this order, and describes the diseases referred to under the title, "Alterations in the Colour of the Skin." He describes the following:—

11. *Gangrenæ. Gangrenes*.—Malignant pustule, bubo of the plague.

Decoloration. Leucopathia.—1, partial; 2, general chlorosis. *Accidental Colorations*.—Ephelis, lentigo, chloasma, maladermis, icterus, nævus maculosus; bronze tint, caused by the internal use of nitrate of silver, (lunar caustic.)

12. *Multiformes. Multiform*.—Burns, frost-bite, syphilitic eruptions.

Ulcers are excluded from this classification, because they never constitute a primary alteration. "They always succeed subcutaneous abscess, vesicular, pustular, or tuberculous inflammations, &c. and the study of them cannot be separated from that of the different inflammations which produce them.

"All inflammations of the skin affect, more or less, the reticular body (rete mucosum) of this membrane; some affect the dermis itself, the sebaceous follicles, the bulbs of the hair, the inter-areolar cellular tissue of the dermis, and even the subcutaneous cellular tissue." (Rayer.) The various other tissues lately discovered by Breschet and Rousel (1835) are of course equally liable to inflammation. Their description is not as yet fully received.

The functions of the different tissues may be deranged by inflammation; the transpiration or perspiration may be diminished, suppressed, or increased; the secretions of the sebaceous follicles

and cuticle altered, the sense of touch deranged, and there is no doubt but the hair and nails may suffer morbid alterations.

Cutaneous inflammations may be general or local ; general, as when they affect the whole surface of the skin, as scarlatina, rubella, variola, &c. ; local, or partial, as tinea, mentagra, &c. ; acute or chronic, and febrile or non-febrile ; and may cause congestion, effusion, inflammation, or suppuration in the head, chest, abdomen, or joints ; or their sudden repression may induce apoplexy, paralysis, asthma, and various other diseases.

CLASS II.—*Dermohæmorrhagiæ, Cutaneous Hæmorrhages, and Subcutaneous Congestions.*

When blood is accumulated in the substance of the skin, it is termed congestion.

When blood is effused on the surface, or into the substance of the skin, it is termed cutaneous hæmorrhage.

The cause of either disease, is want of energy in the venous circulation. Thus, if a ligature is placed round a limb, the parts below it become red or livid, and swollen ; and another familiar example is afforded by the tumefaction and redness of the soft parts under a cupping-glass. This state is also observed on the face and extremities in diseases of the heart, in the asphyxia of new-born infants, in pneumonia, &c., and on the face from vivid emotions. The causes may be temporary, intermittent, or continued ; but the diagnosis between congestions and exanthematous inflammations is very easily drawn.

Hæmorrhage from the skin is a rare disease, except when the epiderm is raised, congested, or ulcerated. A simple illustration is afforded by the application of a blister to a surface from which the cuticle has been already removed. In this instance, the blood will be effused on the surface of the skin in the same manner as on that of a wound. Cutaneous hæmorrhage has sometimes occurred in the course of visceral inflammations which are about to terminate fatally. The disease is so rare, that little can be said of its cause or treatment. Some of the older writers have slightly alluded to bloody sweat as an idiopathic disease. Fournier cites two cases of it (*Art. Cases rares Dict. des Sciences Medicales*). It is said to appear on new-born infants, and that the blood may be seen issuing from the surface of the skin without any alteration in the appearance or tissue of this part. Bichat and others considered that the disease might be idiopathic. It often appears in confluent small-pox, on extensive burns, in eczema, pemphigus, &c. Rayer comprises, with reason, the following diseases under this head—ecchymosis, sugillatio, petechia (*febris petechialis*) and purpura hæmorrhagica.

CLASS III.—*Dermoneuroses*.—*Neuroses of the Skin*.

The skin is the organ of palpation, or touch. "The skin," says Rayer, "is the organ of general and passive tactility, by which is recognized the presence of bodies, and their temperature—is the seat of a peculiar and active sensation, (touch,) at several points in which it is provided with numerous nerves and vessels. The function of the skin may be modified or abolished, without its texture having undergone any appreciable alteration."

Nosographers describe neuroses of the organs of sight, hearing, smell, and taste,—and why should there not be those of the organ of touch, or of the skin? Has not experience convinced every observant physician of the fact, that there may be excessive neuralgic pain, or total insensibility in every part of the skin? Paralysis affords us a familiar illustration of partial or total insensibility of the skin. Every part of it may be affected with abnormal or disordered sensations, excessive pain, numbness, sense of cold, creeping, &c. &c.; and our foreign contemporaries designate these morbid conditions, the hallucinations of the sense of touch. In all the innumerable neuroses or nervous affections of the skin, there is no unnatural or diseased appearance of the tissue itself. This multifiform class of disorders are well known, for they are constantly met with; though their causes are, as yet, unintelligible. It is impossible to explain the causes of the numerous modifications or hallucinations of the sense of touch, or of the abnormal disorders of the skin. But their existence cannot be questioned or denied. In many visceral diseases, such as those of the liver, kidneys, uterus, &c. and in habitual constipation of the bowels, there may be great *exaltation of the sensibility of the skin* in some particular point: indeed, every part of the skin has at different times been in this condition, and unaccompanied by redness or any degree of inflammation, or of eruption.

In like manner, there may be *diminution or abolition of the sensibility of the skin* in any point of its surface. This disorder has been termed *anæsthesia* by the older nosologists; and may exist with or without paralysis of the subjacent muscles. The discoveries of Sir Charles Bell, of M. Magendie, and Sig. Bellingeri, warrant the conclusion, that in a case without paralysis, the sensory, and not the motor filaments of the spinal nerves, are affected. Numerous examples are also on record, of loss of sensibility of the arm or lower extremity, though the power of motion continued unaffected. Paralysis of the skin depends on affections of the nervous centres, which must be vigorously combated to remove them.

CLASS IV.—*Dermachromata*.—*Achroia*.—*Decolorations*.

Absence of colour of the skin depending on the want of the

pigmentary secretion, or usual colouring matter of the rete mucosum, skin and hair, leucopathia, leucoethiopia, albinism, general whiteness, and chlorosis. (Rayer.) This disease may be general or partial, congenital or accidental.

When there is a partial colourless state of the skin, it is termed vitiligo.

CLASS V.—*Dyschroia*.—*Discoloration*.

Discolorations of the skin are caused by different modifications of the pigmentary or colouring matter, as in ephelis, sunburn, lentigo, freckle, chloasma, or pityriasis versicolor, of Willan, or maculæ hepaticæ, or dandriff of others. They are also produced by the introduction of extraneous matters into the tissue of the skin, as in jaundice, artificial colorations, such as those induced by a long use of the nitrate of silver; and lastly, the skin may be greatly discoloured, as in melanosis, and nævus, or mother's marks. Many of the last are more analogous to sanguineous tumors, such as the vascular and subcutaneous nævi, than to alterations of the colour of the skin.

CLASS VI.—*Diaphoresis*.—*Sudor*.—*Perspiration*.

The morbid secretions of the skin are termed *ephidroses generales et locales, sudamina, miliaria, papulæ sudorales, et sudosæ, and hydronos, hydronosus, hydropyretus, sudor Anglicus, or sweating sickness*. Haller well observed, that there is disease of the perspiration: "*estque sudor morbi genus*." There may be chronic sweat, partial or general, on the feet, hands, neck, shoulders, breast, and about the groins, pudenda, and anus. The sweat may acquire a sour, rancid, fetid odour, and one somewhat similar to that of musk. It may be changed in colour, and cases of black, green, and blue, sweat have been cited.—Sauvages' *Nosol. Method.* Art. *Ephidroses, Ephem. Curios.* Dec. 3, an. 7, 8, &c. Dec. 11, an. 4.

CLASS VII.—*Follicular Diseases of the Skin*.

Morbid tumors may be caused by the secretion by the cutaneous cryptæ or follicles, of a ceruminous or waxy layer, somewhat similar to the white unctuous substance on the skin of new-born infants. To this class belong acne, vermiform bodies, (grubs) follicular tumors, (A. Cooper and B. Travers,) which have been denominated lipoma, meliceris, atheroma, and steatoma.

CLASS VIII.—*Adermata*.

Congenital absence and defects of conformation and texture of the skin—cutaneous and subcutaneous vascular vegetations and tu-

mors, erectile tumors, molluscum, atheroma, steatoma, wen, verrucæ, porri, or warts; mamellated excrescences, cornua, horny growths, clavi, bunions, callosities, indurations, tylosis or corns, cicatrix, scar, seam, healing of a wound or burn.

DISEASES OF THE APPENDAGES OF THE SKIN.

Of the Nails.

These consist of:—Onychia, whitlow; the nail growing into the flesh; ecchymosis beneath the nail; absence of the nails; falling off of the nails; supernumerary nails; tumefaction or enlargement of the nails; curvature of the nails; accidental coloration of the nails, &c.

Of the Hair.

These are:—Inflammation of the hair—Plica polonica; also, matting of the hair; canities, hoariness; decoloration of the hair; alopecia, baldness; absence of hair. Calvities senile; fall of the hair; supernumerary hairs. Trichiasis; abnormal direction of the hair.

Anomalous Diseases connected with the Hair and Skin.

Phthiriasis; morbus pedicularis; pediculi; pulex; acarus scabiei, itch insects; sarcopta, flesh worms; œstrus, astromus; elephantiasis; Barbadoes leg; Cochin leg.

The limits of this work are too narrow to allow of a minute description of skin diseases, or of the modes of treatment applicable to each. A few observations, however, may be of use. The febrile exanthemata, of which the chief have been described in Chapter III. of this work, run their appointed course, and can be treated only by remedies which affect the system at large. Many other forms of skin disease, which are not accompanied by severe general symptoms, may also require constitutional remedies. This is the case with the several syphilitic eruptions, which are removed by the same remedies that cure other secondary symptoms, viz. the preparations of mercury, and iodine. Scabies is an example of a cutaneous disease depending upon the presence of a peculiar insect, the acarus scabiei, which is destroyed by sulphur, and by other strong stimulants. There are other diseases of the skin, again, and these are the majority, for which no specific has yet been discovered, and which are extremely difficult of cure. Some of these are accompanied by traces of inflammation; others are slow in their progress, and not dependent upon inflammatory action. The only general rule which can be laid

down for the treatment of this large class is, that where inflammation is obviously present, whatever may be the precise nature of the eruption, benefit will be derived from the exhibition of remedies which are effectual in the cure of inflammation of other parts. Of all these remedies, the most effectual is tartar-emetic in the dose of an eighth of a grain or more, either alone, or in combination with one or two grains of hydrarg. c. cretâ. When inflammation is absent, an opposite plan of treatment is necessary, and instead of reducing the action of the heart, we must endeavour to establish common inflammation by the aid of stimulant ointments and washes, in the hope of superseding by this means the peculiar and often languid action of the vessels. This plan of treatment proves effectual in the several forms of porrigo affecting the scalp; and in the form of the sulphur-bath it has cured chronic affections of the skin, when all other remedies have failed. When there is extreme irritability of skin, with or without inflammation, sedative lotions, of which the decoctum dulcamaræ is one of the best, may be used with advantage. Lastly, in all chronic cutaneous affections a course of alterative medicines, as the Plummer's pill with the decoction of sarsaparilla, gives the best chance of cure. For more minute information on the treatment of the several skin diseases, the reader is referred to works written expressly on that subject. As it is one which can scarcely be understood without the aid of plates, any minute detail would be of little use in this place even if the limits of this work allowed of its insertion. Two diseases of the skin, viz. urticaria and pemphigus, which were described at length in former editions, are added in this place.

URTICARIA.—NETTLE-RASH.

CHARACTER.—An eruption resembling that produced by the stinging of nettles, whence its name. These little elevations often appear instantaneously, especially if the skin be rubbed or scratched, and seldom stay many hours, sometimes not many minutes, in the same place; but vanish, and again make their appearance in another part of the skin. The parts affected with the eruption are often considerably swelled. In some persons the eruption lasts a few days only, in others many months, appearing and disappearing at intervals. Long weals are sometimes observed, as if the part had been struck with a whip. The little eminences always appear solid, not having any cavity or head containing either water or any other liquor. Intolerable itching is their invariable concomitant. They generally disappear in the day-time, and in the evening again break forth, accompanied with slight symptoms of fever. They terminate in a desquamation of the cuticle.

CAUSE.—Mechanical irritation; use of shell-fish, lobsters, muscles; mushrooms; honey; and by infants' deteriorated breast-milk.

TREATMENT.—Frequent cooling aperients; small doses of the submuriate of mercury; nitrous acid; sudorifics; the antiphlogistic regimen; but remedies are seldom needed in so trivial a complaint.

R. Acidi nitrici diluti fʒss; syrupi mori fʒj; aquæ destillatæ fʒxij: misce pro puto ordinario.

When a chronic disease, it yields, occasionally, to serpentaria, and alterative doses of mercury.

R. Radicis serpentariæ contusæ ʒj; aquæ puræ fʒxvj: coque per quadrantem horæ, dein cola.

R. Hujus decocti colati fʒxij; tincturæ serpentariæ, syrupi aurantii, aa fʒj: fiat haustus ter in die sumendus.

PEMPHIGUS.—VESICULAR FEVER.

SYMPTOMS.—The usual symptoms of the cold stage of fever; lassitude, headache, sickness, oppression, frequent pulse, in some instances delirium.

On an *uncertain day* an eruption of small pellucid blisters, similar to those produced by burning; varying in size, sometimes as large as walnuts, more frequently about the size of almonds; surrounded by an inflamed margin, or areola, and distended with a faintly yellow serum. They appear on the face, neck, trunk, arms, mouth, fauces, and sometimes extend along the whole alimentary canal; producing great difficulty of deglutition; pain referred to the stomach; nausea; frequent vomiting; sense of soreness in the abdomen; often bloody stools.

After the blisters have remained from one to several days, they either break, and discharge a yellowish, bland, or sharp ichorous fluid, or they begin to shrink, and in a short time disappear.

CAUSES.—Specific infection? This is yet undetermined: many contend that the ordinary causes of synocha and synochus will produce it: whilst others maintain, that the disease is infectious, and arises from its peculiar poison. Most probably, the vesicular, like other eruptions, appears both in fevers which are, and which are not, infectious; so that the eruption will sometimes be propagated with the fever, and sometimes without it.

DIAGNOSIS.—The peculiar appearance of the eruption.

PROGNOSIS.—*Favourable.*—The vesicles few in number, and confined to external parts; the fever inclining more to the inflammatory than to the typhoid character.

Unfavourable.—The disease attacking the alimentary canal, attended with a rapid, small pulse; symptoms of confirmed typhus; the vesicles becoming livid, with sudden and great prostration of strength; delirium.

TREATMENT.—Added to the treatment proper for the concomitant fever, which is very generally an approximation to typhus.

An emetic at the commencement.

Submuriate of mercury in small and frequent doses.

