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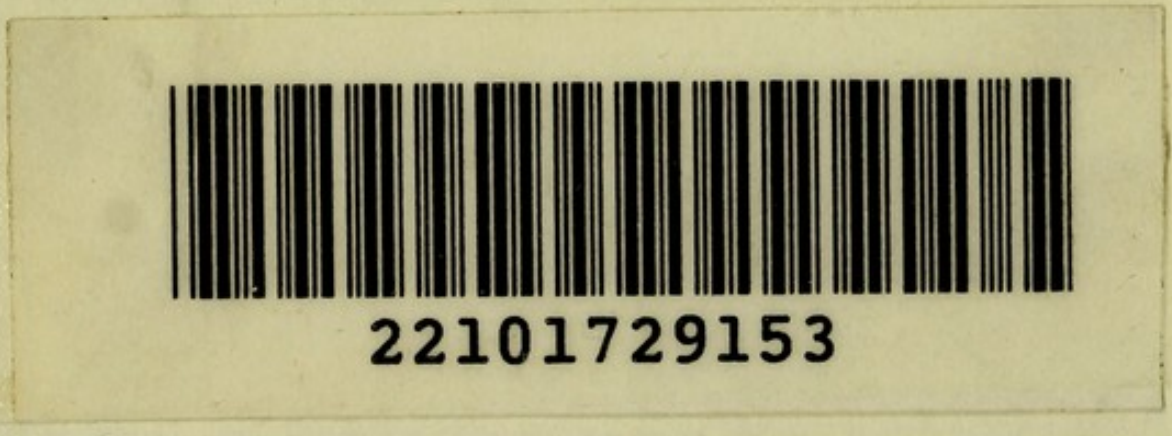
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A MANUAL

OF

MEDICAL DIAGNOSIS:

BEING

AN ANALYSIS

OF

THE SIGNS AND SYMPTOMS OF DISEASE.

BY

A. W. BARCLAY, M.D.

CANTAB. & EDIN.,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS; PHYSICIAN TO ST. GEORGE'S HOSPITAL, ETC. ETC.



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PREFACE TO THE THIRD EDITION.

A VERY large Edition of the Manual has been exhausted, and it has been for some time out of print. The delay which has occurred in the issue of a fresh Edition has been caused by my anxiety to bring it into harmony with the Nomenclature of Diseases issued by the College of Physicians of London. The classification employed in that work must, I presume, be more or less generally adopted in spite of any errors at present existing, which will, no doubt, be corrected in any future issue, and it seemed to me desirable to place the facts connected with the diagnosis of disease before the student in nearly the same order as that which he may have to adopt in recording the results of his practice.

I have endeavoured to condense as much as possible those portions of the Manual which are reproduced in this Edition, but the introduction of a good deal of fresh matter, which was unavoidable in its reconstruction, has unfortunately somewhat increased its bulk. Those who know the rapid strides which medicine has

made of late years will, perhaps, be disposed to think that I might have still added to the volume with advantage, while those who think that too much is expected and required of the student would have gladly seen its dimensions very much curtailed. I shall very much regret if, by an error in either direction, I have failed to produce a safe and intelligible guide to the student in seeking to make himself familiar with the signs and symptoms of disease. This object would not have been fulfilled by a mere summary of pathological conditions or diagnostic signs, but may be equally frustrated by too great an elaboration of details. The extensive alterations which have been made have not, as I am fully aware, sufficed to correct the errors in both directions into which I have been led by certain subjects being more familiar to my own mind than others which have not come so constantly before me; and the error is probably exaggerated by the fact that the volume is mainly the result of experience and practical observation.

Such as it is, I once more submit it to the friendly criticism of those who are making the study of disease the object of their life.

A. W. B.

Bruton Street, Berkeley Square;
September, 1870.

PREFACE TO THE SECOND EDITION.

The very early period at which a call has been made for a Second Edition of this Manual has prevented my attempting anything in its revision beyond verbal alterations and minor additions: in its plan and details the work remains the same.

The rapid sale of the first edition proves that I was not in error in supposing that such an aid to clinical study would be acceptable to the younger members of the profession. And while I take this opportunity of expressing my gratitude for the hearty good will with which my effort to supply an acknowledged deficiency has been received, and for the kindly tone of all the criticisms which have reached me; I cannot but feel that it owes its success more to the earnestness of purpose which characterises the students of the present day than to any merit of its own. Conscious of its many imperfections, I hail its success as an omen for the future of yet higher aims and nobler efforts to place the science of medicine on a sure and

solid foundation; and it will be my greatest reward to have contributed in any way to make its study more methodical, more exact, more logical, and thus to give stability to its doctrines and certainty to its practice.

A. W. B.

Bruton Street, Berkeley Square;
December, 1858.

PREFACE TO THE FIRST EDITION.

In adding another to the many manuals already in the hands of students, a few words of explanation, and perhaps of apology, are necessary.

The want of that instruction which it is meant to convey was felt by myself in the commencement of my studies, and many diligent students have expressed in my hearing a wish for some guide to the systematic investigation of cases in the wards of the hospital. This branch of medical study has been very successfully cultivated on the Continent, and the English student, while conscious of a culpable neglect of the curative powers of remedies, cannot fail to be struck with the precision and clearness with which a clinical professor in Paris conducts the examination of his patients.

When in 1847 the duties of medical registrar were entrusted to me by the Governors of St. George's Hospital, a large field of study in this department was opened to me; by the kindness and courtesy of the physicians I was always assisted in deciding on the nature of an obscure case; while the examinations

after death so constantly practised, either ratified or corrected the opinion that had been formed. During the period that I held the office, more than twelve thousand patients came under my notice, and the construction of a new register of disease, classified on the plan adopted in this volume, led to a more earnest attention to methods of diagnosis.

In offering to those now engaged in study the observations here embodied, I have only committed to writing the system of investigation which it became my habit to pursue: and if it lead them to a more familiar acquaintance with disease, and a better understanding of treatment, my time will not have been misspent. I have endeavoured to arrange in a larger type the general and more important considerations on which diagnosis is based, elaborating the details, and enumerating the points of less importance in type of a smaller size. It seemed desirable that my younger readers should not in the first instance be perplexed by the number and variety of symptoms, while at the same time they should be furnished with all particulars on any subject which they wished to study more closely.

I cannot attempt to trace back to their source all the suggestions received from the writings of others, and from oral instruction, or to separate such suggestions from the ideas which have occurred to myself in prosecuting this subject: and I trust that it will be

understood that, in omitting all reference to authorities, there is no intention on my part either to claim the merit of originality or to appropriate unacknowledged the labours of others. If any of my esteemed friends and teachers in the Profession should find their own ideas or expressions repeated in this volume, it is only because these ideas have become established as truths in my own mind, and the expressions in which they are conveyed have become their habitual and almost necessary exponents. That such a manual should be free from faults, the utmost stretch of self-satisfied vanity could never lead me to believe; I hope that they will be found to be errors of omission rather than of commission,—that in the main the principles will be admitted by all to be true, while none of the details are calculated to mislead.

A. W. B.

Bruton Street, Berkeley Square;
October, 1857.

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Outline of the Particulars which a Clinical Clerk ought to attempt to enumerate in the History of each Case which he records.

Address—Name—Age—Sex—Civil State—Occupation.

History:—

a. Of present attack.
b. Of previous illness.

Present state:—

1. General symptoms:
   a. Skin; as to heat and dryness.
   b. Pulse; as to frequency, force, and fulness.
   c. Tongue; as to coating and moisture.
   d. Bowels and urine.
   e. Appetite and thirst.
2. Appearance:
   a. Size.
   b. Aspect and expression.
   c. Colour.
3. Position or posture:
   a. In bed.
   b. Out of bed—Gait and manner.
4. Sensations.

Survey of regions and organs:—

1. Innervation:
   a. Brain.
   b. Nerves.
2. Respiration.
3. Circulation:
   a. Heart.
   b. Blood-vessels.
4. Digestion:
   a. Assimilation.
   b. Excretion—Character of stools—Analysis of urine.
5. Reproductive organs:
   a. Syphilitic affections.
   b. Menstrual function—Number of children—Date of last pregnancy—Diseases of uterus.

INTRODUCTION.

The Province of Diagnosis—Symptoms, Various and Complex—Error of Pathognomonic Signs—of Neglect of Diagnosis—Object of this Treatise—True Basis of Diagnosis—in Correct Evidence and Knowledge of Diseases—Compound Causes—Relation to the Theory of Disease.

THE ultimate object of study in all departments of medicine—the object which must ever be kept in view alike by teacher and pupil—is the relief of the patient by the successful treatment of disease. To this end the properties of various remedial agents are taught in Materia Medica, as they possess the power of neutralizing or eliminating poison, of counteracting morbid action in its progress or modifying its results, and of aiding and sustaining the powers of life, when those wonderful laws of our economy come into operation, by which the destructive agency of noxious influence is combated, and the useless and effete or injured tissues are extruded from the body. To the same end the student must acquire a knowledge of the various structures of the body and the functions of its organs in health, as well as the pathological changes in solids and fluids, which become the subjects of anatomical research, and the perversions of healthy functions which may be traced at the bedside in the progress of disease; these belong to the domain of Physiology and Pathology. The theory of disease, again, combines, by the aid of experience, the perversion of function with the change of structure, deducing the symptoms observed as a necessary sequence from the disturbance of the laws of health to which such changes must give rise; but it also teaches us that there are other and more hidden elements of disease, stamped, in their operation on the human frame, with characters no less marked and distinct, which have yet evaded our most diligent search. This department divides itself into two branches: it points out the alliances and differences between various forms of disease and the prominent features by which they are characterized, and to this the name of Nosology has been applied; while under

the name of Semeiology it especially treats of the symptoms of diseased action which each organ or region of the body is capable of manifesting. It is the province of Diagnosis to combine together these various lessons, and by the application of the symptomatology of disease in general to any particular case, to arrive at a just conclusion regarding its true nature and pathology: and though it does not enter directly on the question of treatment, it has regard to all those indications on which it ought to be based.