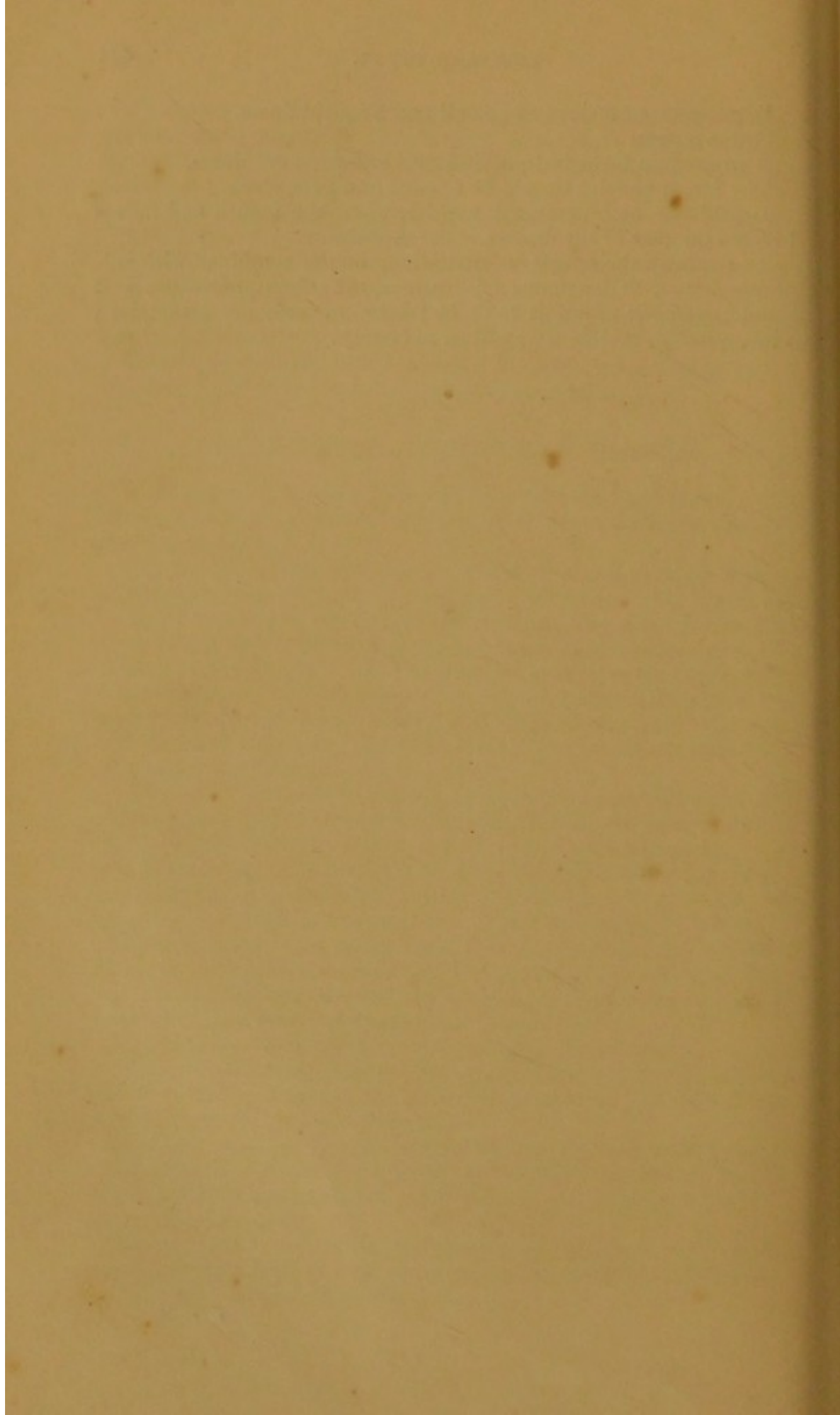
Saline purges.

Antimonium tartarizatum, in small and frequent doses.

The larger vesicles should be opened and kept clean.

Demulcent and detergent gargles, when the mouth and fauces become the seat of the disease.—See Aphthæ.

To diminish the effects of irritation, opium combined with sulphuric æther. Oleaginous applications, milk diet, aperients ; and should gangrene occur, it is to be treated on ordinary principles ; wine, quinine, broths, &c., will be necessary.



FORMULÆ.

The doses are those for the adult, unless otherwise stated.

STIMULANTS.

1. GENERAL STIMULANTS (including Stimulant Antispasmodics).

R. Ammoniaë sesquicarb. gr. vj.
Spirit. æther. sulph. comp. f 3j.
Misturæ camphoræ f 3x.
Syrupi zingiberis f 3j.
Fiat haustus quartis horis sumendus.

R. Ammon. sesquicarb. gr. vj.
Liq. ammoniaë acetatis f 3iij.
Misturæ camphoræ f 3i.
Syrupi aurantii f 3j.
Fiat haustus secundâ vel tertiâ quâque horâ adhibendus.

R. Ætheris rectificati f 3ij.
Misturæ camphoræ f 3vij.
Syrupi croci f 3ss.
Fiat mistura: sit dosis cochlearia tria ordinaria.

R. Spir. æther. sulph. comp. f 3iij.
Misturæ camphoræ f 3vij.
Syrupi zingiberis f 3ss.
Tincturæ camph. comp. f 3i.
Fiat mistura, cujus sumantur cochlearia tria magna quartâ quâque horâ.

R. Spir. æther. sulph. comp. f 3ij.
Spiritûs ammon. succin. f 3j.
Misturæ camphoræ f 3vj.
Syrupi aurantii f 3ss.
Misce; et fiat mistura: cujus sumantur cochl. duo magna omni horâ in dolore.

R. Misturæ camph. f 3xij.
Liquor. ammon. acetatis f 3iij.
Spirit. ammon. comp. m. xx.
Syrupi aurantii f 3j.
Fiat haustus sextâ quâque horâ sumendus.

R. Misturæ camph. fortior. f 3vij.
Spirit. æther. sulph. comp.
Syrupi aurantii āā 3ss.
Fiat mistura, cujus sumantur cochlearia duo magna in horas.

R. Spirit. ammon. succin. f 3ij.
Misturæ camphoræ f 3vss.
Syrupi rhæados f 3ss.
Misce: sumant. coch. duo magna omni horâ.

R. Spirit. ammon. comp. f 3ss.
Tinct. cardamomi comp. f 3ij.
Aquæ pimentæ f 3i.
Syrupi f 3j.
Fiat haustus, sextis horis sumendus.

R. Camph. pulveris 3j.
Sacchari, vel mellis 3j.
Misturæ moschi 3ii.
Aquæ ferventis 3ivss.
Spiritûs ætheris sulphurici 3ss.
Fiat mistura, cujus sumatur cochleare amplum secundâ vel tertiâ quâque horâ.

- R. Lactis vaccin. Oi.
Sinap. sem. contus. \mathfrak{z} i.
M. coquantar simul donec coagulum formetur, et cola. Sumatur cyathum subinde.
- R. Radicis armoraciæ excisæ \mathfrak{z} ij.
Seminis sinapis \mathfrak{z} jss.
Baccæ juniperi contusæ \mathfrak{z} iiij.
Vini albi hispanici Oij.
Digere per dies octo, dein cola:—capiat æger cyathum parvum vinosum bis quotidie.
- R. Spirit. ammon. arom.
Spirit. lavand. comp. $\bar{a}\bar{a}$ \mathfrak{z} i.
M. fiat mistura. Sumat. coch. j. min. ex aquâ, urgente flatu aut languore.
- R. Misturæ assafoetidæ f \mathfrak{z} iiij.
Misturæ camphoræ f \mathfrak{z} iv.
Ammoniac carbonatis \mathfrak{O} j.
Syrupi zingiberis f \mathfrak{z} ss.
Misce: capiat æger coch. tria ampla omni horâ.
- R. Misturæ moschi.
Mist. camph. fortior. $\bar{a}\bar{a}$ f \mathfrak{z} iiss.
Spirit. ætheris nitrici f \mathfrak{z} ij.
Syrupi rhæados f \mathfrak{z} ss.
Fiat mistura, cujus sumantur cochlearia duo magna tertiâ quâque horâ.
- R. Misturæ moschi f \mathfrak{z} vij.
Spirit. ætheris sulph. c.
Syrupi rosæ $\bar{a}\bar{a}$ \mathfrak{z} ss.
Fiat julapium, de quo capiat æger cochleare magnum subinde.
- R. Ammon. sesquicarb. gr. x.
Spirit. myrist.
Syr. aurantii $\bar{a}\bar{a}$ \mathfrak{z} i.
Aquæ destil. \mathfrak{z} i.
M. fiat haustus cum succi. limonis cochl. j. magno inter effervescentiam sumendus.
- R. Spirit. armoraciæ comp. f \mathfrak{z} ss.
Spirit. ammon. foetid. \mathfrak{m} xv.
Tinct. valerianæ ammon. f \mathfrak{z} ss.
Aquæ pimentæ f \mathfrak{z} vi.
Syrupi f \mathfrak{z} j.
Fiat haustus quartâ quâque horâ sumendus.
- R. Olei terebinth. rectific. f \mathfrak{z} iiij.
Ovi vitell. unius.
Sacch. pur. \mathfrak{z} ss.
Aquæ destillatæ f \mathfrak{z} vij.
Misce ut fiat mistura, cujus sumat æger cochlearia tria magnâ ter in die.
- R. Acidi hydrochlorici \mathfrak{z} i.
Aquæ Oj.
Sacchari q. s.
Fiat mistura pro potu communi.
- R. Creosoti \mathfrak{m} x,
Pulv. glycyrrhizæ \mathfrak{z} i.
Mucil. acac. q. s.
M. ut fiat massa in pil. xx. dividenda. Sumat duas ter die. (The number of pills may be gradually increased. Given in neuralgia, atonic rheumatism, and chronic bronchitis.)
- R. Creosoti \mathfrak{m} i.
Mist. camph. \mathfrak{z} i.
Fiat haustus. (In obstinate vomiting without organic disease, and in sea-sickness. The dose may be gradually increased; in which case the quantity of the menstruum must be at least \mathfrak{z} ss to each drop of creosote.)
- R. Decocti senegæ \mathfrak{z} viss.
Mist. acaciæ \mathfrak{z} ss.
Syrupi tolut. \mathfrak{z} i.
M. fiat mistura; sumat. cochl. tria ampla tertiis horis. (In bronchitis with excessive secretion and great debility; in bronchitis senilis.)

R. Radicis serpent. contusæ ʒss.
Corticis cascaril. contusæ ʒiij.
Aquæ ferventis Oj.
Macera in vase clauso per horam, dein cola.

R. Infusionis hujus f ʒx.
Tincturæ aurantii f ʒjss.
Syrupi aurantii f ʒj.
Misce pro haustu quartâ quâque horâ sumendo. (In typhus and in typhoid states of system.)

R. Decocti cuspariæ f ʒxiv.
Tinct. cinchonæ comp. f ʒj.
Confectionis Aromaticæ ʒj.
Syrupi aurantii f ʒj.
Fiat haustus quartis horis sumendus. (Ibid.)

R. Misturæ camphoræ ʒx.
Spir. æther. sulph.
Lavand. comp. āā ʒi.
M. fiat haustus tertiis vel quartis horis adhibendus.

R. Camphoræ, Moschi, āā ʒss.
Fiat pulvis ex quovis vehiculo idoneo sumendus.

R. Misturæ camphoræ f ʒvij.
Acidi sulph. dil. f ʒjss.
Syrupi simp. ʒvss.
Fiat mistura, cujus capiat æger cochlearia tria subinde.

R. Terebinth Venet. ʒi.
Vitel. ovi q. s.
Spt. Junip. c. ʒi.
Aq. font. ʒiv.
M. fiat mistura: sumantur coch. duo magna tertiâ quâque horâ. (In the chronic form of muscular rheumatism.)

R. Infus. rosæ f ʒvj.
Vini rubri f ʒij.
Misce pro potu ordinario.

R. Ol. terebinth. pur. ʒi.
Mellis ʒii.
Spt. lavand. comp. ʒss.
Pulv. acaciæ q. s.
Aquæ ʒi.
M. fiat haustus sextis vel quartis horis sumendus.

R. Tinct. cinchonæ c. f ʒj.
Tinct. valerianæ ammon. ʒxx.
Infus. quassiae f ʒxij.
Fiat haustus ter in die sumendus.

R. Spt. Ammon. comp. f ʒss.
Tinct. cinchonæ comp. f ʒjss.
Decocti cinchonæ f ʒx.
Syrupi rhæados f ʒj.
Fiat haustus quartâ quâque horâ sumendus.

R. Floris arnicæ montanæ ʒj.
Aquæ ferventis f ʒx.
Macera per horam in vase clauso et cola.
Liquoris colati f ʒx.
Tincturæ zingiberis f ʒij.
Syrupi ejusdem f ʒj.
Fiat haustus quartis horis sumendus.

R. Guaiaci pulverisati gr. x.
Tinct. guaiaci ammoniatæ f ʒj.
Pulveris acaciæ ʒij.
Syrupi croci f ʒjss.
Aquæ pimentæ f ʒxiiij.
F. haustus sextis horis sumendus. (In chronic rheumatism.)

R. Solutionis calcis chlorureti ʒi.
Mucilaginis acaciæ.
Syrupi aurantii āā ʒii.
Aquæ destill. ʒi.
M. fiat haustus secundâ vel tertiâ quâque horâ sumendus. (In typhus fever and dysentery.)

R. Camphoræ gr. xxv.
 Spirit. rectificati ℥v.
 Fiat terendo pulvis; dein adde
 Pulveris acaciæ ℥iv.

Syrupi limonis, f ℥ss.
 Aquæ menthæ viridis f ℥vij.
 Ut fiat emulsio:—sit dosis
 cochlearia tria magna.

2. INTERNAL STIMULANTS ACTING LOCALLY UPON CERTAIN SYSTEMS OR PARTS.

ON THE MUSCULAR SYSTEM.

R. Strych. nuc. vom. gr. iii.
 Pulv. acaciæ ℥i.
 Aquæ cinnam. ℥iss.
 Tinct. cardam. c. ℥i.
 M. f. haustus, ter die sumendus.

R. Strych. nuc. vom. ℥i.
 Confect. rosæ gall. ℥ii.
 M. fiat massa in pil. lx. dividenda. Sumat æger unam nocte manequæ.

R. Strychniæ gr. i.
 Sacch. alb. ℥ii.
 Aquæ destill. ℥ii.
 Aceti ℥ii.
 M. fiat mistura cujus sit dosis cochleare parv. nocte manequæ. (The dose to be increased gradually.)

R. Strychniæ gr. ii.
 Spirit. rect. ℥i.
 Solve fiat tinctura cujus sit dosis ℥x. (The foregoing are used with advantage in partial or general paralysis in the absence of inflammation or fever. The dose may be cautiously increased to ℥xxx.)

ON THE UTERUS.

R. Ergotæ ℥i.
 Aquæ ℥iii.
 M. decoque celeriter ad ℥iss.
 (A teaspoonful every twenty minutes for three or four doses in succession.)

R. Secal. cornuti ℥ss.
 Aq. bull. ℥xxiv.
 Adde infus.
 Syrup. simp. ℥i.
 M. sumantur uncias duas tertius horis.

(The first form may be used in lingering labours dependent on deficient action of the uterus; the second with a view of inducing premature labour in cases of deformed pelvis, &c. The ergot has also been used in the dose of ten grains every two hours, in hæmorrhage from the uterus, bladder, and lungs; and in five-grain doses three times a day in leucorrhœa.)

ON THE MUSCULAR COAT OF THE BLADDER.

R. Tinct. cantharidis ℥i.
 Tinct. Hyoscyami ℥iii.
 Misce. Sit dosis ℥x. ter die ex aqua sumenda. (In inconti-

nence of urine from debility of the bladder, and in obstinate gleet. To be gradually increased to 15 drops or more.)

R. Canthar. pulv. gr. ii.
 Camphoræ gr. iv.
 Ext. hyoscyami gr. vi.
 Spirit. vini rect. ℥iii.
 Contere bene ut fiat massa in

pil. iv. dividenda. Sumat æger
 unam bis in die, bibens subinde
 decoct. hordei. (The same as the
 foregoing. The preceding form is
 to be preferred.)

ON THE MUCOUS MEMBRANES.

R. Copaibæ bals. ℥iii.
 Liq. potassæ carb. ℥iss.
 Decoct. hordei ℥viiss.
 Copaibam cum. liq. pot. carb.
 primum contere, dein adde gra-
 datim decoct hordei. Sit dosis ℥i
 —℥iss ter die.

R. Copaibæ bals.
 Magnes. āā ℥i.
 M. divide in pil. cc. quarum
 sumantur vi—xii ter die.

R. Bals. peruv. ℥ii.
 Vitel. ovor. ii.
 Tere simul et adde
 Ext. cinch. ℥ss.
 Mell. ros. ℥vi.
 M. cochl. i. magn. ter die.
 (Chronic bronchitis.)

R. Piper. cubebæ ℥i.
 Sacch. alb. ℥ii.
 Mucil. acac. ℥ii.
 Aq. Cinnam. ℥vi.
 M. f. emulsio, cujus sumat
 cochl. ii. magna ter in die. (Go-
 norrhœa, gleet, &c.)

R. Piper. cubebæ ℥ss.
 Mellis opt.
 Confect. sennæ āā ℥ii.
 M. fiat electuarium incipiente
 gonorrhœa sumendum, et si nau-
 sea absit, post horas duas repeten-
 dum. (Large doses of cubebs, if
 the stomach will bear them, some-
 times cut short an attack of go-
 norrhœa.)

R. Olei terebinth ℥ii.
 Mellis ℥iv.
 Pulv. glycirrh. q. s.
 Misce fiat electuarium cujus.
 Sumatur cochleare i. magnum
 ter die. (In bronchitis.)

R. Olei terebinth. ℥i.
 Aquæ tepidæ ℥xii.
 Inhaletur vapor. (In chronic
 catarrh, with profuse expectora-
 tion.)

R. Tinct. iodinii ℥x—xx.
 Aquæ tepidæ ℥iv.
 M. et statim inhaletur vapor.
 (In phthisis: must be used with
 caution.)

R. Aquæ chlorinii. (saturatæ)
 ℥v—x.
 Aquæ tepidæ ℥iv.
 M. et statim inhaletur vapor.
 (Gangrene of the lung, phthisis.
 The inhalation may be continued
 for about five minutes, and be re-
 peated frequently in the course of
 the day.)

R. Liq. ammoniæ ℥i.
 Aquæ tepidæ ℥iv.
 M. inhaletur vapor. (As a sti-
 mulant in chronic laryngitis. If
 it excites coughing, the quantity
 of ammonia must be lessened.)

3. EXTERNAL AND LOCAL STIMULANTS.

RUBEFACIENTS (Stimulating Embrocations, Plasters, Ointments, &c.)

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| <p>R. Pulv. sem. sinapis ʒj.
Acidi acetici f ʒss.
Linimenti saponis c. f ʒjss.
Fiat embrocatio.</p> <p>R. Tinct. canth.
Lin. sap. c. āā f ʒj.
Fiat linimentum.</p> <p>R. Tinct. cantharidis f ʒj.
Olei terebinth. rect. f ʒss.
Linimenti camphoræ f ʒss.
Fiat embrocatio.</p> <p>R. Olei cajeputi f ʒjss.
Liq. ammon. carbonatis f ʒss.
Fiat embrocatio.</p> <p>R. Camphoræ ʒjss.
Olei terebinth. rect. f ʒjss.
Solve pro embrocatione.</p> <p>R. Liq. ammon. carbonatis f ʒss.
Linimenti saponis comp. ʒjss.
Fiat linimentum.</p> <p>R. Liq. potas. subcarbonatis f ʒss.
Linimenti saponis comp. ʒjss.
Misce pro embrocatione.</p> <p>R. Antim. pot. tart. ʒi.
Hydrarg. bisulphureti gr. x.
Unguent. cetacei ʒvii.
M. fiat unguentum.</p> <p>R. Antim. pot. tart. ʒii.
Tinct. cantharidis f ʒi.
Aquæ rosæ ʒii.
Solve ant. pot. tart. in aqua
rosæ calida dein adde tincturam.</p> | <p>R. Potass. sulphuret.
Saponis albi. āā ʒii.
Alcohol. rect. ʒi.
M. fiat lotio. (In porrigo favosa and scabies.)</p> <p>R. Potass. carb. ʒi.
Sulphur. precip. ʒii.
Adipis ʒiv.
M. fiat unguentum. (Applied every night in scabies, with great success.)</p> <p>R. Picis liquidæ ʒiv.
Ceræ flavæ ʒss.
Solve leni calore, et adde terendo.
Sulphuris ʒi.
M. f. unguentum. (In porrigo, impetigo, &c.)</p> <p>R. Linimenti hydrargyri ʒss.
Olei terebinth. rectificati f ʒss.
Linimenti camphoræ f ʒj.
Fiat embrocatio, cujus illinatur cochleare medium in partes affectas bis quotidie.</p> <p>R. Olei succini rectificati f ʒij.
Linimenti saponis comp. f ʒx.
Fiat embrocatio, cujus illinatur cochleare minimum ter in die in dorsum. (Analogous to Roche's royal embrocation.)</p> <p>R. Camphoræ ʒij.
Olei olivæ f ʒj.
Olei terebinth. rectificati f ʒss.
Fiat embrocatio.</p> |
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℞. Camphoræ ʒss.
Olei olivæ optimi f ʒij.
Fiat embrocatio.

℞. Sinap. pulv.
Lini pulv. āā ʒviij.
Aceti calidi quantum sufficit, ut fiat cataplasma plantis pedum applicandum, per tres vel quatuor horas, dein auferendum.

℞. Olei macis f ʒss.
Cerati saponis ʒij.
Fiat emplastrum toto abdomini imponendum.

℞. Ol. croton tigllii ℥x.
Adipis ʒss.
M. fiat unguentum. Infricetur ad nucis magnitudinem bis terve in die, donec appareat eruptio cutanea. (As a counter-irritant in internal inflammations.)

℞. Creosoti ℥v.—xxx.
Adipis ʒss.
Fiat unguentum. (In acne, sycosis, lepra, psoriasis, ozæna, and ill-conditioned ulcers.)

℞. Creosoti ℥iv.
Aquæ ʒi.
M. fiat embrocatio. (In rheumatism.)

℞. Argent. nit. gr. x.
Ung. cetacei ʒi.
Liq. plumbi. acet. ℥x.
Misce: fiat unguentum. (The size of a pin's head to be introduced between the eyelids in purulent ophthalmia.—Guthrie.)

℞. Hyd. chlorid. gr. cc.
Arsenici. oxid. alb. gr. i.
M. f. pulvis. (In lupus, to be sprinkled over a small portion of diseased surface by means of a puff.—Dupuytren.)

℞. Sinapis pulv. ʒiv.
Aquæ tepidæ q. s.
Fiat pediluvium.

℞. Acidi nitro muriat. ʒii—ʒiv.
Aquæ tepidæ (96°) Cong. iv.
vel. q. s.
Ut fiat pediluvium. (Hepatic derangement with dyspepsia and constipation. It may be used in the proportion of ʒi to 8 gallons, as a bath for the whole body, or the surface may be sponged with it.)

℞. Acid hydrochlor. ʒii—ʒiv.
Aquæ tepidæ (96°) cong. iv.
vel. q. s.
Ut fiat pediluvium.

℞. Potass. carb. ʒiv.
Aquæ tepid. ℥ccc.
M. fiat balneum alkalinum. (This may be sprinkled on bran, and applied to the skin in cutaneous diseases with low action of the skin.)

℞. Manganesii binoxidi ʒi.
Sodii chloridi ʒiii.
Tere optime et adde
Acidi. sulph. ʒi.
Aquæ ʒii.
(The chlorine given off from this mixture on the application of heat forms a powerful stimulant in certain cases of cutaneous disease and in chronic rheumatism, &c. The vapour must be so applied to the surface that it may not reach the lungs. The vapours of sulphur applied with the same precaution are of great service in obstinate forms of skin disease.)

℞. Liq. ammon. fort. ʒi.
Spirit. rosmarinæ ʒvi.
Spirit. camphoræ ʒii.
M. (a highly stimulant appli-

cation to be used where a rapid action on the skin is required. The acidum aceticum, or the acetum cantharidis of the London Pharmacopœia, may be used with the same object.

STIMULATING GARGLES.

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| <p>℞. Capsici contusi, gr. v.
Aquæ bullientis, ℥viij.
Mellis rosæ.
Tinct. myrrhæ āā ℥iv.
Sit gargarisma sæpe usurpandum.</p> <p>℞. Vini rubri Lusitan. ℥vj.
Extracti cinchonæ ℥j.
Misce in usum.</p> <p>℞. Potassæ nitratis ℥ij.
Aquæ hordei f ℥vij.
Oxymellis f ℥vij.
Fiat gargarisma sæpe utendum.</p> <p>℞. Sol. chlor. calcis ℥j—ij.
Mucilag. acaciæ ℥j.
Aquæ fontis ℥vss.
Syrupi simplicis ℥iv. M.</p> <p>℞. Tinct. capsici ℥ss—℥i.
Syrupi simp. ℥i.
Aquæ rosæ ℥vii.
M. f. gargarisma sæpius in die utendum. (Chronic tonsillitis.)</p> | <p>℞. Infusi rosæ ℥iij.
Tinct. myrrhæ ℥iij.
Sacchari pur. ℥v.
Fiat gargarisma in usum.</p> <p>℞. Acidi muriatici f ℥ss.
Aquæ hordei f ℥vij.
Mellis rosæ ℥j.
Fiat gargarisma.</p> <p>℞. Aquæ hordei f ℥vij.
Acidi hydrochl.
Acidi nit. āā ℥x.
Mellis rosæ f ℥j.
Fiat gargarisma.</p> <p>℞. Boracis ℥ij.
Aquæ ℥vij.
Mellis rosæ ℥i.
Misce ut fiat gargarisma.</p> <p>℞. Muc. acaciæ ℥viii.
Olei terebinth. ℥ii.
M. fiat gargarisma. (In ptyalism.)</p> |
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STIMULATING ENEMATA.

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| <p>℞. Decocti hordei ℥x.
Sol. calcis chlorureti ℥iv.
Fiat enema mane vespereque injiciendum.</p> <p>℞. Aquæ hordei ℥x.
Olei menthæ piperitæ ℥iv.
Olei terebinth. ℥j.
Tinct. assafœtidæ ℥iij.
Fiat enema tertiis vel quartis horis injiciendum. (In typhoid states, the abdomen being much distended with gas.)</p> | <p>℞. Seminis fœniculi contusi ℥iij.
Aquæ ferventis f ℥xvj.
Macera per horam, dein cola pro enema.</p> <p>℞. Infusi fœniculi f ℥xij.
Tinct. assafœtidæ f ℥ss.
Fiat enema.</p> <p>℞. Aceti communis f ℥iij.
Infusi anthemidis f ℥v.
Misce pro enema.</p> |
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NARCOTICS, ANODYNES, AND SEDATIVES.

(Including Antispasmodics belonging to these Classes.)

℞. Opii gr. i.
Fiat pilula horâ somni sumenda.

℞. Extracti opii gr. $\frac{1}{4}$.
Extracti papaveris gr. viij.
Fiant pilulæ duæ ter in die sumendæ.

℞. Tinct. opii ℥xx.
Aquæ cinnam.
Aquæ puræ āā ℥vi.
M. fiat haustus horâ somni sumendus.

℞. Morphiae acetatis gr. i.
Aquæ destill. ℥i.
Solve; sumat. coch. i. minimum horâ somni vel urgente dolore.

℞. Potassæ subcarb. ℥i.
Succi limonis ℥ss.
Aq. Menthæ virid. ℥i.
Tinct. opii ℥xxv.
Syrupi tolut. ℥ss.
M. fiat haustus h. s. s.

℞. Tinct. opii ℥xxx.
Liq. ammon. acet. ℥ss.
Aq. cinnam.
Syrupi zingib. āā ℥ii.
M. fiat haustus horâ somni sumendus, vel urgente dolore.

℞. Pulv. ipecac. comp. gr. i.
Sacchari. ℥i.
M. et divide in chartulas iv.
(For young infants.)

℞. Acidi hydrocyanici dil. ℥ii.
Mist. amygdal. ℥i.
M. f. haustus. (The dose may be gradually increased to five or

six drops. In irritable stomach, gastralgia, palpitations, angina pectoris, spasmodic affections of the muscles of respiration, &c.)

℞. Acidi hydrocyanici dil. ℥ii.
Tinct. digitalis ℥v.
Mist. camphoræ ℥i.
M. fiat haustus, quartis horis sumendus.

℞. Mist. cretæ ℥vi.
Conf. arom. ℥ii.
Tinct. opii ℥xxx.
Aquæ cinnam. ℥ii.
M. fiat mistura cujus sumantur coch. ii. magna post singulas sedes liquidas. (In chronic diarrhœa.)

℞. Tinct. opii ℥i.
Muc. acac.
Syrup. simp. āā ℥ss.
Aquæ destill. ℥i.
M. fiat mistura narcotica. (To procure sleep in very young children: dose, a teaspoonful for a child of one month, repeated every half hour till sleep is procured.)

℞. Liq. opii sedativ. ℥xii.
Vin. antim. ℥i.
Liq. ammon acet.
Syrupi tolutani āā ℥vi.
Aquæ ℥iss.
Sit dosis coch. i. medium subinde urgente tussi.

℞. Ext. lactucæ sativæ gr. iv.
Camphoræ gr. ii.
Spirit. vin. rect. ℥ii.
M. fiat pil. ii. h. s. s.