In the present imperfect condition of the science of medicine, too much importance can scarcely be assigned to the study of diagnosis, which, in its higher and more intricate departments, by separating the known from the unknown in our experience, may yet point out new relations between morbid phenomena and structural change; and by enabling us to discriminate the finer shades of difference which distinguish various forms of allied diseases, must lead to a more perfect classification. Upon the basis of such trustworthy generalizations, we may hope ultimately to arrive at a more perfect knowledge of the causes which operate in the production of each, by successive elimination of those that are proved not to be essential, or, as they may be called, efficient causes.

But on this question we are not to enter. Our endeavour must be limited to laying down rules by which the student may be able to recognise at the bedside the diseases which he has been already taught in the schools. And however captivating the study of diagnosis must be to every thoughtful mind, dealing as it does with facts which can be more readily appreciated than those which result from the action of remedies; however gratifying to the observer to call into legitimate exercise the highest mental functions, and to be enabled to pronounce a judgment upon the evidence presented to him, which subsequent events shall prove to have been correct, it must still be remembered that this is but a means to an end. When elevated out of its true place, it only leads to the "médecine expectante;" which, boasting of its knowledge of disease, either leaves the patient to die unrelieved or to struggle unassisted through his malady; or it raises the practitioner into a position of self-satisfied vanity, which, pretending to a kind of omniscience, causes him to overlook any fact or argument opposed to his conclusion, until death reveal how great and how fatal was the error. When neglected or despised, it produces that trifling treatment of symptoms arising in the course of a disease, when the more deep-seated or more distant cause for their production has been missed, and when, unfortunately, both patient and practitioner are often deluded into the idea that a disease has

been cured or eradicated, of which only the most prominent or most distressing symptoms have been alleviated.

Thus guarded, however, diagnosis is to the student the best, nay, the only legitimate introduction to the wards of an hospital; because, while its simplicity delights and its approach to certainty encourages him, it also best prepares him for understanding the uses of remedies; it teaches him what medicine can, as well as what medicine cannot accomplish; it teaches him the vanity of hunting after specifics; it saves him from becoming utterly sceptic.

If it were true that the symptoms by which a disease is recognised were exactly analogous in all cases, it would be enough that the student should commit to memory the summary contained in systematic treatises, when he would be *at once* in a condition to pronounce an opinion upon any case put before him. But this is far from being the case: the idiosyncrasy of the individual, including in this term all the differences exhibited by various persons in their susceptibility to the influence of the same noxious substance or emanation; and not less than this, the varying power of the causes of disease, which though unproved, and perhaps incapable of proof, we cannot deny, exerting an influence now more potent, now weaker;—the combination of these two circumstances leads to an almost endless variety in the outward manifestations of their operation on the human frame. The perplexity thus produced has led men to seek for some symptom which may of itself determine the nature of the malady, which may be considered in the common phrase "pathognomonic" of the disease. Such simple indications would be invaluable if they were attainable, but unfortunately the proof they are supposed to afford is based upon false induction. Some of the greatest minds have fallen into this error, and none more than they who have cultivated the physical aids to diagnosis, first introduced by the great Laennec.

By means of auscultation and percussion we reach a class of phenomena much simpler, and more nearly related to the diseased action, than those evidences which come to us through the circuitous channel of disturbed function, reacting as every function does upon other organs, itself again altered or modified by them. They are, in fact, the necessary consequences of the morbid condition of the parts, but they are not the direct exponents of that state; it is only by inference that we deduce from the acoustic signs the nature of the pathological change. With reference to the lungs, for example, we learn by percussion the relative density of the parts struck, but the cause of that density must be proved by other circumstances. By auscultation we discover that the air enters more or less freely into one portion

of the lung as compared with another; that it meets with obstacles which produce certain sounds; that the acoustic properties of the lung are changed by disease, but the causes of these phenomena must be sought elsewhere than in the phenomena themselves. Crepitation is often spoken of as pathognomonic of pneumonia. Now it is quite true that clinical observation has shown, in a vast number of cases, that when, after death, fibrin is found effused into the parenchyma, such an obstruction to the admission of air at one period exists, that it enters the lung with a puff of crackling noise called crepitation; but until it can be shown that the noise stands to the fibrin in the relation of effect to cause, it is a false induction to assume that it is a certain evidence of its presence. And when we consider how possible it must be that some other cause of obstruction may produce the same effect, or one so nearly alike that it cannot be distinguished from it, how possible that some other sound altogether may be mistaken for it; when we further know that both these events do continually happen in practice, and that cases of pneumonia do frequently present themselves in which crepitation is not heard at all, it will at once be conceded that, though an important auxiliary, it is not an essential point in diagnosis.

In another class of diseases, the changes of structure are before our eyes; and here, if at all, the symptom might be regarded as pathognomonic—the pustules of smallpox, for example. But what shall we say of a case when death ensues before the pustule is formed? I have seen differences of opinion prevail regarding such an one only a few hours before the patient expired. And similar sources of fallacy might be adduced of all corresponding instances of the visible, tangible results of disease.

A perception of the errors arising from this cause has led to one of an opposite tendency, which teaches that the general condition of the patient must be alone considered, and that the name or nature of the disease is a matter of secondary importance. In the hands of a man of sound judgment and accurate perception, such a course is probably less injurious to the patient than a false conclusion formed on insufficient premises. Its peculiar evil consists in its leaving the student without a scheme or proposition, around which to collect and arrange the multitude of distinct and isolated facts which any case in the wards brings before him. Few minds, even those of the highest order, are able to divest themselves wholly of hypothesis in considering any series of facts; and the more untrained the mind is, the more readily does it frame such hypotheses for the purpose of explaining them. By the term explaining we only mean the referring the phenomena to some more general principle, which seems to stand to them in the relation of cause to effect, and includes in itself the whole or any number of the facts under

consideration, as its necessary or common results or consequences. It is impossible to avoid affording such explanations to the student who is acquiring the principles of medicine, and it seems unwise to discard them in the wards of the hospital, where every case ought to be only an example of the doctrines taught in the schools; and if the teacher do not supply the hypothesis, which in any given case seems to him to afford the true solution of the phenomena, the student will naturally frame one for himself, and that probably an erroneous one. At the same time it must be admitted by those who themselves are the most expert in the practice of diagnosis, that the time and the opportunity are not commonly afforded to give these explanations at the bedside of the patient; and clinical lectures can only take up the more prominent class, or the more remarkable individual cases which at the time happen to be in the hospital, and much of the remainder is lost for the purpose of instruction.

My object in the following pages is not to supersede the teaching of the clinical physician, but to meet this necessary imperfection by pointing out to the student how he may best frame a true scheme for himself, and still more to aid him in learning the lesson he is daily taught, by rendering familiar to him the principles on which the physician himself forms his opinion. It cannot need any demonstration to show that one who has thus studied will, when himself called upon to prescribe, all the more readily seize on the true form of the disease, and the exact relation it holds to the vital condition of the patient.

In carrying out this intention it would be equally valueless to give a mere enumeration of symptoms, or to classify the exceptions which experience has taught myself and others to look for, and the errors into which we are liable to fall. My purpose is to elucidate the principles as well as the practice of their interpretation, so that whatever be their variety or perplexity, philosophical conclusions may be drawn from their presence, avoiding unwarrantable inferences, and at least guiding the mind in a right direction, if no satisfactory solution of any individual case can be arrived at.

All true diagnosis is ultimately based upon inductions separately framed out of clinical and pathological investigations and experiments. By careful and repeated observation, we have succeeded with every appearance of truth, in associating certain phenomena observed during life with particular lesions found after death; and these form the first step in our progress. Sound principles have advanced exactly in proportion to the number and the accuracy of these conclusions, because there are many conditions which we are not yet, and perhaps never shall be able, to associate with any appreciable change in structure;

and to them we must apply by inference the truths which have been taught in other instances by direct observation. In so far as we are able correctly to interpret symptoms, and to trace out in connexion with them a real change of structure or of function which affords an adequate explanation of their presence, in so far are we prepared to form a correct diagnosis. It is not the province of this branch of study to elucidate the *modus operandi* of the change; but, assuming these principles as true, our especial work is to learn to group symptoms together, and to analyse them separately in such a manner that we may be able to apply to them a scheme already supplied to our hand, which shall in some way account for their existence. It is by the nature of this assumption that rational medicine is distinguished from empiricism. The latter equally seeks to group symptoms together, and to assign to each group the most suitable remedies; but the theory or scheme which it furnishes is not based on scientific principles. In the application of the theory to the case under observation, the two are exactly analogous. A comparison is to be instituted between the probable results of the supposed malady and those presented by the particular case, and their correspondence serves for the verification of the hypothesis. In short, it is the deductive process of reasoning applied to the elucidation of morbid phenomena. We gather together in the best manner we can the fragmentary evidence of symptoms, and we apply to it the known laws of causation taught by the theory of disease.

The correctness with which this process is performed depends on a variety of circumstances. In the first place, it will be greatly influenced by the amount of evidence. This evidence has to be sought, and therefore much will depend on the manner in which the investigation is conducted. Without method, some portion of it is sure to be overlooked or forgotten; with a bad method, the information presents itself in such a form as makes the inference of truth a matter of difficulty. The plan adopted in this volume is one which, on close consideration of the subject, has most commended itself to my own mind; but each person will probably be disposed to modify it so as to suit his own habits of thought.

In the second place, the correctness of the conclusion must very greatly depend on our assigning the true value to each portion of the evidence, especially if the group of symptoms be a very complex one. We still form our judgment from the aggregate, but we know that one part is much more trustworthy and more important than the remainder. One single symptom even may, by its presence or absence, turn the balance of evidence in favour of one disease, or exclude another; but this view of its importance in connection with the whole group,

of which it is but a part, is very different from the error already pointed out of regarding any sign as "pathognomonic." On this point correct general knowledge of disease can alone give precision to our judgment; but it is also the province of a work on diagnosis to assign in some measure to each symptom its relative value.

In the third place, the verification of the result wholly depends upon the accuracy of our knowledge of the theory of disease. The evidence of symptoms properly arranged leads us so far in the right direction for discovering its true seat and nature; but it does no more than point out a number of requirements with reference to particular organs, or to the system at large, which any disease must be known *à priori* to fulfil, before we can admit it to be that which exists in the case before us.