- ℞. Tinct. digitalis *m*. x—xxx.
Potassæ nitratis gr. vj.
Aq. menthæ viridis f 3xiiij.
Syrupi croci f 3j.
Misce, pro haustu sextâ quâque horâ sumendo.
- ℞. Tinct. digitalis *m*. x—xxx.
Acidi sulphurici dil. *m*. xv.
Aquæ menthæ viridis f 3xi.
Syrupi rhæados f 3j.
Fiat haustus sextis horis sumendus.
- ℞. Tinct. digitalis *m* vj—xx.
Liq. ammon. acet. f 3iij.
Syrupi rosæ f 3j.
Aquæ menthæ viridis f 3x.
Fiat haustus quartis horis adhibendus.
- ℞. Potassæ nitratis gr. vj.
Tinct. digitalis *m* v—x.
Liq. ammon. acetatis f 3ij.
Aquæ destillatæ f 3v.
Syrupi croci f 3j.
Fiat haustus tertiâ quâque horâ adhibendus.
- ℞. Extracti conii gr. j—iv.
Fiat pilula quavis nocte sumenda.
- ℞. Extracti conii gr. v.
Hydrargyri submuriatis gr. $\frac{1}{2}$.
Fiat pilula quartâ quâque horâ sumenda.
- ℞. Extract. conii.
Pulv. ipecac. comp. āā 3i.
Mucil. acac. q. s.
Ut fiat massa in pilulas x. dividenda. Sumat unam tertiis horis.
- ℞. Extracti conii 3ss.
Pulv. fol. conii gr. xv.
M. divide in pil. xii. quarum sumat unam ter die. (In cancer
- and other painful affections where opium disagrees.)
- ℞. Extracti hyoscyami gr. v.
Fiat pilula quartâ quâque horâ sumenda.
- ℞. Aquæ cinnamomi 3j.
Tinct. hyoscyami *m* xxx.
Syrupi simplicis 3iv.
Fiat haustus.
- ℞. Camph. pulveris gr. iij.
Extracti hyoscyami, gr. ij.
Fiat pilula tertiâ, quartâ, vel sextâ quâque horâ sumenda.
- ℞. Extracti hyoscyami gr. ij—v.
Extracti conii gr. iij.
F. pilula sextis horis sumenda.
- ℞. Extracti hyoscyami g. ij—x.
Pulveris digitalis gr. j.
Fiat pilula sextâ quâque horâ sumenda.
- ℞. Extract. aconiti gr. i.
Extract. glycirrh. gr. viii.
M. fiat massa in pilulas iv. dividenda, sumat unam bis vel ter die.
- ℞. Pulv. digitalis.
— scillæ.
Ext. hyoscyami āā 3i.
Misce et divide in pilulas xii quarum sumatur una ter die. (Bronchitis, asthma, &c.)
- ℞. Mist. camphoræ 3i.
Tinct. digitalis *m* v—x.
Acidi hydrocyanici dil. *m* ii.
M. fiat haustus.
- ℞. Ext. belladonnæ gr. ii.
Aquæ destill. 3i.
Fiat mistura, sit dosis *m* v—x. (As a prophylactic in scarlatina?)

℞. Ext. stramonii gr. i.
Ext. glycirrh. ʒi
M. ut fiat massa in trochismata
vi distribuenda. Sumat. unum
p. r. n. (In cough, with irritation
of the larynx or throat.)

℞. Ext. belladonnæ gr. iv.
Extracti conii
Pulv. ipecac. c. āā ʒi.
M. et divide in pil. xvi. sumat
i. sextis vel quartis horis. (Given
in pertussis and scarlatina.)

℞. Acidi sulph. dil.
Tinct. hyoscyami āā ʒxx.
Tinct. digitalis ʒx.
Liq. ammon. acet. ʒss.
Aquæ ʒi.
M. f. haustus ter die sumendus.

(Very useful in hyperlactatio and
states of system called "nerv-
ous.")

℞. Vini ipecacuanhæ f ʒss.
Oxymellis scillæ f ʒiss.
Misce: cujus sumat æger cochl.
unum minimum subinde.

℞. Tinct. scillæ f ʒjss.
Oxymellis ejusdem.
Aquæ destill. āā f ʒjss.
Misce: sumat cochleare mini-
mum omni horâ.

℞. Mist. amygdalæ f ʒv.
Potassæ nitratis gr. xv.
Syrupi papaveris f ʒss.
Misce: sumat æger cochleare
medium urgente tussi.

EXTERNAL APPLICATIONS.

℞. Camphoræ gr. x.
Aceti communis f ʒij.
Aquæ destillatæ f ʒxiv.
Fiat lotio frigida capiti raso ap-
plicanda.

℞. Liq. ammon. acet.
Acidi acet.
Spirit. tenuioris, āā f ʒj.
Aquæ puræ f ʒix.
Misce fiat lotio.

℞. Mist. camph. f ʒvj.
Liq. ammon. acet. f ʒij.
Misce fiat lotio.

℞. Liq. ammon. acet.
Spirit. tenuioris.
Aq. singulor., partes equales.
Misce fiat lotio, capiti raso,
applicanda.

℞. Liq. potassæ ʒii.
Acid hydrocyanici dil. ʒi.
Mist. amygdal. ʒviii.
M. f. lotio. (In prurigo.)

℞. Plumbi acetatis ʒss.
Acidi hydrocyanici dil. ʒiii.
Unguent. cetacei ʒiii.
M. f. unguentum. (In cases
of eczema, &c.)

℞. Potassii cyanidi g. xii.
Ol. amygdal ʒii.
Ung. ceræ alb. ʒii.
M. fiat unguentum. (In lichen
and prurigo.)

℞. Veratriæ gr. iv.
Alcohol ʒvi.
Adipis ʒss.
M. bene: fiat unguentum. (In
neuralgia.)

℞. Aconitinæ gr. ii—iv.
Alcohol ℥vi.
Adipis ℥ss.
M. optime: f. unguentum.

℞. Ext. Belladonnæ ℥ii.
Cerat. cetacei ℥i.
M. f. unguentum.

℞. Opii ℥ii.
Aquæ ferventis ℔ij.
Solve, pro fomentatione.

℞. Conii fol. exsicc. ℥i.
Aquæ ℔iiss.
Decoque ad ℔ii. Cola. Sit pro
fomentatione. (Scrofulous ulcers,
cancers, &c.)

℞. Ext. belladonnæ ℥ii,
Aquæ calcis ℥viii.
Ol. amygdal. ℥iv.
M. fiat linimentum. (To be
applied with a feather in acute
eczema and impetigo.)

℞. Ext. belladonnæ ℥i.
Emp. saponis ℥ii.
M. f. emplastrum regioni cordis,
vel parti dolenti applicandum.
(Angina pectoris, palpitation,
pleurodynia, &c.)

℞. Conii fol. exsicc. ℥ii.
Med. panis ℥vi.
Aquæ ferventis q. s.
Ut f. cataplasma. (Cancer, &c.)

ENEMATA, &c.

℞. Camphoræ ℥j.
Olei olivæ f ℥ij.
Solve pro enemate urgente pruriginē adhibendo. (In the irritation of worms.)

℞. Fol. belladonnæ gr. xii.
Aq. fervent. ℥vi.
Macera fiat, injectio. (In spasmodic contraction of the urethra.)

℞. Opii gr. ii.
Saponis duri. gr. iii.
M. fiat suppositorium. (To procure sleep, or to allay irrita-

tion in the rectum, bladder, or uterus.

℞. Tinct. opii ℥xl.
Mucil. amygd. ℥iv.
M. fiat enema. (The same as the foregoing.)

℞. Camph. ℥i.
Spirit. rectific. q. s.
Vitel. ovi. i.
Decoct. hordei ℥xiv.
M. f. enema. (In low typhus.)

STIMULANTS, IN COMBINATION WITH NARCOTICS, SEDATIVES, AND ANODYNES.

(Including Stimulant and Anodyne Antispasmodics.)

℞. Ammon. subcarbon. g. xij.
Succi limonis recentis q. s.
Mist. camph. f ℥x.
Syrup aurantii f ℥j.
Tinct. opii ℥x—xxx.
Fiat haustus quartâ vel sextâ

quâque horâ sumendus.

℞. Mist. camphoræ f ℥xjiii.
Tinct. opii f ℥ss.
Syrupi tolutanti f ℥j.

R. Mist. camph. fortior. f 3vij.
Spirit. æther. sulph. comp.
Syrupi rhæados āā f 3ss.
Tinct. opii f 3j.

Misce: sit dosis cochlearia tria magna.

R. Mist. camphoræ cum duplice camphoræ quantitate 3viij.
Spirit. æther. sulph. 3ij.
Tinct. opii 3ss.
Pulv. moschi 3ss.

Spirit. ammon. aromatici 3ij.
M. fiat mistura cujus sumantur cochl. ii. vel iii. secundâ vel tertiâ quâque horâ, prout urgeant symptomata.

R. Tinct. valerianæ ammon. 3ss.
Spirit. æther. sulph. 3i.
Tinct. hyoscyami 3ss.
Mist. camphoræ 3i.
M. fiat haustus. (In hysteria.)

R. Spirit. æther. sulph. 3iss.
Tinct. opii mxx.
Tinct. valerianæ ammon. 3ii.
Spirit. cinnamomi 3i.
Aquæ anethi. 3iii.
M. fiat mistura cujus sumat cochl. ii. magna bis terve in die. (Gastralgia, flatulence, &c.)

R. Camphoræ.
Moschi.
Assafoetidæ, sing. gr. iii.
Opii gr. i.
Syrupi zingib. q. s.
Fiat bolus omni bihorio adhibendus.

R. Camphoræ gr. viij.
Moschi gr. vj.
Pulveris opii gr. ij.
F. pulvis ex syrupo sumendus.

R. Pil. saponis cum opio gr. iij.
Pulveris capsici gr. iij.
Olei fœniculi mij.
Fiat pilulæ duæ sextâ quâque horâ sumendæ.

R. Camphor. gr. iv.
Ammon. sesquicarb. gr. iii.
Ext. hyoscyami gr. iv.
Mucil. q. s.
Ut fiat pil. iii. statim sumendæ.

R. Moschi gr. x.
Æther. sulph.
Tinct. opii āā mxx.
Aq. cinnam. 3i.
M. f. haustus ter die sumendus. (Last stage of typhus.)

R. Mist. camphoræ 3vi.
Liq. ammon. acet. 3iii.
Spirit. æther. sulph. c.
Tinct. camphor. c.
Syrupi papav. āā 3i.
M. f. haustus.

R. Liq. opii sedativ. mx.
Mist. Camph. 3i.
M. fiat haustus.

R. Castorei 3i.
Ammon. carb. gr. v.
Syrup. q. s.
Ut fiat bolus. (Hysteria.)

EXTERNAL APPLICATIONS, &c.

R. Lin. saponis comp. f 3jss.
Tinct. opii f 3ss.
Fiat embrocatio, cujus illinatur quarta pars ter in die in partes affectas.

R. Olei cajeputi f 3jss.
Tinct. opii f 3ss.
Fiat linimentum eodem modo utendum.

℞. Tinct. cantharidis f ʒss.
 Linimenti camphoræ f ʒj.
 Tinct. opii f ʒiij.
 Liq. ammon. carbon. f ʒj.
 Fiat embrocatio partibus affectis applicanda.

℞. Extract. conii ʒij
 Olei anisi f ʒss.
 Fiat emplastrum.

℞. Olei camphorati ʒij.
 Morphiæ acetatis gr. ij.
 Fiat unguentum in usum.

℞. Gallæ pulveris ʒj.
 Camphoræ ʒss.
 Tinct. opii f ʒij.
 Cerati ʒj.

Tere simul ut fiant unguentum quo partes affectæ nocte maneque illinantur.

℞. Lin. camph. comp. ʒiv.
 Tinct. opii ʒiv.
 Potassæ hydriodatis ʒij—iij.
 Misce fiat linimentum.

℞. Tinct. assafœtidæ ʒss.
 Tinct. opii ʒj.
 Aquæ destillatæ ʒviij.
 Fiat enema.

℞. Olei terebinth. ʒi.
 Camphoræ ʒi.
 Ol. olivæ ʒiss.
 Vitell. ovi i.
 Spirit. ammon. fœt. ʒii.
 M. fiat enema. (In flatulent colic, tympanites, &c.)

TONICS.

℞. Tinct. cinchonæ comp. f ʒj.
 Tinct. valer. ammon. ʒxx.
 Infus. quassiæ f ʒxij.
 F. haustus ter in die sumendus.

℞. Confectionis rosæ ʒj.
 Aquæ ferventis ʒiss.
 Acidi sulphurici diluti ʒij.
 Quinæ sulphatis gr. ij.
 Tinct. aurantii ʒj.
 Fiat haustus, secundâ vel tertiâ quâque horâ intermissionis tempore, adhibendus.

℞. Acidi nitrici diluti ʒviij.
 Aquæ destill. f ʒxij.
 Syrupi simplicis f ʒij.
 Fiat haustus ter quaterve die sumendus.

℞. Acidi nitrici f ʒj.
 Aquæ destill. f Oij.
 Syrupi aurantii f ʒjss.
 Fiat mistura quotidie sumenda, ope tubuli vitrei, partitis haustibus.

℞. Rad. armoraciæ contusæ ʒij.
 Seminis sinapis.
 Radicis valerianæ āā ʒij.
 Radicis rhei incisæ ʒss.
 Infunde in vini hispanici Oij: sæpe agitetur, et coletur usûs tempore: cochl. duo magna quartâ quâque horâ sumenda.

℞. Acidi muriat. oxygen. f ʒj.
 Aquæ menthæ viridis f ʒxiv.
 Syrupi aurantii f ʒj.
 Fiat haustus ter quaterve die sumendus.

℞. Aq. menthæ piperitæ ʒj.
Syrupi aurantii ʒiv.
Acidi muriatici.
—— nitrici āā mʒj.
Fiat haustus.

℞. Decocti cinchonæ ʒxi.
Acidi sulphur. diluti mʒij.
Syrupi glycyrrhizæ ʒj.
Fiat haustus.

℞. Aquæ destill. ʒx.
Acidi nitrici diluti ʒij.
Syrupi aurantii ʒij.
Misce pro potu ordinario.

℞. Magnesiz ʒj.
Liquoris calcis ʒvii.
Tinct. cardamomi ʒss.
Fiat mistura, cujus sumat æger
cochlearia tria magna in dolore.

℞. Confectionis aromat. ʒj.
Spirit. æther. sulph. c. f ʒss.
Mist. camphoræ ʒvij.
Syrupi zingiberis f ʒss.
Misce: sumantur cochlearia tria
parva in dolore.

℞. Quassiz rasuræ ʒj.
Corticis aurantii concisæ ʒjss.
Aquæ ferventis Oj.
Stent in vase aperto per horæ
spatium, et cola. Infusionis colatæ
capiat æger cochlearia quatuor bis
quotidie.

℞. Tinct. ferri muriatis ʒss.
Cujus adhibeantur guttæ sex
ter quaterve die ex poculo ali-
cujus liquoris idonei, infuso theæ
excepto.

℞. Aquæ cinnamomi.
Aq. menthæ viridis, āā f ʒvj.
Syrupi aurantii f ʒj.
Misce, dein adjice; acidi mu-
riatici; acidi nitrici, āā mʒss: fiat
haustus quater in die sumendus.

℞. Zinci sulphatis gr. j.
Infus. quassiz f ʒvjss.
Tinct. calumbæ f ʒj.
Fiat mistura, cujus capiat æger
cochl. quatuor secundâ tertiâ vel
quartâ quâque horâ.

℞. Zinci sulphatis gr. ij.
Decocti cinchonæ f ʒvijss.
Tinct. gentianæ f ʒij.
Fiat mistura, cujus sumantur
cochl. tria magna tertiâ vel quartâ
quâque horâ.

℞. Cort. querc. exter. cont. ʒjss.
Aquæ ferventis f ʒxx.
Macerâ per horas duas vel tres,
leni calore, dein cola.

℞. Hujus colatæ f ʒjss.
Pulveris gallæ gr. x.
Tint. cardamomi compositæ.
Syrupi zingiberis, āā f ʒj.
Fiat haustus secundâ tertiâ vel
quartâ quâque horâ sumendus.

℞. Decocti cinchonæ f ʒvi.
Extract. ejusdem gr. v.
Tinct. cinchonæ comp. f ʒj.
Syrupi aurantii f ʒj.
Fiat haustus quartis horis, in
apyrexia, sumendus.

℞. Liq. arsenicalis mʒiv—viiij.
Tinct. cinnamomi f ʒj.
Syrupi rhæados f ʒj.
Aq. pimentæ f ʒxiij.
Misce: fiat haustus ter in die
sumendus.

℞. Infusi calumbæ ʒiss.
Acidi muriatici mʒvj.
Tinct. opii mʒiv.
Fiat haustus secundis vel tertiis
horis adhibendus.

R. Ext. hellebori nigri ʒj.
Ext. gentianæ ʒij.
Fiant pilulæ xij. quarum sumantur duæ nocte maneque.

R. Pulveris myrrh. comp. ʒss.
Balsami peruviani q. s.
F. bolus ter in die sumendus.

R. Pulv. cinchonæ ʒss.
Pulv. valerianæ ʒss.
F. pulvis ter in die sumendus.

R. Sodæ carbonatis gr. vj.
Pulv. cinchonæ ʒj.
F. pulvis ter in die sumendus.

R. Sodæ carbon. exsic. gr. viij.
Pulv. cinchonæ ʒj.
F. pulvis ter in die adhibendus.

R. Zinci oxydi gr. vj.
Ext. gentianæ gr. iv.
Syrupi zingiberis q. s.
Fiant pilulæ duæ ter in die sumendæ cum haustulo infusi anthemidis.

R. Zinci sulphatis gr. i.
Ext. anthemidis g. x.
Fiant pilulæ duæ ter in die sumendæ.

R. Cupri ammon. gr. ij.
Confectionis rosæ gr. v.
F. pilula ter quotidie capienda.

R. Cupri sulphatis gr. ij.
Confectionis rosæ ʒj.
Ext. opii gr. iv.
Optimè misceantur in massam in pilulas xxiv. dividendam, quarum capiat æger unam vel duas ter in die.

R. Argenti nitratis gr. j.
Confectionis rosæ gr. v.
Fiat pilula ter in die sumenda.

R. Argenti nitratis gr. ii.
Ext. humuli ʒi.
— hyoscyami gr. xii.
M. fiat massa in pilulas viii. div. sumat unam ter die.

R. Liq. potassæ arsenitis miv.
Decoct. cinchon. ʒx.
Syrupi aurantii ʒii.
Tinct. opii. miv.
M. fiat haustus bis in die sumendus.

R. Ext. taraxaci gr. x.
Sodæ carb. gr. iv.
Tinct. cardam. comp. ʒi.
Infus. calumbæ ʒi.
Aquæ pimentæ ʒiii.
M. fiat haustus ter quotidie sumendus. (In chronic hepatic affections.)

R. Ext. gentianæ ʒii.
Fellis bovini ʒiii.
Pulv. rhei. ʒii.
Assafœtidæ ʒi.
M. et divide in pilulas cxx. Sumantur duas vel tres ter die.

R. Pilulæ ferri cum myrrhâ ʒss.
Fiant pilulæ duæ bis terve in die sumendæ.

R. Ext. tanaceti ʒjss.
Ferri sulphatis ʒj.
Fiant pilulæ xxiv. quarum sumat duas ter in die.

R. Ext. tanaceti ʒj.
Ferri tartarizati ʒjss.
Pilulæ galbani comp. ʒss.
Fiat massa in pilulas xxxvj. dividenda, è quibus sumat ægra tres ter quotidie.

R. Ferri sulph. exsic.
Ext. gentianæ aa ʒss.
M. f. massa in pil. xii divid.; quarum sumantur duæ ter die.

R. Ferri sulphatis gr. xij.
Ext. gentianæ ʒj.
Pulv. cinnam. comp. ʒss.
Fiat massa in pilulas xxiv. dividenda, quarum sumat ægra duas ter in die, superbibens haustum infusi alicujus amari.

R. Ferri sulph. ʒss.
Magnes. calcin. ʒii.
Tinct. quassiae ʒii.
Aquæ ʒvi.
M. f. mistura cujus sumantur cochl. ii. magna ter die.

R. Ext. glycyrrhizæ concis. ʒij.
Aquæ puræ fʒxvj.
Coque et cola.

R. Myrrhæ ʒij.
Ferri sulphatis gr. xxiv.
Potassæ subcarbonatis ʒj.
Decoct. glycyrrh. fervent. ut supra præscripti fʒxiv.
Tinct. zingiberis fʒj.
Myrrham et ferri sulphatem cum potassæ subcarbonate et tere donec perfecte commisceantur, dein gradatim adjice decoctum et denique tincturam.

ASTRINGENTS.

R. Aluminis purificati ʒss.
Infusi rosæ ʒxij.
Syrupi ejusdem ʒj.
F. haustus ter in die sumendus.

R. Aluminis gr. v.
Acidi sulph. dil. mxxx.
Infus. anthemidis fʒxij.
Syrupi aurantii fʒj.
Tinct. opii mʒj.
F. haustus ter in die sumendus.

R. Aluminis purificati ʒss.
Kino gr. viij.
Confectionis opii ʒss.
F. bolus sextis horis sumendus.

R. Mist. cretæ fʒvj.
Syrupi papaveris fʒvj.
Fiat mistura, cujus capiat æger cochl. duo magna post singulas sedes liquidas.

R. Confectionis aromaticæ ʒj.
Mist. cretæ fʒxij.
Pulv. ipecac. gr. j.
Fiat haustus quartis horis sumendus.

R. Elec. catec. (Pharm. Ed.) ʒiij.
Decocti cuspariæ fʒvij.
Tinct. ejusdem fʒiij.
Fiat mistura.

R. Mist. cretæ fʒjss.
Spirit. myristicæ fʒij.
Syrupi zingiberis fʒj.
Fiat haustus bis die sumendus.

R. Pulv. ipecac. comp. gr. v.
Mist. cretæ fʒx.
Spirit. cinnam. fʒij.
Syrupi papaveris fʒj.
F. haustus quartâ quâque horâ adhibendus.

R. Aluminis purificati ʒss.
Pulv. kino gr. v.
F. pulvis ter in die sumendus.

R. Pulveris rhei ʒss.
Confect. aromat. ʒj.
Tinct. rhei fʒjss.
Aq. menthæ piper. fʒjss.
Syrupi croci fʒj.
Fiat haustus.

- ℞. Zinci sulph. gr. iii.
Aluminis purificati gr. x.
Infus. rosæ f ʒxij.
Syrupi ejusdem f ʒj.
Fiat haustus sextis horis sumendus.
- ℞. Tinct. ferri muriatis ℥x.
Aq. cinnamomi f ʒij.
F. haustus ter in die sumendus.
- ℞. Terebinth. de chio ʒj.
Kino pulv. ʒss.
Fiant pilulæ xxiv. quarum capiat æger tres ter in die.
- ℞. Potassæ nitratis ʒij.
Aceti communis f ʒij.
Syrupi f ʒij.
Aquæ destill. f ʒxij.
Fiat potio quotidie bibenda.
- ℞. Acidi sulph. diluti f ʒjss.
Syrupi rosæ f ʒij.
Aquæ destill. f ʒiv.
Misce pro potu ordinario.
- ℞. Acidi nitrici f ʒj.
Syrupi rosæ f ʒij.
Aquæ destill. f ʒxiv.
Misce pro potu communi.
- ℞. Plumbi acet.
Opium āā gr. vi.
Sacchari albi. ʒij.
M. divide in chartulas xii. sumat unam bis vel ter die. (Colliquative diarrhœa and sweating of phthisis.)
- ℞. Confect. aromat. ʒj.
Tinct. catechu f ʒj.
Spirit. ammon. comp. f ʒij.
Aquæ cinnamomi f ʒvj.
Syrupi zingiberis f ʒss.
Tinct. opii ℥xl.
Fiat mistura, de qua sumantur cochl. tria magna post singulas sedes liquidas.
- ℞. Cupri sulph.
Opium āā gr. ss.
Confect. rosæ q. s.
Ut fiat pilula ter die sumenda.
- ℞. Acid. sulph. dil. ℥xxx.
Tinct. opii ℥xx.
Syrup. tolut. ʒi.
Aquæ ʒiss.
M. fiat haustus tertiis horis sumendus. (Hæmorrhage.)
- ℞. Acid. sulph. dil. ℥xxx.
Infus. rosæ comp. ʒi.
Syrupi simp. ʒi.
M. fiat haustus tertiis horis sumendus.
- ℞. Confect. aromat. ʒj.
Tinct. catechu f ʒj.
Mist. cretæ f ʒvj.
Syrupi zingiberis f ʒss.
Tinct. opii f ʒss.
Fiat mistura, cujus sumantur cochlearia duo vel tria post singulas sedes liquidas, concusso prius phialo.
- ℞. Confect. opii ʒjss.
Tinct. kino f ʒj.
Syrupi zingiberis f ʒss.
Mist. cretæ f ʒvjss.
Fiat mistura, cujus sumantur cochl. iii. magna post singulas liquidas sedes.
- ℞. Fol. uvæ ursi contus. ʒss.
Aquæ ferventis Oj.
Macera, et cola.
- ℞. Hujus infusionis f ʒvii.
Tinct. kino.
Syrupi zingiberis āā f ʒss.
Fiat mistura quotidie, partitis haustibus, sumenda.
- ℞. Granati baccae cort. ʒss.
Lactis vaccini recent. ℥ii.
M. decocque ad ℥bi. Suman-

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| <p>tur cochl. iii. magna tertiis horis.
(Chronic diarrhœa.)</p> <p>R. Pulv. nucis vomicæ ʒi.
Aquæ ʒviii.
Decoque ad ʒvi. et adde
Tinct. opii mxl.
Fiat mistura cujus sumantur</p> | <p>cochl. i. max. secundis horis. (In
dysentery.)</p> <p>R. Pulv. ipecac. gr. ii.
Alum. gr. vi.
Syrupi papav. q. s.
Ut fiat bolus, quartis horis su-
mendus. (In chronic dysentery.)</p> |
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EXTERNAL APPLICATIONS, &c.

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| <p>R. Zinci sulph. ʒj.
Aquæ destill. f ʒx.
Fiat injectio frigide utenda.</p> <p>R. Zinci sulph.
Alum. purific. āā ʒss.
Aquæ destill. Oj.
Fiat injectio.</p> <p>R. Alum. purific. ʒj.
Decocti querc. Oj.
Fiat injectio.</p> <p>R. Liq. plumbi acet. ʒj.
Mist. camph. ʒij.
Aquæ destill. Oss.
Fiat solutio in rectum opê se-
phunculi injicienda.</p> <p>R. Liq. calcis ʒi.
Olei olivæ ʒii.
Camphoræ ʒii.
M. fiat linimentum. (Superfi-
cial inflammations, burns, &c.)</p> | <p>R. Liq. plumbi diacet. miv—viii.
Aquæ destill. ʒiv.
M. fiat collyrium.</p> <p>R. Liq. plumbi diacetat. ʒss.
Vin. opii ʒi.
Aquæ rosæ ʒviii.
M. fiat collyrium.</p> <p>R. Alum. sulph. gr. viii.—xvi.
Aquæ rosæ ʒiv.
M. fiat collyrium. (In chronic
ophthalmia.)</p> <p>R. Pulv. gallæ ʒi.
Opium pulv. ʒi.
Adipis ʒi.
M. fiat unguentum. (Hæmor-
rhoids.)</p> <p>R. Cort. gallarum ʒss.
Aquæ ʒxviii.
Decoque ad ʒxvi. et fiat injectio.
(In cases of leucorrhœa.)</p> |
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DEPRESSANTS.

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| <p>R. Antim. pot. tart. gr. vi.
Aquæ cinnamom.
Aquæ destill. āā f ʒiii.
Syrup. simplicis ʒii.
M. fiat mistura, cujus sumatur
sexta pars secundis horis.</p> | <p>R. Aquæ destill. ʒx.
Antim. tart. gr. ss.
Syrup. papav. ʒss.
Syrup. croci ʒiss.
Fiat haustus, secundis, tertiis
vel quartis horis sumendus.</p> |
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℞. Antim. pot. tart. gr. ij.
Sacch. albi ʒj.

Misce: fiat pulvis, in partes quatuor æquales dividendus, quarum sumat unam omni horâ.

℞. Antim. pot. tart. gr. i.
Sacch. alb. gr. xxxi.

M. f. pulvis. (This powder admits of easy division into fractional parts, and may be given in doses proportioned to the age, in the inflammatory affections of young children.)

℞. Antim. pot. tart. gr. i.
Hyd. c. cretâ gr. xii.
Sacch. alb. ʒi.

M. fiat pulvis in chartulas viii. dividenda. Sumat i. ter vel quater quotidie. (In cutaneous affections with inflammatory action of the skin, in pertussis and bronchitis of children.)

℞. Tabaci fol. ʒi.

Aq. fervent. ʒviii.

Macera per horam et cola.

Fiat enema. (In ileus, strangulated hernia, tetanus, &c.)

DIAPHORETICS.

℞. Pulv. ipecac. comp. gr. v.

Fiat pulvis diaphoreticus sextâ quâque horâ sumendus, ex haustu salino communi.

℞. Pulv. ipecac. c. gr. x.

Confect. aromat. q. s.

Ut fiat bolus, horâ somni sumendus.

℞. Pulv. ipecac. gr. j.

Pulv. antim. gr. iij.

Hydrarg. submuriatis gr. ½.

Sacch. purificati gr. vj.

Fiat pulvis ex syrupo sumendus.

℞. Hydrarg. submur. gr. ½.

Pulv. Jacobi veri gr. iij.

Pulv. scillæ gr. ¼.

Conservæ rosæ caninæ gr. iij.

Misce, fiat pilula.

℞. Liq. ammon. acet. f ʒiij.

Aquæ destill. f ʒx.

Potas. nitratis gr. viij.