From these considerations, I think it must be evident that the more numerous and the more simple the symptoms are on which we have to decide, the more certain must be our diagnosis.

Further illustration may perhaps be deemed unnecessary, but my meaning may be made more evident by comparing the investigation of a case, to the properties of figures in geometry. Suppose that through any four fixed points straight lines are drawn enclosing a quadrangular space: it is manifest that the number and variety of figures which may be produced is very great; and if these figures are placed side by side and compared with each other, they will only be recognised as being four-sided figures, and few persons could find out that they had any other property in common. But if through two of the points (the first and third, for instance) the lines are always drawn parallel to each other, the number of instances is at once much reduced, and this fact is immediately recognised as being common to them all. If, in addition to this, the lines drawn through the second and fourth points are also parallel, the class becomes reduced to those known as parallelograms, of which the opposite sides and angles are equal, and the original property of their passing through four fixed points become much more apparent. Further, if one of the angles is ascertained to be a right angle, we are certain that only one figure can fulfil all these several indications.

Again, the parallelograms may be compared with each other by the relative length of their diagonals, and we find that in the rectangular parallelograms the two diagonals are exactly equal. Here, then, we may disregard all the other facts, and finding straight lines drawn through four fixed points enclosing a quadrangular space of which the diagonals are equal, we are certain that the opposite lines are equal and parallel, that all the

angles are right angles, and that only one possible figure can possess these two properties, just as before we found that only one figure could possess all the other properties in detail. At the same time, if any one of these properties could not be detected on further investigation, we know that we must have made some mistake in the observation regarding the equality of the diagonals.

In studying disease, it is manifest that attention to one symptom only cannot lead to truth, since the causes of its production may be various; but when a greater number are considered, and are found to harmonize together, the possibility of the whole group being produced by one or other of several causes becomes necessarily very greatly diminished. When the symptoms present are obscure or uncertain, it is much more difficult to trace them back to their true source than when they are clear and intelligible. But yet we must remember than even after we seem to have arrived at a correct result from the comparison of two or more definite symptoms, yet if other important phenomena which ought to be found on closer search are absent, we must have committed an error in observation, and the opinion formed ought only to be persisted in, when this exact correspondence can be traced, or good reasons can be assigned for the existence of an exception. Hence it sometimes happens that future examination of the same case, by bringing to light new symptoms, may oblige us to discard an hypothesis framed on insufficient premises; indeed, we must often suspend our judgment altogether, till the progress of the case has determined the actual form which the disease is about to assume.

Another point must also be kept in view in diagnosis. Diseased action in the body is often very complex, and the phenomena present may not be all reducible to the results of one form of disease, or a morbid condition of one set of organs; it may, on the contrary, be compounded of the effects of several causes acting together. And not only in such a case are the single effects associated together and intermingled with each other, but the product is a combined effect of the compound cause, in which the direct symptoms of each separate lesion are modified or neutralized by one another. It is, therefore, necessary to distinguish between symptoms uniformly associated with certain conditions and those which are merely accidental; these, again, must be divided into phenomena which, though not essential, are more or less directly connected with the morbid state, and those which are wholly independent of it. And having collected all the evidence which the case affords, if it appear sufficient to establish any hypothesis, we have yet to make sure that no other condition of disease is present that might give a different

interpretation to some of the symptoms; and still more, when it is unsatisfactory or contradictory, must the examination be careful and extensive in order to discover the cause of this imperfection, and the associations which modify or suppress those symptoms which each would display if acting alone.

In every one of these points of view it is evident how much correct diagnosis must depend on a knowledge of the true nature and history of disease. That alone can suggest trustworthy hypothesis for the explanation of the phenomena, by bringing before the mind the different states which commonly give rise to prominent symptoms, so that when one fails to fulfil all the requirements of the case, another may be substituted for it; it teaches which among the phenomena are important and constant in their character, which are unimportant and variable; it also indicates the different diseases which are most likely to be associated together, and shows how they mutually react upon one another. And when we have reasoned to the best of our judgment upon the whole of the premises submitted to our consideration, such knowledge can alone supply a standard of comparison, whence we learn what conclusions have been true or false, as the order of events corresponds to or differs from that which scientific experience teaches us to be their known course and progress.

While thus studying diagnosis, let it not be forgotten that though our first aim be to arrive at a correct conclusion regarding the disease under which the patient is labouring, our ultimate object is to restore health. Therefore, while combining symptoms in our own mind to give unity to the whole, we must ever have regard to anything they may teach us concerning the condition of the patient. Thus, for example, in a case which may at first sight be regarded as one of the simplest examples of that state to which the much-abused term of inflammation is applied, however clear the evidence in favour of inflammation of any particular viscus, we must not act upon this knowledge alone, but must take into consideration the signs of strength or weakness, of increased or depressed vitality, which accompany it. This oversight is probably the most prolific source of many a hasty and ill-formed assumption, based on insufficient grounds. The self-evident symptoms are alone considered, other phenomena are too often disregarded, sources of fallacy are overlooked, and a diagnosis is pronounced to which the whole course of the disease is made to bend. Of necessity erroneous hypotheses are admitted in order to reconcile the evident discrepancy between the progress of the case and the supposed nature of the malady. Faith in treatment is shaken, because a false opinion once formed, remedies cannot be employed in a manner conducive to the recovery of the patient. In the end, the student becomes a fanciful speculator in place of a sober physician. He finds the aimless

impotence of quackery as successful as his own misguided efforts, and follows the fashion of the day in homœopathy, hydropathy, the abuse of the speculum, &c., to say nothing of the errors into which some have fallen in the introduction of specific modes of treatment, when their position and their knowledge had given promise of better things.

CHAPTER I.

METHOD OF DIAGNOSIS.

History of Case—Narrative of previous Symptoms—Arrangement of existing Phenomena—Plan of carrying on the Investigation—Classification of Diseases necessary to Diagnosis—Nomenclature of the College of Physicians.

The discrimination of disease, as we have attempted to show, proceeds upon a knowledge, more or less complete, of all the phenomena which any given case presents. When it has terminated in the recovery or death of the patient, the series of events arranged in a definite and intelligible order, from their commencement to their conclusion, is comprised under what is called its "History," which ought to present to the mind a perfect picture of all its important features. Unfortunately, the perusal of the clinical case-books of an hospital, or even the published reports of cases by our best authors, must convince us how little the real meaning of the history of a case is understood. Without the key of a knowledge of the disease, derived from some extraneous source, it will be found too often impossible to form a correct diagnosis. Many of the difficulties are inseparable, to a certain extent, from the nature and sources of the information, but many are due solely to want of system and arrangement.

The history divides itself naturally into two parts; the report of the patient himself, or of his friends and attendants, of what happened before he was seen by the physician; and the phenomena actually observed at the time of examination: the same distinction must be made between events occurring in the absence of the observer, and those noted at any subsequent visit.

But as our object is rather to point out the true principles on which diagnosis is based than to give the history of diseased states, only casual reference can be made to ulterior changes, and, in general, it must be presumed that the previous history is learned by report, while the signs and symptoms are investigated as they present themselves on a first examination.

The previous history is often of great importance; it ought to commence with the very first deviation from health, in so far as the sensations and functions of the patient are concerned, and to give a connected account of the changes through which he has subsequently passed, and the origin of new symptoms. This account is of itself sometimes sufficient to point out the nature of the malady. It seldom happens that all the particulars are correctly detailed, yet such as it is, this statement is often our only guide in determining the duration, and order of sequence of particular symptoms, and investigating the causation of the phenomena of disease. Practically it will be found that the more perfect this information is, whether limited to the present illness, or extended to a perfect acquaintance with previous ailments, the more valuable does it prove as an aid to diagnosis.

Much care is necessary not only to get at the first deviation from health, but also to avoid being led away by a preconceived idea in the mind of the narrator, especially if he be a scientific person. So much does the mind seek after causes of all natural phenomena, that the simplest and most illiterate patient is more ready to broach a theory of his illness, than to tell his sensations or his sufferings.

It is also to be remembered, that although disease has a distinct and intelligible history, because it follows a definite course, yet the story of the patient is often inconsistent with itself. General inconsistency on all points is commonly an evidence of imaginary, hypochondriacal or hysterical maladies. Partial inconsistency may arise from the existence of different diseases, either simultaneously or at successive periods, and the misplaced association of the symptoms belonging to each, or simply from incorrectness of observation.

Sometimes the narration of past sensations and sufferings may

tend to lead the observer away from the true seat of the malady, inasmuch as not unfrequently disease of central organs first makes itself known by symptoms in remote parts. Against this there can be no safeguard but a thorough knowledge of the relations subsisting between morbid states and the possible phenomena which may attend upon them. Again, symptoms of importance may be forgotten, and circumstances which must greatly influence our opinion on the case may have been omitted, and these points must be inquired into. The same knowledge of the associations of morbid states and their phenomena leads us to ask such questions as may determine whether the symptoms detailed have been caused by one condition or another (*e.g.* whether pain has been caused by inflammation from the knowledge whether fever has been present or not).

Out of this further inquiry arises one of the greatest and most common sources of fallacy; and it is great in proportion as the history and sensations of the patient become the sources of information, and the alterations in structure or function of which we can take cognizance are few and indistinct. It springs from the necessity of framing an hypothesis of the disease from the general outline already given of the case, and the anticipation arising out of this hypothesis, that certain phenomena ought to be present: in consequence of this persuasion, interrogatories assume the form, more or less, of leading questions, unconsciously to the inquirer himself; and this cannot fail to bias the mind of the person to whom they are addressed.

This preliminary investigation leads to the association of symptoms according to their order of sequence, and we must be careful, by observing them from another point of view, to correct any false impression to which it may have given rise. While, therefore, we follow the patient telling his own case in his own way, it is quite essential that we should make a subsequent and independent investigation of existing symptoms according to some systematic course, which shall have the effect of ranging them in such scientific groups as may most readily and naturally lead to the detection of the cause which best accounts for their origin, and most fully satisfies all the requirements of the case.

In seeking for such an arrangement, we find that there are two great classes of indications, the general and the local; each of these comprehending two divi-

sions, the subjective and the objective, the sensations of the patient, and the alterations in structure or function of which the observer can take note.