Syrupi aurantii f ʒj.

Liq. antim. pot. tart. ʒxx.

Fiat haustus.

℞. Potas. nitratis ʒj.

Mist. amygd. f ʒjss.

Syrupi rosæ f ʒj.

Misce: fiat haustus.

℞. Potassæ carb. gr. xviii.

Succ. limonis ʒiv.

Aquæ destill. ʒi.

Vin. ant. pot. tart. ʒxx—xxx.

M. fiat haustus tertiis vel quartis horis sumendus.

℞. Spirit. æther. nit. ʒiii.

Vin. ipecac. ʒi.

Mist. camph. ʒv.

Syrup. simp. ʒss.

M. f. mistura cujus sumat cochl. ii. ampla tertiis vel quartis horis.

℞. Vin. colch. ʒss.

Liq. ammon. acet. ʒii.

Mist. camphoræ ʒi.

M. fiat haustus sextis horis sumendus. (Gout and muscular rheumatism.)

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| <p>R. Liq. ammon. acet. ʒss.
Mist. camph. ʒvii.
Syrup. aurantii ʒi.
M. fiat haustus tertiis horis sumendus.</p> <p>R. Ammon. sesquicarb. ʒi.
Aquæ ʒiss.
Syrupi simp. ʒi.
M. f. haustus cum succi li-</p> | <p>monis coch. i. amplo quartis horis repetendus.</p> <p>R. Tinct. guaiaci ammon. ʒi.
Tinct. opii ʒx.
Pulv. tragacanth. ʒi.
Aquæ cinnam. ʒi.
Fiat haustus ter die sumendus.
(Chronic rheumatism.)</p> |
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EXPECTORANTS.

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| <p>R. Liq. antim. pot. tart. f ʒij.
Liq. ammon. acet. f ʒj.
Aquæ menthæ viridis f ʒvss.
Oxymellis ʒss.
Misce; sumat æger cochleare unum magnum quartis vel sextis horis.</p> <p>R. Aceti scillæ ʒij.
Oxymellis ʒij.
Misce; sit dosis cochleare minimum subinde.</p> <p>R. Aceti scillæ f ʒj.
Oxymellis ejusdem f ʒvj.
Aquæ menthæ viridis f ʒvj.
Misce; sumat æger cochleare unum parvum subinde.</p> <p>R. Aceti communis f ʒiss.
Syrupi tolutani f ʒj.
Aquæ destill. f ʒv.
Vini antim. tart. f ʒss.
Misce: sumantur cochl. duo magna frequenter.</p> <p>R. Vini ipecac.
Potassæ carb. āā ʒiss.
Aquæ ʒvi.
M. f. mistura cujus sumantur cochl. ii. ampla cum cochl. uno succi limonis inter effervescentiam tertiis horis.</p> | <p>R. Pulv. scillæ.
—— ipecac. āā gr. x.
Ext. conii ʒss.
M. f. massa in pil. x. dividenda sumat i. ter die.</p> <p>R. Pil. scillæ c.
Ext. conii āā ʒss.
M. f. massa in pil. xx. dividenda. Sumat ii. ter die.</p> <p>R. Vin. ant. pot. tart. ʒi—ʒii.
Tinct. opii ʒii.
Mucil. acac.
Syrup. limon. āā ʒss.
Aquæ ʒi.
M. fiat mistura, sumat cochl. i. vel ii. minim, secundis horis.
(Pneumonia of young children.)</p> <p>R. Assafoetidæ ʒi.
Pulv. ipecac. ʒss.
Scillæ pulv. gr. x.
Sapon. duri.
Syrup. tolut. āā q. s.
Ut fiat pil. xvi. Sumat unum quartis horis.</p> <p>R. Decoct. senegæ ʒi.
Liq. ammon. acet. ʒss.
Syrup. papav. ʒii.
M. fiat haustus quartis horis adhibendus.</p> |
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℞. Sodæ carb. ℥ss.
 Vini ipecac. ℥i.
 Tinct. opii ℥x.
 Syrup. tolut. ℥iii.
 Aquæ ℥iss.
 Fiat mist.: sumat cochl. i. amplum tertiis vel quartis horis.

℞. Decoct. senegæ ℥viii.
 Tinct. camph. comp. ℥i.
 Syrupi zingib. ℥ss.
 Mist. acaciæ ℥i.
 M. fiat mist.: cochl. ii. magna tertiis vel quartis horis sumantur.

℞. Tinct. digital. ℥x.
 Oxymel. scillæ ℥ss.
 Tinct. opii ℥v.
 Mist. camphoræ.
 Aquæ āā ℥ss.
 M. fiat haustus, quartis horis sumendus.

℞. Mist. ammoniaci ℥iv.
 Vin. antim. pot. tart. ℥iii.
 Tinct. camphoræ comp. ℥v.
 Syrup. tolut. ℥i.
 M. fiat mistura: sumat cochl. i. med. urgente tussi.

EMETICS.

℞. Vini antimonii ℥ij.
 Fiat haustus emeticus.

℞. Vini ipecacuanhæ f ℥ss.
 Fiat haustus emeticus.

℞. Pulv. ipecac. f ℥i.
 Aquæ menthæ pip. ℥i.
 M. fiat haustus (to be followed by large and repeated draughts of warm water.)

℞. Pulv. ipecac. ℥i.
 Vin. ant. pot. tart. ℥ii.
 Aquæ menthæ sativ. ℥iss.
 M. f. haustus emeticus.

℞. Vin. ant. pot. tart. ℥i.
 Sumat coch. i. minim vel med. singulis horæ quadrantibus donec supervenerit vomitus.

℞. Zinci sulph. ℥i.
 Aquæ cinnam.
 Aquæ puræ āā ℥ss.
 Fiat emeticus statim sumendus.

℞. Cupri sulph. gr. x.
 Aquæ ℥iss.
 M. f. haustus emeticus statim sumendus.

℞. Tabaci fol. ℥i.
 Aquæ tepidæ q. s.
 Contunde. Fiat epithema epigastrio applicand. (must be removed as soon as sickness takes place.)

℞. Sinapis pulv. ℥ss.
 Aquæ ℥iii.
 M. sumatur dimidium statim, et quod restat post horæ quadrantem si opus sit.

℞. Ammon carb.
 Pulv. ipecac. āā ℥i.
 Tinct. capsici ℥ii.
 Aquæ menthæ pip. ℥ii.
 M. f. haustus emeticus. (These more stimulating emetics are required when the sensibility of the stomach is impaired, as in poisoning with opium.)

LAXATIVES, APERIENTS, CATHARTICS.

℞. Potassæ tartratis ʒss.
 Mannæ optimæ ʒvj.
 Aquæ menthæ viridis f ʒvi.
 Tinct. lavandulæ comp. f ʒss.
 Fiat mistura, cujus sumat æger
 cochl. tria, pro re natâ.

℞. Infus. rosæ f ʒvij.
 Magnesiæ sulphatis ʒvj.
 Syrupi rosæ f ʒss.
 Fiat mistura cujus capiat æger
 cochl. iv. sextâ quâque horâ.

℞. Confectionis aromaticæ.
 Pulveris rhei āā ʒi.
 Aquæ menthæ piper. f ʒxi.
 Tinct. cardamomi ʒjss.
 Syrupi zingiberis ʒj.
 Fiat mist. Sumat cochl. iii.
 magna quartâ vel sextâ quâque
 horâ.

℞. Magnesiæ sulphatis ʒiij.
 Infusi sennæ f ʒxij.
 Syrupi rosæ f ʒij.
 Fiat haustus aperiens.

℞. Aquæ menthæ piper. Oj.
 Rhei pulv. ʒj.
 Magnesiæ calcin. ʒiss.
 Pulv. zingiberis ʒj.
 Sit dosis ʒss ter quaterve in die.

℞. Sodæ carbon. exsic. gr. x.
 Sapon. duri gr. iv.
 Pulv. rhei q. s.
 Fiant pilulæ duæ nocte ma-
 neque sumendæ.

℞. Assafœtidæ gr. vj.
 Pulv. rhei gr. iv.
 Olei anisi m̃ij.
 Fiant pilulæ duæ quartâ vel
 sextâ quâque horâ sumendæ.

℞. Sulphuris loti.
 Potassæ supertartratis, āā ʒj.
 Pulv. jalapæ ʒj.
 Pulv. cinnam. comp. ʒj.
 Mellis vel theriacæ q. s.
 Fiat electuarium cujus sumat,
 cochleare medium bis vel ter in
 die.

℞. Myrrhæ Optimæ ʒss.
 Olei essentialis juniperi m̃i.
 Pulveris rhei q. s.
 Fiat bolus ter in die sumendus.

℞. Potassæ tartratis ʒjss.
 Infusi quassiæ f ʒij.
 Infusi sennæ f ʒiv.
 Tinct. ejusdem.
 Syrupi aurantii, āā f ʒss.
 Fiat mistura, cujus sumat æger
 cochlearia tria magna ter in die.

℞. Saponis duri gr. vj.
 Ext. colocynth. comp. gr. ij.
 Ext. gentianæ gr. ij.
 Pulv. rhei q. s.
 Fiant pilulæ duæ ter in die su-
 mendæ, superbibendo haustu in-
 fusi anthemidis.

℞. Hydrarg. submuriatis gr. j.
 Pulv. rhei gr. vj.
 Saponis duri gr. iv.
 Fiant pilulæ duæ singulis au-
 roris sumendæ.

℞. Radicis armoraciæ cont. ʒij.
 Seminis sinapis.
 Radicis valerianæ āā ʒij.
 ——— rhei incisæ ʒss.
 Infunde in vini hispanici Oij.
 Sæpe agitetur, et coletur usûs
 tempore: cochlearia duo magna
 quartâ quâque horâ sumenda.

- ℞. Pulv. rhei ʒj.
Potas. supertartratis ʒj.
Pulv. cinnam. comp. gr. v.
Fiat pulvis aperiens.
- ℞. Potas. tartratis ʒj.
Pulv. rhei gr. x.
Infusi sennæ f ʒxij.
Syrupi aurantii.
Tinct. cardam. comp. āā f ʒj.
Misce pro haustu aperiente.
- ℞. Pulv. rhei gr. xij.
Pulv. cinnam. comp. gr. v.
Hydrarg. submuriatis gr. iij.
Fiat pulvis aperiens, ex paux-
illo mellis sumendus.
- ℞. Ext. gentianæ.
Ext. colocynth. comp. āā ʒss.
Fiant pilulæ xij. : sit dosis duæ
pro re natâ.
- ℞. Olei ricini f ʒj.
Aquæ hordei f ʒij.
Fiat haustus.
- ℞. Olei ricini f ʒjss.
Vitellum ovi unius.
His rite terendo subactis, adde
paulatim.
Aq. menthæ viridis f ʒv.
Syrupi aurantii f ʒss.
Ut fiant mistura aperiens, de
qua capiat æger cochl. tria omni
bihorio donec alvus soluta sit.
- ℞. Magnesiae sulph. ʒvj.
Mannæ optimæ ʒij.
Aquæ destill. f ʒxij.
Fiat haustus.
- ℞. Potas. tartratis ʒiij.
Mannæ optimæ ʒj.
Aquæ destill. f ʒvj.
Misce : fiat mistura cujus su-
mantur cochl. tria magna tertiâ
quâque horâ, vel pro re natâ.
- ℞. Antimonii tartarisiati gr. j.
Magnesiæ sulph. ʒj.
Aquæ destill. f ʒvjss.
Syrupi aurantii f ʒss.
Solve ut fiant mistura cathar-
tica :—sumantur cochl. tria magna
quolibet bihorio donec alvus bene
purgaverit.
- ℞. Pil. aloes cum myrrhâ gr. vj.
Sapon. duri gr. iv.
Fiant pilulæ duæ nocte ma-
neque sumendæ.
- ℞. Aloes socotrinæ gr. iij.
Sapon. duri gr. vj.
Fiant pilulæ duæ mane seroque
sumendæ.
- ℞. Potass. subcarbon. ʒjss.
Myrrhæ contusæ ʒj.
Aloes socotrinæ ʒjss.
Crocii ʒss.
Aquæ destill. Oj.
Coque ad ʒxij; et liquori co-
lato adde—
Tinct. cardam. comp. ʒiv.
Syrupi zingiberis f ʒjss.
Sit dosis cochl. duo magna bis
die.
- ℞. Hydrarg. submuriatis gr. v.
Pulv. antim. gr. iij.
Pulv. cinnam. comp. gr. ij.
Fiat pulvis catharticus ex sy-
rupo sumendus.
- ℞. Hydrarg. submuriatis gr. ij.
Pulv. antim. gr. iij.
Fiat pulvis catharticus ex sy-
rupo sumendus.
- ℞. Gummi-resin. scammon. gr. iv.
Hydrarg. submuriat. gr. iij.
Sacch. pur. gr. v.
Fiat pulvis catharticus ex paux-
illo mellis sumendus.

℞. Pulv. scammon. comp. ℥ss.
Hydrarg. submuriat. gr. v.
Fiat pulvis catharticus.

℞. Herbæ gratiolæ incisæ ℥iij.
Foliorum sennæ ℥jss.
Ext. glycyrrhizæ ℥iij.
Elect. cassiæ ℥iij.
Aquæ destill. Ojss.

Leniter coque per quadrantem horæ, addendo sub finem cotionis; Myrrhæ optimæ f 3j; Potassæ sulphatis ℥jss: Cola pro usu: et sumat æger cyathum parvum pro re natâ.

℞. Ext. colocynth. comp.
— jalapæ āā 3j.
Gambogiæ ℥ss.
Olei juniperi miv.

Fiant pilulæ xij., quarum sumantur tres omni horâ donec alvus ter quaterve respondeat.

℞. Pil. aloes cum myrrhâ gr. vj.
Pulv. baccæ capsici gr. iij.
Fiant pilulæ duæ.

℞. Hydrarg. submuriat. gr. v.
Fiat pulvis, pro re natâ sumendus ex syrupo vel melle.

℞. Ext. colocynth. comp. gr. vj.
Pil. galban. comp. gr. iij.
Olei carui mij.
Fiant pilulæ duæ.

℞. Pulv. aloes comp. gr. viij.
Olei anisi mij.
Fiant pilulæ duæ.

℞. Tinct. sennæ ℥j.
Vini aloes ℥ij.
Aquæ menthæ piper. f 3iij.
Syrupi zingiberis f 3j.
Misce; sumantur cochl. duo magna pro re natâ.

℞. Potas. tartratis ℥ss.
Infus. sennæ ℥vss.
Tinct. ejusdem f 3jss.
Syrupi zingiberis f 3ss.
Fiat mistura, cujus sumantur cochl. tria magna pro re natâ.

℞. Ext. colocynth. comp. gr. vj.
Hydrarg. submuriatis gr. iij.
Fiat bolus aperiens, vel sint pilulæ duæ.

℞. Pil. aloes cum myrrhâ 3j.
Hydrarg. submuriatis gr. iij.
Fiant pilulæ xij., quarum sumat ægra unam vel duas pro re natâ.

℞. Pulv. aloes cum ferro 3j.
Sapon. duri ℥ij.
Syrupi zingiberis q. s.
Fiat massa in pilulas xxiv., dividenda, quarum sumantur duæ alterna quâque nocte.

℞. Tinct. aloes comp. f 3ss.
Pro dosi alternis auroris.

℞. Pulv. scammoniaæ ℥ss.
Hydrarg. submuriatis ℥j.
Ext. colocynth. ℥j.
Syrupi zingiberis q. s.
Fiat massa in pilulas xij. dividenda, quarum tres pro dosi sumendæ.

℞. Extract. elaterii gr. ij.
Sacch. pur. 3j.
Optime terantur simul, dein in pulveres octo æquales dividuntur, quorum capiat æger unum omni horæ quadrante donec adsit catharsis.

℞. Jalapinæ.
Pulv. rhei āā gr. ii.
— ipecac gr. i.
Olei carui mi.
Fiat pilula omni nocte sum.

ENEMATA.

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| <p>℞. Magnesiae sulph. ʒj.
Aquae frigidae f ʒx.
Fiat enema.</p> <p>℞. Ext. aloes socrotrinae ʒj.
Lactis communis ʒvj.
Solve pro enemate.</p> <p>℞. Ext. colocynth. ʒj.
Infus. sennae f ʒxij.
Fiat enema.</p> <p>℞. Infus. anthemidis f ʒx.
Sodae sulphatis ʒj.
Fiat enema purgans.</p> | <p>℞. Decoct. althaeae f ʒx.
Sodae sulphatis ʒvj.
Olei olivae f ʒj.
M. f. enema purgans.</p> <p>℞. Decocti seminis avenae f ʒxij.
Sodae sulphatis ʒj.
Olei olivae f ʒjss.
Fiat enema purgans.</p> <p>℞. Scammoniae pulverisatae ʒss.
Sapon. duri ʒjss.
Aquae ferventis f ʒviij.
Fiat enema quartâ quâque nocte injiciendum.</p> |
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DIURETICS.

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| <p>℞. Pilulae scillae gr. vj.
Pilulae hydrarg. gr. ijss.
Fiant pilulae duae nocte maneque sumendae.</p> <p>℞. Pulv. digitalis gr. j—ij.
Hydrarg. submuriatis gr. ¼.
Pilulae scillae gr. vj.
Fiat bolus ter in die adhibendus.</p> <p>℞. Infus. armoraciae comp. f ʒxij.
Spir. æther. nitrici f ʒj.
Syrupi aurantii f ʒj.
Fiat haustus ter in die sumendus.</p> <p>℞. Potas. acet. ʒj.
Infus. quassiae f ʒxij.
Tinct. digitalis m̄x.
Fiat haustus ter in die sumendus.</p> | <p>℞. Potas. acet. ʒss—j.
Syrupi simplicis ʒijj.
Spir. æther. nitros m̄xx—ʒss.
Sit dosis ʒj bis vel ter in die.</p> <p>℞. Copaibae f ʒss.
Vitellum unius ovi.
Sacch. pur. ʒj.
His bene subactis terendo, adde paulatim.
Aquae menthae viridis f ʒvj.
Ut fiant emulsio, cujus capiat æger cochl. tria magna ter in die.</p> <p>℞. Terebinth. de chio gr. iii.
Sapon. duri gr. iv.
Pulv. calumbae q. s.
Fiant pilulae duae ter in die sumendae.</p> <p>℞. Potassae nitrat. ʒii.
Mist. amygdal. lbii.
Solve fiat emulsio. Sit dosis cochl. iii. magnâ omni horâ.</p> |
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R. Potassæ nit. gr. x.
 ——— bitartrat gr. xv.
 Pulv. acac. gr. x.
 Sacch. ʒss.
 M. fiat pulvis ex hordei decocti
 tepidi cyatho quartis vel tertiis
 horis sumendus.

R. Potassæ bitart. ʒii.
 Aquæ fervent. lbii.
 Cort. limon. et sacch. q. s. ut
 fiat potus communis.

R. Pil. scillæ comp. ʒi.
 Hyd. chloridi gr. v.
 M. divide in pil. xx. Sumat
 duas mane nocteque.

R. Infus. digital. ʒiv.
 Potassæ acetat. ʒi.
 Spirit. æther. nit. ʒi.
 Liq. ammon. acet. ʒv.
 M. fiat haustus sextis vel quartis
 horis sumendus.

R. Junip. Bacc. contrit. ʒii.
 Sem. anisi contus. ʒii.
 Aquæ fervent. lbj.
 M. macera per horis tres et cola:
 sumat æger cyathum subinde.

R. Pulv. jalapæ c. ʒj—ʒss.
 Hydrarg. subm. ʒss.—ʒj.
 Pulv. scillæ.
 Pulv. digitalis āā gr. j—ij.
 ——— cinnam. comp. ʒj.
 ——— sacchari puri ʒss.
 Tere intime et divide in char-
 tulas decem, quarum sumat unam
 mane nocteque nisi alvus soluta
 sit. (Diuretic and purgative.)

R. Tinct. ferri muriat. ℥xii.
 ——— hyoscyami ℥xx.
 Sumatur omni horæ quadrante
 donec supervenerit urinæ fluxus.
 (Retention of urine, dysuria, &c.)

R. Spartii cacumin. concis ʒi.
 Aquæ lbj.
 M. decoque ad dimidium, cola,
 et adde
 Spirit. æther. nit. ʒii.
 Syrup. zingiberis ʒvi.
 M. fiat mist. Sumat cochl. duo
 ampla alternis horis.

R. Uvæ ursi ʒiss.
 Sodæ carb. exsicc. ʒss.
 Pulv. cinnam. c. ʒss.
 Confect. rosæ ʒss.
 Syrupi q. s.
 Ut fiat electuarium, cujus su-
 matur cochl. i. amplum omni
 horâ, vel alternis horis. (Chronic
 inflammation of the kidneys and
 bladder, calculous affections, &c.)

R. Acet. colch. ʒss.
 Potassæ acet. ʒii.
 Aquæ fœnic. ʒvii.
 Spirit. junip. comp. ʒss.
 M. fiat mistura. Sumat cochl.
 ii. magna ter die.

R. Infus. diosmæ crenatæ (bu-
 chu) ʒviii.
 Tinct. diosmæ.
 Spirit. junip. c. āā ʒss.
 M. fiat mistura. Sit dosis cochl.
 ii. ampla.

R. Decoct. uvæ ursi.
 Liq. calcis āā ʒiv.
 M. sumat cyathum vinosum
 quater in die.

R. Infus. pareiræ ʒviii.
 Acid. nitr. dil. ℥xl.
 Tinct. hyoscyami ʒii.
 M. fiat mistura cujus sumatur
 cochl. iii. magna ter quaterve in
 die.

ANTHELMINTICS.

℞. Ol. terebinth. ℥ss—℥ii.

Decoct. hordei ℥i.

M. fiat haustus. (In tænia.
The dose to be repeated every morning, or every other morning, for three or four times in succession, and followed at the end of two hours by a full dose of castor oil.)

℞. Ol. terebinth. ℥ss.

Ol. ricini ℥i.

M. fiat haustus. (In tænia.)

℞. Dolichi pubis mucunæ ℥i.

Theriaca ℥i.

M. fiat electuarium. Sit dosis cochl. i. min. omni mane. (In lumbrici and ascarides: should be followed by an occasional purgative.)

℞. Hydr. chloridi gr. vi.

Jalapæ pulv. ℥i.

M. fiat bolus. (In tænia.)

℞. Stanni pulv. ℥i.

Ext. artem. absinth.

Pulv. jalapæ āā ℥i.

Syrupi simp. q. s.

Ut fiat massa in bolos xii. divid.
Sumat unum, singulis semi-horis donec bene dejecerit alvus.

℞. Pulv. rad. granati cort. ℥ss.

Divide in pulv. vi. Sumat unum omni semi-horâ ad sextam vicem. (The last dose should be followed by an aperient. In tape-worm.)

℞. Semin. santonici

——— tanaceti āā ℥ss.

Pulv. valer.

—— jalap.

Sulph. potass. āā ℥ii.

Oxymel. scillæ q. s.

Ut fiat electuar. Sumat cochl. i. min. omni nocte maneque. (Lumbrici and ascarides.—*Bremser*.)

℞. Artemesiæ santonicæ ℥i.

Hydrarg. chlorid. gr. vi.

Pulv. rhei ℥ss.

Camphoræ gr. xii.

Syrup. simp. q. s.

M. divide in bolos ii. Sumat unum mane, et alterum post horas sex, nisi prius bene dejecerit alvus.

℞. Cort. rad. granati ℥ii.

Aquæ lbii.

Macera per horis xxiv, et decoque ad lbj. Huic adde—

Syrupi zingib. ℥i.

M. divide in partes tres. Sumat unam omni semi-horâ ad tertiam vicem.

℞. Decoct. felicis. maris ℥iv. (℥iss ad lbj.)

Æther sulph. ℥i.

M. fiat haustus mane sumendus. (This may be followed up by an enema containing the same ingredients.)

ENEMATA.

℞. Absinthii.
 Tanacetī āā ℥iii.
 Valer. rad. contrit. ℥ii.
 Cort. aurant. ℥i.
 Aquæ fervent. ℥viii.
 Macera per horam et cola. Fiat
 enema nocte manequē injicien-
 dum. (In ascarides.)

℞. Mist. assafœt.
 Lactis Vacc. āā ℥iv.
 M. fiat enema, h. s. injic.

℞. Tinct. ferri mur. ℥iv.
 Aquæ ℥viii.
 M. fiat enema. (Ascarides; a
 purgative of calomel and jalap
 being given simultaneously, —
Darwell,—and camomile tea be-
 ing drunk thrice a day for a fort-
 night afterwards.)

℞. Ol. terebinth. ℥i.
 Decoct. amygli ℥viii.
 M. fiat enema, h. s. utendum.

EMMENAGOGUES.

For this class of remedies, see Tonics, especially those containing steel, myrrh, and aloes. The stronger emmenagogues, such as savin, are rarely used. A stimulant injection containing ℥xii of liquor ammoniæ to ℥iss of warm milk has been recommended.

ANTACIDS.

℞. Liq. potassæ ℥xx.
 Mist. cretā ℥i.
 Tinct. calumbæ ℥i.
 M. fiat haustus ter die sumen-
 dus.

℞. Liq. potassæ ℥ii.
 Liq. calcis ℥vi.
 M. fiat mistura. Sumantur
 cochl. i. vel ii. ampla e jusculi
 tenuis poculo. (In acidity, with
 tendency to lithic acid deposit
 in the urine.)

℞. Liq. calcis ℥viss.
 Liq. potassæ ℥iss—ij.
 Magnesiæ calcin. ℥j.
 Mellis ℥j.
 Olei menthæ pip. ℥v.
 Sit dosis cochl. ampl. ter qua-
 terve in die.

℞. Liq. potassæ f ℥ij.
 Liq. calcis f ℥vjss.
 Magnesiæ calcin. ℥j.
 Misce: capiat æger cochleare
 magnum bis in die ex poculo jus-
 culi bovini.

℞. Potassæ carb. gr. x.
 Infus. gent. comp. ℥iss.
 Tinct. cascarillæ ℥i.
 M. fiat haustus ter die sumen-
 dus.

℞. Sodæ carb. exsicc. ℥iss.
 Pulv. cinnam. comp.
 Saponis āā ℥ss.
 Balsam. Peruv. q. s.
 Ut fiat pil. xxx. Sumat iij.
 ter die.

R. Liq. calcis.
Lactis. vac. āā ʒvi.
M. sit pro potu.

R. Magnes. ʒi.
Aquæ menthæ pip. ʒxv.
Tinct. aurantii ʒi.
M. fiat haustus p. r. n. sumendus.

R. Magnes. sulphat. ʒi.
—— carb. gr. x.
Aquæ menthæ pip.
Infus. gent. comp. āā ʒvi.
M. fiat haustus ter die sumendus. (Antacid and aperient.)

R. Magnes. carb. ʒii.
Pulv. rhei ʒii.
Spirit. ammon. arom.
Syrup. zingib. āā ʒiv.
Aquæ cinnam.
Aquæ puræ āā ʒiiiiss.
M. fiat mistura cujus sumantur
cochl. ii. ampla ter quotidie. (In
gastralgia, pyrosis, &c.)

R. Tinct. opii ʒii.
—— rhei
—— humuli āā ʒiii.
M. Sit dosis ʒxxx. ter die ex
aquæ cyatho parvo.

DEMULCENTS AND EMOLLIENTS.

R. Camphoræ.
Potassæ nitr. āā ʒi.
Pulv. acaciæ ʒi.
Mist. amygd. ʒvi.
M. fiat mistura. Sumat cochl.
duo ampla secundis vel tertiis
horis. (Chordee, strangury, &c.
with diluents.)

R. Cetacei ʒii.
Vitel. ovi unius.
Syrup. tolut. ʒss.
Aquæ cinnam. ʒiss.
Aquæ ʒiv.
Fiat mistura. Sumat cochl.
i. amplum subinde. (Bronchitis.)

R. Potassæ nitr. ʒii.
Mannæ opt. ʒi.
Infus. lini comp. Oii.
M. fiat mistura cujus sumat
cyathum vinosum subinde. (In
gonorrhœa.)

R. Acaciæ gummi ʒss.
Aquæ lbii.
Solve. Sit pro potu communi.

R. Cornu cervi rament. ʒiv.
Micæ panis ʒi.
Aquæ lbii.
Decoque ad bibras ii. Cola.
Adde—
Syrup. simp. ʒii.
Aquæ cinnam. ʒss.
M. Sumat subinde cochl. ii.
vel iij. ampla. (In chronic
diarrhœa, and in advanced stages
of inflammatory affections when a
little nutriment is required.)

R. Althææ offic. ʒi.
Aquæ bullient lbij.
Syr. symp. q. s.
Sit pro potu ad libitum. (In
affections of the urinary organs.)

R. Ichthyocollæ ʒii.
Aquæ lbii.
Decoque ad lbj. Cola et adde
Lactis vaccini lbj.
Sacchari ʒi.
M. Sumat cochl. iii. vel iv.
ampla subinde. (Demulcent and
nutritive.)

EXTERNAL APPLICATIONS.

R. Decoct. althææ rad. ℥j.
 Liq. plumbi diacet. ʒi—ʒii.
 M. fiat lotio. (In various forms
 of cutaneous disease, as lichen
 eczema and impetigo.)

R. Feculæ tuber. solani.
 Decoct. rad. althææ āā q. s.
 M. et coque ad spissitudinem
 idoneam pro cataplasmate.

R. Furfuri tritici ℥iv.
 Aquæ frigidæ ℥xii.
 M. coque simul, cola, et adde
 balneo tepido. (To form an emol-
 lient bath in acute cutaneous dis-
 eases.)

R. Decoct. dulcamaræ.
 ——— althææ āā ℥ss.
 M. fiat lotio. (In cutaneous
 diseases with much irritation of
 the skin.)

ALTERATIVES.