It may be useful to notice here that different names are assigned to these phenomena, as the indications which they afford happen to be derived from perversion of vital functions, or from altered relations of parts to each other, or to the external world. These are known by the names respectively of vital symptoms and physical signs; thus, pain is one of the symptoms, while swelling and redness are among the signs of local inflammation; cough and expectoration represent the symptoms, the noises produced by the meeting of air and fluid in the bronchial tubes are the signs of bronchitis. I believe this division was intended originally to mean much more than this; it was believed that every disease had not only its category of symptoms, which might, any or all of them, be common to it with other diseases, but that each had for itself its peculiar distinguishing sign or mark, by which it was as readily recognised as by its name (for instance, the râle crépitant for pneumonia, the râle sous-crépitant for pulmonary œdema, &c.). But we shall find as we proceed that the absence of the sign does not imply absence of the disease, and its presence affords at best only a strong presumption in favour of a certain condition of parts.

If general and local indications could be arranged so as to correspond to general and local disease, it would be enough to discuss them in this order; but the two are so inextricably mingled together, that no more can be done than merely to adopt, as far as possible, the plan of taking general indications first, and special indications afterwards; for we must often reconsider the general symptoms in investigating local disease, as we must also frequently anticipate special signs in inquiring into conditions of general disorder. No observation can be considered complete which has not taken note as well of the general state of the patient as of the particular condition of each individual organ, under both these aspects; and however we may endeavour to simplify the inquiry, omissions can only be avoided at the expense of occasional repetition. It will constantly happen in practice that the same indication which has been already noted in re-

gard to duration and sequence, must again be reviewed both in its bearing on the general condition of the system, and also in relation to lesions of particular organs.

When the student is introduced to the bedside of the patient, it is of great importance that he should carry in his mind a certain definite course of inquiry, according to which he should endeavour to trace out a faithful history of the case, so that without any guide but his own investigation he may be able to form such a conception of the case as will leave him in little doubt where its proper place in nosology will be found.

We are at present only engaged in inquiring into the uses of such an investigation, in so far as it leads to correct diagnosis; but every one of the separate features in the picture may be of importance in determining the treatment. Various remedies may suggest themselves to the mind of the practitioner as equally applicable, and their judicious selection very often depends upon a due consideration of the antecedents and peculiarities of the case, much more than upon the name given to the disease, or the place it may hold in a scientific classification.

The student will do well to commit to writing the results of his inquiries. There is no means nearly so successful in giving system and correctness to his investigation; in no other way can he acquire the habit of observing all the phenomena of any given case, or tracing their bearing on each other; and nothing will so effectually teach him to mark correctly, and estimate justly, each successive fact elicited by his own inquiries, or volunteered by the patient. From the whole evidence thus faithfully committed to writing can he alone hope to form a correct diagnosis. His written description ought to be a full and accurate account of all that he sees, hears, feels, or even smells, and must never embody any conclusions he has formed from them until the whole inquiry has terminated. Thus, to take a prominent example,—in examining the lungs, however distinct he may fancy the evidence of a cavity to be, he ought never to put down in his notes 'cavernous râles,' or 'cavernous breathing,' but what he actually hears—gurgling sounds, loud or very loud, blowing expiratory breath-sound, &c.; everything, in fact, just as it is heard; as he proceeds, it is quite possible that other signs or symptoms may be observed so inconsistent with the hypothesis, that it would be quite unwarrantable to assume the existence of a cavity—a conclusion which ought only to be formed from the coincidence of several other phenomena.

The following plan has seemed to me the best adapted for obtaining the information required, and is that which is adhered to in the following pages, but admits of modification according to the previous course of study or habits of the individual. It is merely offered as one which has been found practically most serviceable in making available notes of a large number of cases.

It may be divided into four principal sections. After a preliminary inquiry into the age, occupation, and habits of the patient, and also ascertaining if there have been any previous similar attacks or any important illness, we proceed,—

1. To inquire when the first deviation from health occurred, how it was manifested, and what was the order of sequence among subsequent events.

2. To examine into the general state of the patient at the time of observation, as manifested both by objective and subjective phenomena.

3. To make a rapid survey of all the organs, especially with reference to the sensations of the patient.

4. While doing so, to make a careful examination of any organs to which the history of the case, the general indications, or the sensations of the individual especially point.

In short, we first get all the information we can of what has happened, we next feel the pulse, look at the tongue, &c., then ask, with reference to each of the larger divisions of the trunk, whether there be anything to complain of, stopping in our progress to make more minute investigations whenever it seems necessary.

In endeavouring to point out to the student the probable deviations from health he may meet with in various parts of the body, in the order in which they present themselves according to this arrangement, it will necessarily happen that the diseases of which they are the indications should be discussed in a similar order; and as it is not my wish to create for diagnosis

a distinct place in the science of medicine, but to make it subservient to practice it seems desirable to adapt it as much as possible to a scientific and practically useful classification.

For this purpose the nomenclature of diseases published by the College of Physicians of England has been selected; and in discussing the various forms of disease, the classification adopted by the committee will be followed as closely as possible. But for the sake of comparison, which is one of the most important elements of diagnosis, groups will occasionally be formed of diseases presenting analogies to each other, in a manner that might be regarded as inconsistent with the plan of a scientific classification.

It is unnecessary here to enter on a consideration of the principles involved in this arrangement, further than to point out that the two primary divisions are framed on the assumption that general diseases involve the whole organism, and that any local affection, however constant and essential, is only a development of the general ailment; while local diseases, even when exciting symptoms of general disorder, are in their origin, at least, limited to the organ in which they are developed. The first of these main divisions has been again broken up into two sections, which are mainly distinguished from each other by the relation which the general state of the system bears to any local affection associated with it. In Section A the local affection may be regarded simply as a sign of the disease, whether its presence be an essential part of the malady or not, whereas in Section B the local affection is the paramount and prominent derangement of health, and probably the only evidence of constitutional change to which we can distinctly point. The other grand division of local diseases naturally forms groups ranged under various organs, representing the various affections to which they are severally liable, apart from those which may result from the local manifestation of some general disease.

CHAPTER II.

DURATION AND SEQUENCE OF PHENOMENA.

Dividing Diseases into Acute and Chronic—Long Ailment—Pain in reference to Duration—Order of Sequence—Established Course of Disease.

THE inquiry into the first manifestation of a deviation from health, the duration of the disease, and the order and sequence of the phenomena, is of considerable importance, as defining in general terms the whole period of the illness, and the duration of each particular derangement, and pointing out the relation between each new symptom and that which immediately preceded it.

From the preliminary inquiry as to the age, occupation, and habits of the patient, valuable suggestions are sometimes obtained. We need not dwell upon the variations in the character of diseases, as they occur in infancy, youth, adult life, and old age, because these are rather associated with stages of development than with periods of years; but we may refer to the information of tardy growth or premature decay, which the contrast between the actual and the probable age of the individual sometimes reveals; and to the liability at certain ages to the occurrence of specific diseases. In a still more marked manner does the occupation of the patient become the direct index of the disease under which he is labouring, as we know that in the pursuit of certain trades men are necessarily exposed to the influence of various morbid agencies. Not less important is a knowledge of previous habits in enabling us to calculate the strength of constitution, or the tendency to unhealthy action, in

warning us that certain modes of treatment must or must not be adopted, and in pointing out the diseases which probably exist as the consequence of baneful indulgences.

1. Duration divides diseases into acute or rapid, and chronic or slow.

2. It sometimes tells of a previous condition of weakness and long ailment, which, though it does not negative the subsequent occurrence of acute disease, puts us on our guard against a hasty decision, and is of immense value in determining on treatment.

3. It gives a measure of the intensity of pain and suffering, by enabling us to compare its effect on the patient's health with its alleged duration.

4. Order of sequence helps us in tracing back the phenomena of disease to their origin; and the first deviation from health sometimes points at once to the organ affected.

5. It sometimes enables us to exclude certain possible diseases to which the symptoms might be due, by the knowledge that in their course events occur at fixed periods, which have been already passed by.

1. The question whether a disease be acute or chronic is not one merely of intensity. The clinical history, the pathological changes, and the treatment, are all of them often very different, not only in degree, but also in kind. Little is known of the essence of disease; and when similar causes give rise to somewhat similar groups of symptoms, we are content to assume a similarity in the disease. This we do even when in detail it may be very difficult to point out an exact resemblance between any of the particulars in two cases bearing the same name, of which the one has been of long duration and minor intensity, while the other has been of shorter duration and greater intensity. The name is merely the mark or sign by which we agree to distinguish the group of symptoms; and its relation to other similar groups is conveyed by the resemblance of their denomination. But the inquiry has a further application; for, inasmuch as the existing phenomena may be produced by one of two causes, of which one developes its effects in more rapid succession than the other, the duration of the disease will often aid in determining to which of the two they are to be referred.

2. Long ailment may imply either a peculiar susceptibility in

the constitution of the patient which exaggerates minor sufferings, or an actual depression of the vital powers, from protracted illness. In each case, evidence of a recent severe attack must be unquestionable before we give our assent to the existence of acute disease; in the one, because the susceptibility of the patient so greatly influences the character of the symptoms; in the other, because the depression of the vital powers renders the supervention of active disease more improbable, and stamps it with a character different from that which it has in a healthy individual. In both cases, bearing in mind the subservience of diagnosis to treatment, the information is most valuable in directing the selection of remedies.

3. The duration of pain has a very important bearing on the diagnosis of hysteria and neuralgia. Here it may be observed how impossible it is, from the description of the patient, to form any idea of the exact amount of pain and suffering, or to institute any comparison between the expression of it as employed by different individuals. One will talk composedly during a severe operation; another looks pale and haggard and seems to be in great pain, perhaps really does suffer much from a mere nervous affection, which exists chiefly in the imagination, and is principally maintained by the attention being continually directed to it. In such a case there is the inconsistency that a very unimportant distraction serves to withdraw the attention, and thereby removes all recollection of the existence of pain and every indication of its continuance. A third person suffers severely from paroxysms of pain, which no amount of pre-occupation can prevent, no distraction during its continuance can suspend; yet in this case there may be no structural change to account for its presence. The power of distracting the attention is sometimes the only distinction between that which is unimportant and transitory and that which is of grave import and exceedingly untractable until its duration and recurrence, and the exhaustion it produces, point out its reality.