(Including Antisiphilitic, Antiphlogistic, and Deobstruent Remedies.)

R. Hydrarg. c. cretâ ʒi.
 Antim. pot. tart. gr. i.
 Sacchari ʒi.
 M. f. pulvis in chart. xii. Dis-
 tribuendus. Sumat i. ter die.

R. Hydrarg. c. cretâ ʒss.
 Pulv. ipecac. gr. x.
 ——— rhei ʒii.
 ——— cinnam. c. gr. x.
 Sacchari albi ʒi.
 Divide in pulv. x. Sumat
 unum bis terve in die.

R. Hydrarg. chloridi gr. ¼.
 Ext. opii gr. ss.
 Confectionis rosæ q. s.
 Fiat pilula ter in die sumenda.

R. Hydrarg. chloridi gr. ½.
 Sulph. antim. præcipit. gr. ½.
 Confectionis opii q. s.
 Fiat pilula ter in die sumenda.

R. Hydrarg. chloridi.
 Sulph. antim. præcipit. āā ʒj.
 Terantur simul in mortario

per horam unam integram ut fiat
 pulvis subfuscus.

R. Hujus pulveris gr. j.
 Confectionis rosæ gr. v.
 Misce ut fiat pilula ter in die
 sumenda.

R. Hydrarg. chloridi gr. j.
 Ext. conii gr. iij.
 Misce ut fiat pilula ter in die
 sumenda.

R. Pulv. opii.
 Hydrarg. chloridi āā gr. ¼.
 Pulv. antim. gr. iij.
 Fiat pulvis, octavâ quâque horâ
 sumendus, ex pauxillo mellis.

R. Pil. hyd. chlor. comp. ʒss.
 Ext. sarsæ.
 Ext. tarax. āā ʒi.
 Divide in pil. xxx. Sumat ij.
 ter die.

- R. Pilulæ hydrarg. gr. j.
Guaiaci gummi resinæ gr. viij.
Mucilaginis acaciæ q. s.
Fiant pilulæ duæ ter in die sumendæ.
- R. Hydrarg. bichlorid. gr. ii.
Spirit. rectific. ʒss.
Aquæ destill. ʒiiss.
M. fiat mistura. Sumat cochl. unum min. e cyatho decocti hordei vel aquæ edulcoratæ quotidie.
- R. Hyd. bichlorid. gr. i.
Tinct. cinchon. ʒii.
Solve. Sumat cochl. i. min. bis die in cyatho infus. anthem. (In scrofula.)
- R. Potassæ iodidi gr. v.
Infus. quassiæ ʒi.
M. fiat haustus, ter die sumendus. (Secondary syphilis.)
- R. Tinct. iodinii comp. mxx.
Aquæ destill. ʒi.
M. f. haustus ter die sumendus. (The dose may be gradually increased.)
- R. Potassii iodidi gr. ii.
Iodinii gr. i.
Aquæ destill. ʒviii.
M. fiat mist. Sumat tertiam partem ter quotidie. (For children under seven years.)
- R. Ferri iodidi gr. ii.
Aquæ destill. ʒi.
Syrup. sim. ʒi.
M. fiat haustus ter die sumendus.
- R. Syrupi ferri iodidi mxxx—
ʒi ter die ex aquæ cyatho.
- R. Plumbi iodidi gr. iv.
Confect. rosæ q. s.
Ut fiat pil. xii. Sumat unam nocte maneque.
- R. Ferri iodidi ʒss.
Ext. gentianæ ʒiss.
M. fiat massa in pilulas xxiv. divid. Sumantur duæ vel tres ter die.
- R. Hyd. iodidi gr. i.
Ext. sarsæ.
— gentianæ aa ʒi.
M. fiat massa in pil. x. distribuenda quarum sumatur una ter die.
- R. Hyd. biniodidi gr. i.
Ext. glycyrrh. ʒss.
M. et divide in pil. xvi. quarum sumat æger i. bis vel ter die.
- R. Potassii bromidi gr. xii.
Syrup. tolut. ʒi.
Aquæ destill. ʒiii.
M. fiat mistura, cujus sumatur cochl. i. magnum ter die.
- R. Auri chloridi gr. v.
Ext. gentianæ.
— sarsæ aa ʒii.
M. fiat massa in pil. c. distrib. sumat unam bis terve quotidie.
- R. Ext. sarsaparillæ ʒj.
Decoct. sarsaparillæ f ʒxiv.
Fiat haustus ter in die sumendus.
- R. Ext. sarsaparillæ ʒj.
Decoct. ejusdem comp. f ʒxiv.
Fiat haustus ter in die capiendus.
- R. Stipitum dulcam. contus. ʒj.
Rad. glycyrrhizæ contusæ ʒj.
Aquæ destill. Ojss.
Coque per quadrantem horæ, dein cola. Bibat æger libram dimidiam quotidie, partitis haustibus.

℞. Rad. sarsaparillæ.
 Ligni sassafras incisi.
 ——— santali rubri.
 ——— guaiaci excisi āā ʒjss.
 Radicis mezerei.
 Seminum coriandri āā ʒss.
 Aquæ destill. Ox.
 Decoque ad octarios quinque:
 capiat æger octarium unum quo-
 tidie, partitis haustibus.

℞. Rad. sarsaparillæ jamecen.
 concisæ ʒiv.
 Glycyrrhizæ ʒss.
 Liq. calcis Oij.
 Macera per horas viginti qua-
 tuor in vase vitreo optime oper-
 culato, et in loco frigido et ob-
 scuro; dein cola in usum. Hu-
 jusce infusionis sumatur quotidie
 dimidium partitis vicibus.

EXTERNAL APPLICATIONS.

(Containing Mercury, Iodine, &c.)

℞. Camphoræ ʒj.
 Unguenti hyd. fortior. ʒss.
 Fiat unguentum, de quo illi-
 nantur gr. x. omni nocte in extre-
 mitates.

℞. Camphoræ gr. v.
 Unguenti hyd. fortior. ʒj.
 Fiat unguentum, in regionem
 hepatis alterna quâque nocte, il-
 linendum.

℞. Iodinii pulveris ʒj.
 Potass. hydriodatis ʒij.
 Morphæ acetatis gr. iv.
 Unguenti hyd. fortior. ʒj.
 Fiat unguentum, cujus fricetur
 regio hepatica drachmâ nocte ma-
 neque.

℞. Iodinii ʒii.
 Potassii iodidi ʒss.
 Aquæ destill. ʒviii.
 M. fiat embrocatio. (A bath
 may be formed by adding this to
 about forty gallons of water.)

℞. Potass. iodidi gr. vi.
 Iodinii gr. iii.
 Aquæ destill. ℥bj.
 Solve; fiat collyrium. (Scro-
 fulous inflammation of the eye.)

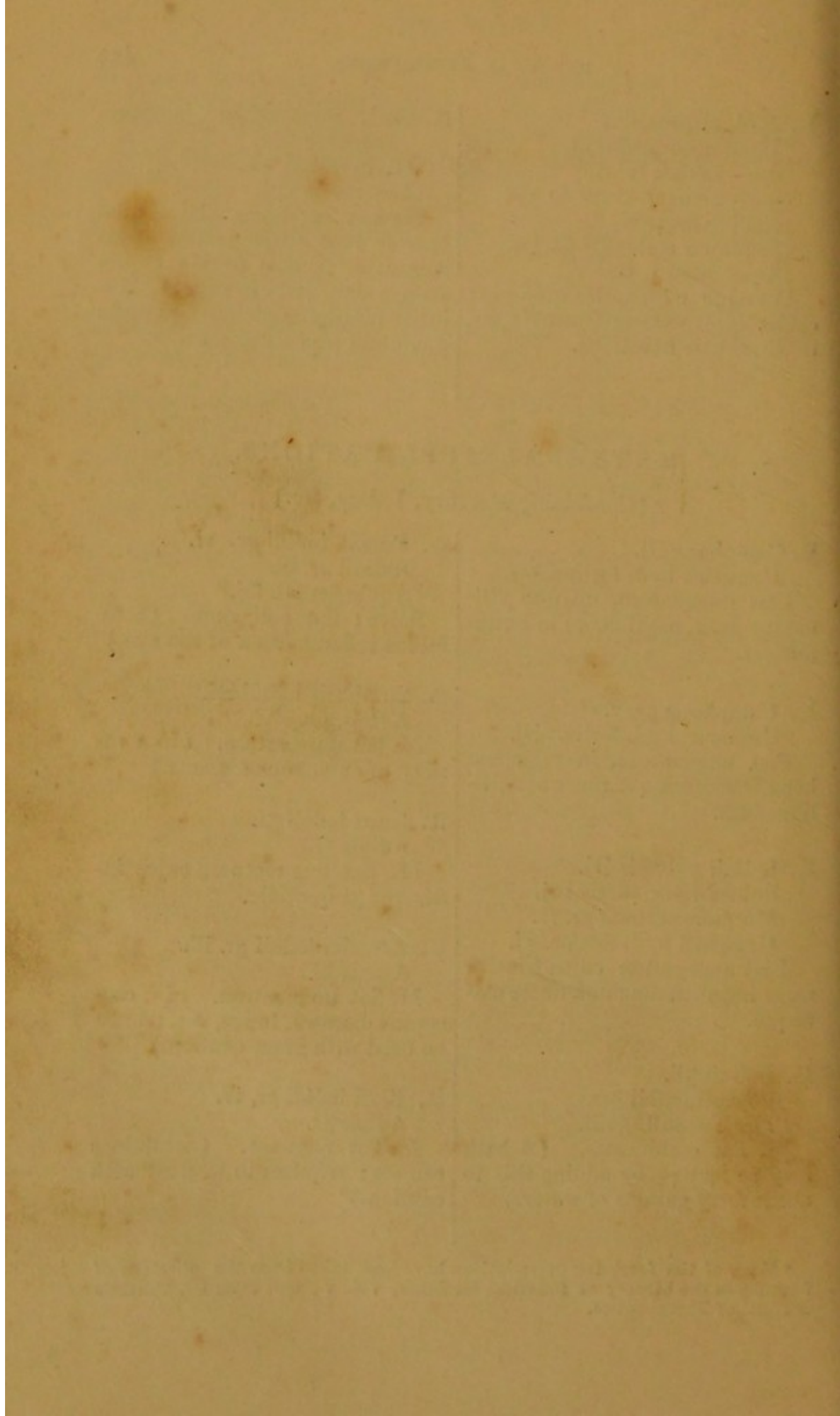
℞. Sulphuris iodidi ʒi.
 Adipis ʒss.
 M. fiat unguentum. (In a va-
 riety of cutaneous diseases.)

℞. Zinci iodidi ʒi.
 Adipis ʒi.
 M. fiat unguentum, cujus in-
 fricetur ʒi quotidie.

℞. Arsenici iodidi gr. iii.
 Adipis ʒi.
 M. fiat unguentum. (In can-
 cerous diseases, lupus, &c.; must
 be used with great caution.)

℞. Barii iodidi gr. iv.
 Adipis ʒi.
 M. fiat unguent. (Scrofulous
 tumors; requires to be used with
 caution.)*

* Many of the foregoing prescriptions have been taken from the collection of formulæ in the Library of Practical Medicine, vol. v., and from Dr. Spillan's Manual of Therapeutics.



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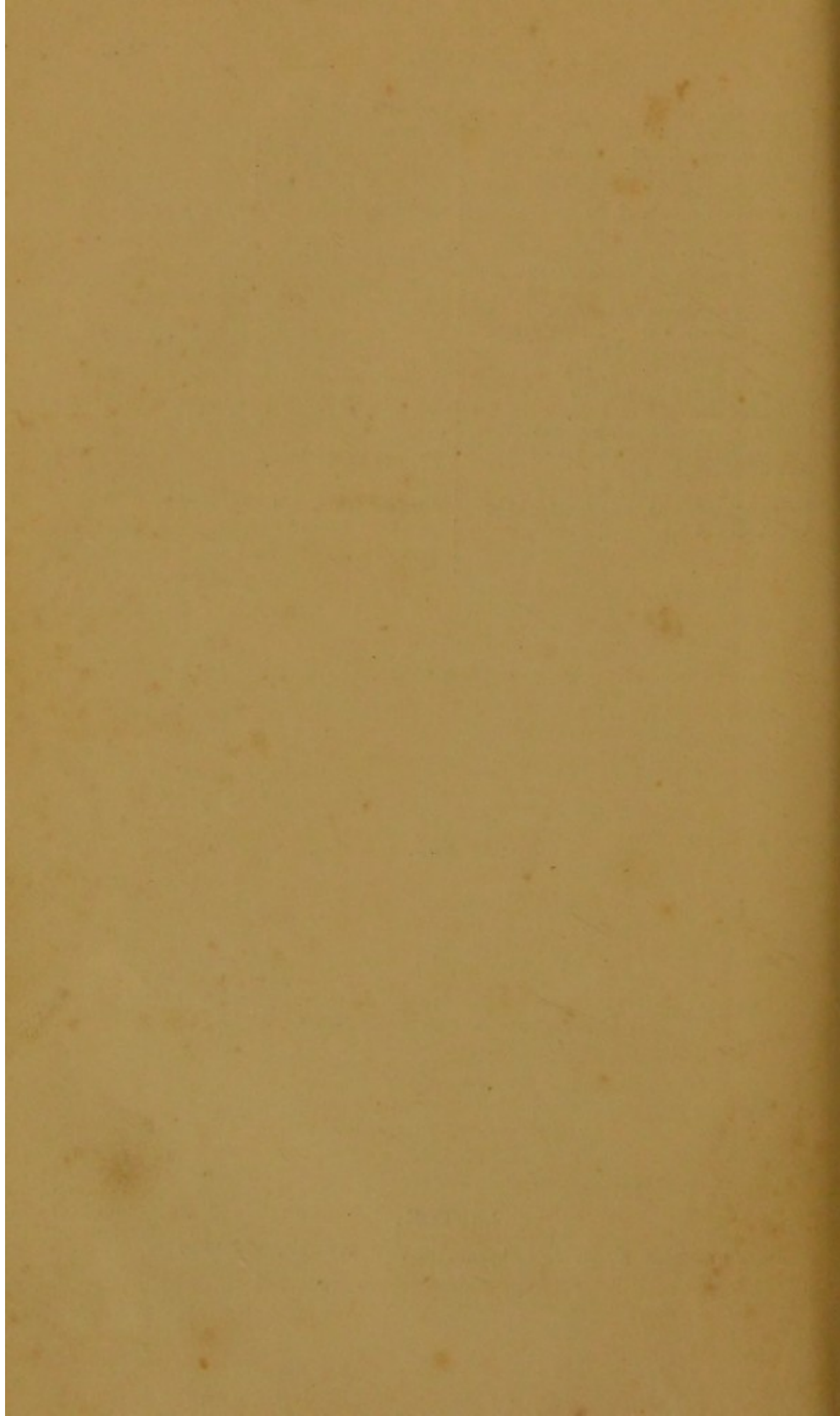
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