Duration is, therefore, a point of great value in judging of the intensity and importance of expressions of pain. *a*. Severe pain of long continuance must have told on the health of the sufferer. *b*. The pain of a nervous affection may be actually greater than that accompanying a severe disease in the same locality; but the continuance of disease produces far more important changes than can result from the mere persistence of pain. *c*. When local pain is only one of the features of long-standing illness by which the constitution has not been affected, it must be regarded as of minor importance.

4. A certain amount of caution is necessary in adopting the patient's description of the order of sequence of symptoms. It is remarkable how, in slowly advancing maladies, nature accom-

modates herself so completely to immense alterations in structure, that until some unusual event occurs, the patient is utterly unconscious of any deviation from health; or it may be there is only a sense of malaise, without the possibility of tracing this feeling to its cause, or of naming any single symptom which has attended it. Suddenly some change occurs of which the patient becomes cognizant, and then other sensations which previously existed take form and shape in his mind, and consequently find place in his description, after that which is in reality their effect and not their cause.

Again, so intimate are the relations maintained between all parts of the body, that it may not be in the very locality in which disease has commenced that symptoms of its presence first arise; and hence sometimes the first feeling of illness does not directly point to its true seat. This must be corrected by knowledge of the theory of disease, and the various symptoms by which it is accompanied.

With these qualifications, the first real deviation from health is of much value in leading us back to the true seat of disease.

5. Most diseases have a certain established course, which, either in broad and general outline, or even in minor detail, is followed by all the examples coming under observation; and although we cannot prescribe the exact limits of these sequences, either in days or weeks, yet there are periods of greater or less duration during which certain phenomena must present themselves, or else our diagnosis has been utterly at fault. This fact forms one of the elements of prognosis, and points out its association with a just discrimination of the nature of a malady in the first instance.

CHAPTER III.

GENERAL CONDITION OF THE PATIENT.

Objective and Subjective Phenomena—General Symptoms; Skin; Temperature; Pulse; Tongue; Bowels and Kidneys; Thirst and Hunger—Appearance—Position or Posture—Sensations—Particular Signs.

We next proceed to inquire into the general state of the patient at the time of observation; our information being derived from a consideration of all those phenomena which are not confined specifically to any particular organ.

They are either objective or subjective. Objective phenomena are those changes in the condition of vital functions of which the observer becomes conscious by his own perceptions. They may occasionally point out the actual seat of disease, but generally they acknowledge a variety of causes, and therefore only pave the way for further investigation. They are much more trustworthy than subjective phenomena, because to them we can apply the test of experience and comparison, which gives them a certain relative value, in all cases in which they are found. They are independent of the patient's sensations or imagination, and are less under the control of his volition; they are therefore less liable to be simulated or exaggerated.

Subjective phenomena have special reference to the sensations of the patient; they may to a certain extent express his consciousness of general derangement of health; but their more direct tendency is to point out the particular function which is disturbed, and hence the particular organ or portion of the body where disease is located.

The two classes are in great measure inseparable. They may be divided into the four following groups:—

1. General symptoms, as pertaining to—
   - *a.* Temperature and dryness of skin;
   - *b.* Fulness and quickness of pulse;
   - *c.* Appearance of the tongue;
   - *d.* State of bowels and kidneys;
   - *e.* Desire for food and drink.

It is indispensable to a correct result that the whole of these should be always taken together, as the indications derived from one source serve to correct those drawn from another, and any one of them is valueless as standing alone.

2. The general appearance of the patient:—
   a. Size, including emaciation, and increase of bulk, whether general or local;
   b. Aspect of face, and expression;
   c. Changes of colour of skin, general and local.
3. His position, or posture:—
   a. In bed; the manner of lying—on the back, on either side; quiet, restless, &c.
   b. Out of bed; posture, gait, stiffness or loss of power of limbs.
4. The sensations of the patient.

§ 1. The indications of a general condition of system, derived from a comparison of the symptoms exhibited by the skin, pulse, tongue, bowels, thirst, and appetite, serve to determine whether the condition be one associated with febrile disturbance or not; and in this view the intensity of one symptom is of very much less importance than the complete agreement of all. A mutual relation of some of them points out the opposite conditions of vigour or weakness, on which so much of correct treatment depends; while their harmony or inconsistency is one of the very first elements in rational diagnosis.

a. The temperature of the skin may be either colder or hotter than natural, and each of these conditions may be accompanied by moisture or dryness. This relation must always be taken into consideration; heat and dryness generally characterise febrile excitement, coldness and moisture indicate prostration and weakness: a hot and moist skin, or a cold and dry one, are each of them less significant than their opposites. The actual elevation of temperature, as measured by the thermometer, is a much more certain indication than

that derived from the mere application of the hand. Its special value consists less in the assistance it gives in determining the actual presence of fever, than in the evidence of diurnal variations which, with due care, may be traced in almost every febrile state. To this subject we must return in the next chapter.

We have also to pay attention to the casual changes in external circumstances by which its condition may be modified; such as the effects of exercise or fatigue; the temperature of the surrounding atmosphere, and the immediate consequences of exposure; or even the temporary effects of mental excitement. In ordinary changes of temperature, moisture, by a natural law, attends its elevation, dryness its depression; while these again react upon each other, evaporation producing coolness, and *vice versâ*. In disease this association is sometimes, but not always, broken through; and hence, while a hot, dry, and pungent skin indicates a febrile state, a hot and moist skin may, or may not, be the consequence of disease, and its value can only be estimated by determining the causes which have given rise to it. Similarly a cold moist skin, in severe disease, is a most alarming evidence of collapse, and a clammy skin generally indicates debility, while a cold and dry skin is either simply the effect of exposure in perfect health, or is found, as the *cutis anserina*, at the moment of rigor in fever. The thermometer is sometimes of great use in such cases. With a quick pulse, the skin of the patient may give no indication to the hand of an elevation of temperature which may be distinctly traced when the instrument is placed in the axilla, thus correcting a very erroneous impression. The temperature always begins to rise during rigor, while the patient still feels chilly.

b. The characters observable in the pulse are chiefly change of rate or frequency, of volume or fulness, and of force or firmness. These changes are, to a certain extent, expressive of really different conditions of system; but with reference to febrile action we have to consider their relation to each other, and to other conditions, especially that of the skin. It is from these two sources that we derive evidence of the difference between inflammation, or inflammatory fever, and simple or continued fever. The skin is more apt to be moist when its temperature is raised by inflammation; to be dry when it is the accompaniment of fever.

The pulse has more frequency and less force in fever; greater force and commonly less frequency in inflammation. These distinctions are all-important in treatment, but in diagnosis they do no more than give a general impression that one or other condition is most probably present.

The age of the patient has an important influence over the frequency of the pulse; sex and habit over its fulness and firmness.

The pulse may be quickened by mere excitement; the tongue may be at the same time coated from disorder of the bowels; but this condition must not be mistaken for fever, nor, if associated in a delicate female with pain in the left side, be taken as indicative of pleurisy. The state of the skin, as well as the absence of thirst and the character of the urine, will here probably decide against any such supposition. Acceleration of pulse, to be important, must be constant and persistent, not transient and varying with temporary excitement, &c. Certain chronic states are also accompanied by acceleration of pulse, such, for example, as heart disease and phthisis; and here again the indications from other sources, even without considering the special indications derived from its force or firmness, enable us to correct an impression of acute or febrile disorder.

Changes in volume chiefly give rise to impressions of the pulse being full or empty, large or small; but these are necessarily associated with conditions of hardness or softness, strength or weakness, which are expressive of changes in force. The impressions of this character are conveyed to the finger by the greater or less degree of compressibility; the pressure required to obliterate the current. Deviations occurring within the limits of health generally combine fulness with firmness, weakness with smallness. We do not expect to find a similar pulse in a man of sedentary occupation, and in one of active, or perhaps laborious, pursuits; the pulse of the female has neither the fulness nor the force of the other sex. And while these point to real differences in constitution, which guide us in the adaptation of remedies, they are not the less to be borne in mind in judging of the extent of deviation in disease.

Certain names have been given to unusual combinations of the characters just mentioned, with which the student must make himself acquainted: thus, smallness, with force, gives rise to what is termed a hard pulse, or, in extreme cases, a wiry pulse; largeness,

with want of force, to a soft pulse; emptiness and frequency to what is often called a rapid pulse.

Irregularity of pulse has very important bearings upon special forms of disease, but is of less consequence as a symptom of the general condition of the patient.

c. The state of the tongue is to be noted with reference to its coating and its degree of moisture; and the latter is probably of more importance than the former in its bearing on our present inquiry. The characters of its coating vary in thickness, extent, and colour or general appearance: it may resemble a thin coating of white paint, or of paste, or look like buff-leather; the fur may be limited to the back of the tongue, or the tip and edges alone are left clean and red; a red streak may be observed in the centre, or the organ has a general patchy appearance; lastly, the coating is either white, yellow, or dark and brown. Sometimes, on the other hand, the tongue appears unusually clean, and has a smooth and peeled appearance, or is chapped, or marked by prominent papillæ. Each of these conditions is, again, associated with differing degrees of moisture or dryness. Sometimes the excessive moisture gives it an appearance of flabbiness or œdema. Its relation to the condition of the bowels must not be overlooked.

No organ more quickly indicates derangement, however slight: in every state it sympathises, and many of the variations just mentioned have especial reference to particular forms of disease: but they have still greater significance, as symptoms of the general condition of the patient; the least important being those in which the fur is confined to the back of the tongue, or is thick and yellow and bears evidence of large accumulation. The moist, flabby, or œdematous condition is wholly opposed to the idea of febrile excitement; the red patch in the centre, and the peeled or chapped condition of the mucous membrane, are very important evidence of the form which a febrile condition has assumed, but they may be in various degrees exhibited without the existence of fever, properly so called; on the other hand, a bright red tip and edges, or a dark brown fur, are more decidedly characteristic of fever. As a general rule, dryness is more

indicative of a febrile state than any appearance which the coating presents. Accidental circumstances must not be overlooked: a patient in a weak state waking from a short sleep after taking food will have a dry tongue, one who has recently taken any fluid will have a moist one, in cases in which neither condition is persistent or permanent.

d. The state of the bowels and kidneys is at present to be considered only in general terms, whether there be constipation or diarrhœa, abundant or scanty discharge of urine. These questions must again present themselves in investigating the separate organs, but the knowledge of the condition of the bowels is here necessary to qualify the observations made upon the condition of the tongue; and the quantity of the urine has a similar relation to the existence of thirst.

In discussing the diseases of the intestinal canal, we shall have to refer not merely to the great fact of the frequency of the stools, but also to their appearance and consistence which will be found each to have a definite bearing on diagnosis. The existence of constipation or diarrhœa deprives a coated tongue of much of its importance, considered with reference to a general state of system. Hence the value of the observation is in proportion to the explanation it affords of the appearance of the tongue. It is also sometimes suggestive of disease in remote organs, of which the diarrhœa of phthisis, and the constipation attendant on inflammation of the brain may be taken as examples.

With regard to the urine it may be remarked, that while an abundance of pale limpid urine entirely negatives the idea of acute or febrile disease, an opposite state, its being scanty and loaded, although a constant concomitant of such disorders, may depend on a great variety of causes; and is of importance chiefly when conjoined with thirst. The special diagnosis must be deferred to a later stage of the inquiry; but in the present day, with all the advantages of chemical analysis, something more ought in all cases to be done, than merely to ascertain the amount of the secretion or the degree of its turbidity.

e. In regard to thirst it may be stated, as a general rule, that the dryness of the tongue and the desire for liquids are proportionate to each other. All febrile states present this phenomenon in greater or less degree, and too much importance must not be attached to its presence, inasmuch as copious discharges from the bowels or kidneys invariably give rise to it, whether

there be fever or not. The only chronic states in which it is very marked, are diabetes, and its simulation, diuresis. In the former, it is accompanied by hunger even in a more remarkable degree.

Loss of appetite is so common that it hardly needs to be inquired into, except for the purpose of noting as an important symptom the circumstance of the appetite being unimpaired in cases where other indications would lead us to expect it should have been lost.

§ 2. The general appearance of the patient affords to the physician very distinct indications of the nature of the disease, and of the organ in which it is probably located. This group ought to be studied with care, because they are apt to lead to hasty conclusions.

a. Alterations in general bulk are chiefly important as evidence of long-continued diseased action. Emaciation implies imperfect nutrition depending on a variety of causes, which are generally slow in their operation. It also sometimes supervenes very rapidly in acute febrile disorders; but here the cause is unequivocal. In chronic maladies it arises either from deficiency, from waste, or from perversion of the blood-plasma or nutritive material. Hence it occurs in organic diseases of the abdominal organs, in suppurations and diabetes, in phthisis and cancer, in its greatest degrees.

Along with some general resemblance in all these cases, there are certain special characteristics forming part of what may be called the physiognomy of disease, which materially aid an experienced eye in forming a diagnosis quickly; but too much reliance is not to be placed on them, and their only use is in directing the practitioner where he is to look for disease, the nature of which must be afterwards determined by its own special phenomena.

General increase of bulk when occurring as obesity, is to be regarded as a diseased state, but it cannot be traced to any special organ as its source. It may also arise from universal anasarca, and in rare cases from universal emphysema. The doughy feeling of the one, accompanied by the remaining mark of the finger known as pitting on pressure, contrasts strikingly with the elasticity of the other, and the peculiar sensation of crepitation it conveys to the hand of the observer.

It is worthy of remark that in what has been called acute dropsy, especially as occurring in children after scarlatina, the increase in size sometimes has a feeling of elasticity, and scarcely seems to pit at all. Firm continued pressure over a superficial bone, such as the tibia, will remove any doubt. In such a case, I have heard the suggestion thrown out whether the case might not be one of emphysema.

Local changes of size are more particularly connected with local disease; those which are attended by increase will be discussed separately under the head of morbid growths; those characterised by emaciation have their source in imperfect nutrition of the part, and are merely the concomitants of some other more important lesion; *e. g.*, the wasting of a limb which is the subject of paralysis.

b. Aspect and expression are to be viewed in their relation to the physiognomy of disease, of which they are most important elements. The former points to physical conditions; the latter to the sensations of the patient, as revealed by the features. They are both of much value, but nothing further can be done here than to indicate the direction in which they must be studied.

Aspect tells of a general state—cachexia, the existence of tubercle, scrofula, anæmia, &c., that which accompanies cancer is frequently called malignant: it may be that of ill-ventilated blood, of dissipation, or of exhaustion.

Expression, on the other hand, has more distinct reference to the nervous system. It may be tranquil, or it may indicate pain or anxiety; it may be listless, depressed, wandering, unmeaning, excited, or maniacal. But further, it is of use as a test of the reality of complaints made by the patient, or, at least, of their exaggeration; and the rapid transition from smiles to tears in the hysterical female is often a valuable sign.

Both are to be noted with as much precision as possible, because they have an important bearing on the particular form which any malady has taken or may assume. The mind will naturally revert to them in confirmation of an opinion formed on other grounds, or as a cause for modifying a conclusion which other symptoms might seem to warrant; and the observant prac-

titioner will always let them have their due weight in the treatment of the case. It is scarcely necessary here to remark, that, of the two classes, those having reference to aspect are less liable to mislead than those derived from expression; the former belong to objective, the latter are in great measure subjective phenomena.

c. Alterations in colour are in some respects more specifically diagnostic; sometimes inseparable from aspect, as in the waxy complexion of chlorosis, the pale puffiness of advanced albuminuria, the sallow hue of malignant disease, or the particular blueness of the nose and lips with dark-coloured unaërated blood; sometimes distinct from it, as the yellowness of jaundice, the muddiness of enlarged spleen, or the blueness of Asiatic cholera, and the eruptions of measles and scarlatina.

Local changes may result from a general state, as in scurvy or purpura, and the blue line of colica Pictonum, or the specific colour of syphilitic eruptions; from one partly local, partly general, in erysipelas or erythema, and the red patches over the joints in acute rheumatism or gout; or from a purely local state, as in the formation of abscess.

Cutaneous diseases are all more or less associated with local changes of colour, which must be particularised when this class of diseases comes before us.

§ 3. The fact that a patient is first seen in bed, or going about his usual business, serves to give a vague impression of greater or less severity of the attack, which may turn out to be very false.

a. Position in bed is to be considered with reference to its being horizontal, or more or less erect; to the position of the limbs, whether flexed or extended, fixed in one position or moved freely about; to the quietude or restlessness of the patient in lying, or the maintenance of a constant posture, whether on the back or on one side. These circumstances have reference chiefly to the state of the respiration, and the muscular power of the individual, or to sensations of pain, which are aggravated by one position and relieved by another.

In many instances the breathing is felt to be much easier when the head is elevated, and occasionally the horizontal position cannot be tolerated at all: to this last the name of ortho-

pnœa (erect breathing) is frequently applied. It is independent of frequency of respiration, which may attain to three times its average rate without any consciousness of dyspnœa, and while the patient prefers lying perfectly flat in bed; but it is generally accompanied by a certain degree of hurry of the breathing. Such a distinction is often to be seen in the effects of disease of the heart or aorta upon the respiration, as compared with those of lung disease in phthisis and pneumonia. Occasionally the freedom of breathing is more interfered with by inclining to one side than the other, and this generally when one lung is from any cause obstructed, and free movement of the ribs on the opposite side is sought to be obtained by elevating the shoulder; this is seen in cases of extensive consolidation of one lung or effusion into one pleural cavity. But, on the other hand, pain on the diseased side may be aggravated by such a position, and therefore this indication is by no means a certain one.

Then, again, pain of very slight character in a fanciful person is sometimes said to be aggravated by lying on the affected side; whereas pain of a rheumatic character may be relieved by it. In congestion of the liver, although there be pain on the right side, a still more painful sensation of dragging is felt on turning to the left. In the pain of colic the patient may receive so much relief from pressure as to be induced to lie on his face.

Pain dependent on inflammatory action is always increased by pressure, frequently by movement, and hence we may generally conclude that it has this source, when it obliges the individual to maintain one constant posture. A most striking instance of this is afforded by acute peritonitis, when the patient lies flat on his back, with his knees drawn up and afraid even to breathe, lest by any possible movement the pressure on the abdomen should be increased or the relation of the viscera disturbed. What a contrast is this to the effect of pain in colic!

The absence of pain or serious discomfort, on the other hand, induces a patient who has any feeling of weakness to lie quiet, without his being in any way constrained to remain in the same position. This, however, is very distinct from the stillness which is expressive of complete prostration, or of loss of muscular power; the one patient may be characterised as listless, the other helpless. It is impossible to describe all the differences in words, and yet to the experienced eye how instructive the observation! Watch, for example, the apathy of the patient first seized with malignant typhus, and his subsequent helplessness, and compare with them the quietude of the convalescent, and the powerlessness of the paralytic. Observe, again, the marked stillness of acute rheumatism, when, for example, the patient sees some one accidentally about to touch a painful joint, know-

ing that that touch is agony, and yet not daring to move the limb out of danger.

Information may also be derived from seeing the patient in bed, which may aid in determining the reality and amount of alleged want of power, by ascertaining how far he can move those muscles in bed which seem to be useless when he is up.

These and similar indications must only be trusted to in so far as they are borne out by other symptoms, and in fact derive their chief value from pointing out the probable seat of disease and leading to further examination.

b. Out of bed the presumption is strong, that the disease is not active or acute; yet this is not to be absolutely relied on, because of the difference in sensations and constitution already referred to, which lead one person to regard as trivial what is considered of serious import by another. An erect posture indicates a state of general health and strength, and freedom of respiration; a crouching one, general feebleness, or laboured breathing. The gait may be halting on one side, or equally imperfect on both; and here it is very important to notice, whether the imperfection arise from stiffness, or loss of power; in the one case the movement is firm and steady, though impeded; in the other it is irresolute and unsteady. The features too are sometimes disturbed by paralysis.

The action in rising up or sitting down is often of use in determining this point with reference to the legs; and in the upper extremities the manner in which the limb droops when raised by the hand of the observer best discriminates stiffness from loss of power.

Paralysis will be subsequently discussed. Stiffness leads to inquiry into the state of the joints, and especially as to rheumatic affections.

As a striking contrast to these conditions, we have the involuntary jerking movements of chorea, and the quick, hurried, and rather tremulous actions of delirium tremens; we may also observe the inconsistent proceedings of one completely delirious, and the perverse stupidity of the imbecile.

§ 4. The sensations of the patient have not much reference to his general state. They include those pertaining to temperature, of excessive heat or cold, feverishness or chilliness, which sometimes contrast strangely with the actual temperature of the skin;

feelings of weakness. malaise, or pain; insomnia, giddiness, or headache; shortness of breathing; hunger, thirst, and their opposites;—all the subjective phenomena, whether related in the history of the case, or in answer to our inquiries regarding general symptoms, serve to point out the direction which subsequent investigations ought to take. We note not only their actual existence at the time, but also their previous occurrence in the past history of the case; both in their bearing on the general state of the patient, and in the light they may throw upon special pathological conditions, when the various organs subsequently pass under review, bearing in mind the sympathetic and indirect, as well as the more evident and more direct sensations. Sometimes they are such as we feel assured can have no existence in reality, and then we are led to inquire into disordered innervation, distorted imagination, or perverted function of the brain.

This is the proper period of the examination at which to inquire what the patient has to complain of. We are preparing to enter on the investigation of the special phenomena of disease, and it is a good plan to ascertain, first, in what direction the sensations of the patient point. But it must be remembered that every person has a tendency to express a theory of his malady, rather than to relate the simple facts of which his sensations have made him conscious; not satisfied with the knowledge that such and such effects have followed, he always fixes his mind on what he assumes to be their cause, and when asked what he has to complain of, his answer is commonly framed in the language of this theory. The French physicians have a form of question which seems to me very well suited to avoid this evil; they ask, "où avez vous mal?" and it would be well to adopt something of the same kind among ourselves, rather to ask *where* is the complaint, than *what* it is.

In making the observations which have just been detailed, it not unfrequently happens that some particular or unusual condition is present, which has a more direct bearing upon the diagnosis of the disease; not, let it be understood, as a distinctive mark, or special diagnostic sign, but as a phenomenon which, in the majority of instances, has been found associated with only one form of disease, or at least with a comparatively small va-

riety of cases. Some of these are very distinct and unmistakeable, while others scarcely admit of description, and are only learned by repeated observation. Even to the most practised eye such signs are more or less uncertain, and the student should never place reliance on them; they are but solitary indications, and his object should be to acquire accurate knowledge, which is only to be obtained by testing conclusions drawn from one series of observations, by others which are as distinct from them as possible. The sources of fallacy which especially affect all these special indications have been already noticed, and it is most essential to remember that they have no necessary or absolutely inseparable connexion with any one single morbid state, to the exclusion of all others. The deeper seated the lesion in all these cases, the more liable are we to fall into error. It surely needs no argument to prove that instead of trusting to such special signs, a systematic examination of the whole symptoms of the case may not only lead to the discovery of some other disease in addition to that which the particular sign, however truthful, may have indicated, but it may also point out peculiarities in the case under observation which a more cursory view must overlook; and with reference to treatment, both of these circumstances are of much importance. A few of the indications just referred to are here ranged under the four groups, into which the general symptoms have been divided, several of them having been already incidentally mentioned.

Particular indications derived from GROUP I.

a. 1. The skin.

α. The skin feels peculiarly thin and detached from the subcutaneous structures in phthisis; and to a less degree also in similar wasting diseases.

β. A feeling of fulness and tension exists in the eruptive fevers; it is accompanied by a sense of hardness in erysipelas, and of grittiness in smallpox.

γ. The nails become clubbed and the hair falls off in tubercular disease, but these circumstances are not limited to such cases; in secondary syphilis the hair also falls, and during recovery from fever.

δ. Disease of the abdomen, especially of a tubercular character, is often accompanied by a dry, harsh state of skin, which is most marked in childhood.

ε. The skin is remarkably moist and soft in delirium tremens.

ζ. The perspirations are profuse and sour smelling in acute rheumatism, but this is not specifically diagnostic as has been supposed. In some of the most intractable forms of the disease the odour is peculiarly rancid and disagreeable.

Excessive perspiration of any kind is frequently attended with an eruption of miliary sudamina.

η. Colliquative sweats are constant attendants on the later stages of phthisis and on profuse suppuration, such as lumbar abscess.

θ. Rigor, as indicated by the cutis anserina, is the common precursor of fever; its recurrence at intervals, if not from the presence of ague, or its sudden supervention during any existing illness, is indicative of the formation of pus.

κ. The crackling feeling of emphysema, and the doughy character and pitting under pressure of anasarca, are each very characteristic.

(See also changes of colour.)

a. 2. Temperature.

α. The temperature rises quickly in smallpox before the eruption, after which it sinks to a certain extent till the period of suppuration, when it again rises. The diurnal variations are considerable.

β. In measles the rise of temperature before the appearance of the eruption, is very rapid and very great. The subsequent fall also takes place rapidly, and the diurnal variations are slight.

γ. In scarlatina the rise is slower and the elevation less, but it is continued long after the eruption appears, with very distinct diurnal variations.

δ. In typhus the temperature rises slowly, and remains elevated during the whole attack, with slight diurnal variations; it then falls rapidly.

ε. In enteric fever the range of temperature is very analogous till towards the termination of the attack. This period is marked by very large oscillations before the temperature finally falls to the standard of health.

ζ. The diurnal range in ague is very wide, and the oscillations are regular in their recurrence; in pyæmia and suppuration their extent is equal, but very irregular.

η. An extreme rise and a sudden fall below the normal standard, towards the end of an acute attack, are each of evil omen, elevation usually pointing to suppuration or blood-poisoning, depression to exhaustion and failure of vital powers.

b. The pulse.

α. When frequent, the pulse is observed to be remarkably full in acute rheumatism, and generally firm in all acute inflammatory diseases.

β. It is hard and wiry in abdominal inflammations especially

γ. It is weak in fevers, properly so called; either large and soft, or small and feeble.
δ. It is rapid and jerking in hæmorrhage.
ε. It is simply hard and unyielding in old age, and in all conditions of arterial degeneration.
ζ. The rapidity or shortness of the stroke is very observable as an indication of excitement.
η. Its frequency is most remarkable in acute hydrocephalus, varying with unappreciable causes, and generally uneven or unequal.
θ. It is still more unequal and depressed, or it is slow and laboured, in cerebral disease, especially where the case is marked by pressure on the brain.
κ. Irregularity of the pulse is most commonly associated with disease of the heart, and, along with this, it is remarkably faint and feeble, if there be mitral regurgitation.
λ. A hammering pulse indicates aortic regurgitation.
μ. The pulse becomes imperceptible in syncope and in cholera, and more or less faint in all conditions of collapse.
ν. It is sometimes felt only at one wrist, when disease, chiefly in the form of aneurism, affects the origin of the subclavian, on the opposite side. More rarely, this circumstance is the effect of accidental obliteration.

c. The tongue.
α. The thin white even layer is generally indicative of slight gastric disorder.
β. The thicker coating, from accumulation, exists to its greatest extent in affections of the fauces, and less remarkably in conditions of general debility; it has a creamy look in delirium tremens.
γ. A peculiar buff leather appearance is presented in cases of enteritis and hepatitis.
δ. A patchy tongue is often indicative of considerable irritation, or even partial inflammation of the stomach.
ε. Its yellow colour is generally believed to be bilious; a dark brown colour exists only in malignant fever, and in hæmorrhage from the mouth.
ζ. The shining and glazed tongue, especially when chapped, is very common in ulceration of the bowels.
η. The papillæ project most remarkably in scarlatina; the general surface being either coated or unusually red (the strawberry tongue.)
θ. A less degree of projection through a thin white coating often accompanies hysteria.
κ Aphthæ and ulcerations indicate imperfect nutrition, and tendency to diarrhœa.

d. 1. The character of the stools.

α. Motions simply watery are the characteristic of diarrhœa, and their opposite, of a condition of constipation.

β. Undigested food is sometimes seen in the stools.

γ. They are of an ochrey colour, as well as thin and watery, in fever.

δ. They resemble rice-water in cholera.

ε. The fæces pass in scybalous lumps with blood or mucus in acute dysentery.

ζ. Mucous and purulent discharges are seen in the same disease in its chronic form; pure pus comes away when an internal abscess discharges itself by the intestinal canal.

η. The motions are black and pitchy when blood becomes mixed with the ingesta in the stomach, or upper part of the canal.

θ. They are streaked, or more or less mixed with blood of more natural colour in hæmorrhoids, and hæmorrhages low down in the canal.

κ. The stools are clay-coloured in deficiency of bile.

λ. They are sometimes frothy and yeast-looking, as if fermentation had taken the place of digestion.

μ. They may contain fluid fat, which solidifies on cooling; this is sometimes connected with pancreatic disease; or, they may contain biliary calculi, intestinal worms, and even calculi from the kidney.

ν. Occasionally the form of the evacuation is altered by passing through a strictured portion of the gut, when that is placed near its lower orifice.

d. 2. The character of the urine.

α. It is remarkably pale, limpid, and abundant in hysteria, but not persistently so.

β. It is generally dark coloured, with or without deposit on standing, in febrile states.

γ. There is a copious deposit on cooling, when the watery portion is deficient, and much acid is secreted, as in acute rheumatism.

δ. It gives a red stain to the utensil in disorder of the liver, in connexion with the foregoing state.

ε. It presents a dark porter colour in jaundice, from the presence of bile.

ζ. It has a smoky colour from altered blood when acid, and a pinkish hue when alkaline, in hæmaturia, becoming quite crimson when much blood is passed.

η. The conditions of albuminuria, pyuria, and diabetes, the characters of the sediments, and the effect of chemical reagents, will be afterwards noticed.

e. 1. The appetite becomes—

α. Excessive in diabetes.

β. Craving in mesenteric disease, or when intestinal worms exist.

γ. Depraved in hysteria—eating of chalk, cinders, slate-pencil, &c.

δ. Fanciful in pregnancy; expressed as longings for certain articles.

ε. It is very variously altered in dyspepsia.

ζ. The name of bulimia has been applied to that condition which seems to consist in nothing more than extraordinary voracity.

e. 2. Thirst.

α. Is remarkably increased in diabetes.

β. It is very urgent in cholera, and also in a less degree in diarrhœa.

γ. Diuresis with uncommon thirst, when no sugar passes in the urine, is generally due to hysteria; it is not attended with hunger.

Particular indications from GROUP II.

a. 1. Emaciation seems to affect—

α. More especially the arms and thorax in phthisis, and the face least.

β. The lower limbs and the face in abdominal disease.

γ. It is most marked in the features in malignant disease.

a. 2. Local increase of bulk becomes remarkable—

α. When the upper half of the body is anasarcous and not the lower, or when one limb only is œdematous.

β. When the head is enlarged in chronic hydrocephalus.

γ. When one side of the chest or the abdomen projects from effusion of fluid, or internal tumour.

b. 1. The aspect is often very significant.

α. A delicate appearance, with long fringed eye-lashes, often serves to point out the tubercular diathesis.

β. The thickened alæ of the nose and upper lip of scrofula are most marked in childhood.

γ. The pallor of anæmia is very important; it is waxy in chlorosis, and pasty in disease of the kidney.

δ. A puffy appearance about the eyelids, along with anæmia, is very generally an indication of albuminuria.

ε. The sallow hue of the malignant disease appears to be only another form of anæmia.

ζ. The blue colour, especially of the nose and lips, in heart

disease and chronic bronchitis, is equally remarkable, and forms a striking contrast to

η. The dusky flush of pneumonia, or

θ. The hectic flush of phthisis.

κ. The congested features and suffused eyes of typhus are exceedingly characteristic.

λ. A bloated, blotchy face generally indicates irregular habits of living.

μ. The features undergo remarkable change in erysipelas, parotitis, facial paralysis, &c.

b. 2. Expression.

α. The face is remarkably anxious in disease of the heart, and in urgent dyspnœa, *e. g.*, laryngitis.

β. It is at the same time pinched and contracted when there is much pain or suffering, especially in a vital organ.

γ. Its immobility is most remarkable in catalepsy or in states of unconsciousness, and perhaps under the influence of spasm, as in tetanus.

δ. The opposite state exists in nervousness and hysteria.

ε. The expression of the countenance is most materially altered by the swelling of œdema or erysipelas. (Many of its characters have direct reference to the brain, in treating of which they will be further discussed.)

c. Alterations of colour.

α. The whiteness of the skin is remarkable in all the varieties of anæmia already noticed, and contrasts strongly in limbs anasarcous from albuminuria with those in which dropsy is connected with disease of the heart. It is also very striking in phlebitis (phlegmasia dolens).

β. There is a certain yellowness of the malignant aspect, which is distinguished from jaundice by the pearly lustre of the eyes.

γ. The yellowness of jaundice varies from a pale orange to a deep green yellow.

δ. Redness of skin, when local, indicates congestion; when general, is more frequently due to measles or scarlatina, or simply to febrile heat. It is the marked characteristic of erysipelas, erythema, gout, acute rheumatism, and some diseases of skin.

ε. The skin has a muddy hue in disease of the spleen.

ζ. It becomes blue in Asiatic cholera; it is also blue in morbus cæruleus, and in forms of diseased heart and bronchitis.

η. It is livid in commencing gangrene; and it might also sometimes be called livid in disease of the heart.

θ. Spots and patches of discoloration are of value in recognising certain fevers, purpura and scurvy, colica pictonum, syphilis, and most cutaneous affections.

From GROUP III a very large number of particular indications might be drawn; we shall here enumerate only the more important.

a. Position in bed.

α. The head is elevated chiefly in disease connected with the heart, less frequently in diseases of the lungs.

β. The head is leant forward when there is pressure on the trachæa.

γ. The patient may be unable to lie down from pain of the head or giddiness.

δ. Lying on the back is the position of debility; it is then combined with listlessness: it is also the position of paralysis, when it is combined with inability to alter it; and of stiffness and pain in acute rheumatism, when it is chiefly characterised by stillness.

ε. The same position is generally assumed in acute peritonitis, when it is combined with drawing up of the knees towards the abdomen.

ζ. The patient assumes a prone position generally only in abdominal spasm or colic: much more rarely in consequence of the pressure of internal tumour.

η. When fixed on one side, we may generally assume that the breathing is much obstructed in the lung of that side on which he lies. When he is unwilling to turn to either side, it is commonly from the sense of pain accompanying inflammation; pressure produces pain on the affected side, while turning on the opposite causes a sensation of dragging.

b. Posture and gait.

α. Inability to stand depends on weakness, vertigo, or paralysis; in the two former the patient reclines, in the latter he sits.

β. The body is bent to one side in curvature of the spine, and also in disease of the hip.

γ. The gait is quick in excitement;

δ. Slow in debility;

ε. Laborious, staggering, or uneven in diseases of the brain and paralysis.

ζ. It is stiff and halting in rheumatism and disease of joints.

η. There is constant movement in chorea.

θ. Tremor exists in nervousness, and more especially in delirium tremens; it is seen in fever, sometimes with what is called floccitatio; it also accompanies severe rigor.

κ. Tonic spasm occurs in tetanus, in disease of the spinal cord, poisoning with strychnia, &c. When long continued, it is probably associated with inflammatory softening of the brain.

λ. Catalepsy is a peculiar form of tonic spasm; cramp is its mildest manifestation.

μ. Clonic spasm occurs in epilepsy, eclampsia, chorea, and hysteria; subsultus is also a form of clonic spasm, allied to tremor.

ν. The muscular movements generally are exalted in mania and delirium, are diminished in idiotcy and imbecility, are lost in paralysis. There is a certain restlessness sometimes belonging to hypochondriasis, and more rarely to hysteria, allying them with delirium in this external manifestation.

Group IV, when applied as particular indications referring to disease in distinct organs, would include the whole of the subjective phenomena of disease. Here we can only point out one or two which are remarkable for their indirect indications:—

α. The contrast in genuine cholera between the corpse-like coldness of the body and the sensation of heat with which the patient is oppressed; in diarrhœa there is generally chilliness.

β. As a sensation of an opposite kind, may be mentioned the common complaint of chilliness in fever when the skin is burning hot.

γ. The sensations of the hypochondriac are opposed alike to the evidence of the senses and the conclusions of reason.

δ. A patient's complaint of want of sleep is almost certain to be exaggerated: the report of the nurse or attendant can alone be relied on.

ε. The sympathetic pains form an important group. Thus pain of the right shoulder may proceed from disease in the liver; pain of the sacrum, from disease of the uterus; of the thigh and testicle, from nephritis or nephralgia; of the knee, from disease of the hip; of the meatus, from stone in the bladder, &c.

ζ. Complaints of pain are often exaggerated in persons of nervous susceptibility,

In this enumeration let it be remembered that the circumstances detailed only give us hints of what we may suspect, that they afford no certainty: and I think it will be found that the physician who is most familiar with such indications, and who sometimes astonishes by the rapidity with which he arrives at a correct conclusion by catching up some such clue to the disease, is very often grievously in error.

CHAPTER IV.

GENERAL DISEASES, CLASS A

ERUPTIVE FEVERS.

General Febrile State—Characters of Eruptive Fevers—Period of Illness—Premonitory Symptoms—Smallpox—Varieties—Chicken Pox—Measles—Scarlatina—Varieties.

The object in view is to direct the student how to proceed in the investigation of any case submitted to him, in such a manner as may naturally lead to his forming a correct judgment regarding its nature and causes. With this purpose we have directed attention in the preceding chapter to certain signs and symptoms which have especial reference to the general condition of the patient, and have endeavoured to show what conclusions may be legitimately drawn from them when taken along with the history of the case. We have also inquired what the patient has to complain of. The next step is to take a rapid survey of the various organs, and also to examine more closely any one in which evidence is given of an abnormal state by the sensations of the patient, or by facts elicited in inquiring into the history of the case.

There is a large class of cases in which local disorder, as manifested by symptoms belonging to particular organs, is only secondary and subsidiary to the general disease; with regard to such, the most important facts are those which have a relation to the general condition; and while the examination of the various organs must be by no means omitted, the evidence is chiefly negative. Occasionally more positive results are obtained, and then the examina-

tion must be more minute. The plan which I would venture to recommend is to bear in mind the order of arrangement in which the organs are placed in the nomenclature of diseases, and to ask such general questions regarding each in succession as may help us to decide whether they are or are not in a normal state. We ask if there is any complaint of headache, giddiness, or insomnia; pain in the chest, cough, shortness of breathing, or palpitation; sickness, flatulence, &c. The care with which this is done must depend upon whether the whole history of the case and the symptoms present point pretty clearly to some special disease which we are inclined to assume as their cause, or whether there be anything unusual or unaccounted for in the record of the case which has been made.

The first point to be determined is the presence or absence of a febrile state. The best evidence of its existence is the combination of general symptoms detailed in the early part of the preceding chapter, with a history of a comparatively recent origin. When symptoms of fever are present in a case of longer duration, the details must be more closely investigated; on the one hand, we may find that, though a certain amount of general or local ailment has existed, the patient has been able to go about his usual avocations till within a very short period, when more severe illness has set in with rigors, alternate flushings, and chilliness, &c.; or, on the other hand, we may find that the febrile state is only an aggravation of previous sufferings, and consequent exhaustion.

Rigor is an important, but not an essential, element in febrile disturbance; it attends on most acute diseases, but occasionally it is not observed. When present, it often serves to mark the commencement of the illness, and is therefore of value in the history of the case. Recurring frequently in the course of the attack, and described as "cold chills," it is especially

characteristic of continued fever. In inflammations it may frequently be observed in a severe form at the outset, and then is more commonly absent till suppuration commences, when the occurrence of rigor is very significant. Its periodical recurrence is the chief distinguishing feature of ague.

The next point for consideration is, whether these general symptoms make up the whole of the disease, or whether it accompanies inflammation of some particular organ; whether (to use the hard words of science) the pyrexia be idiopathic or symptomatic; and this can only be ascertained by the negative results obtained from examining in detail each of the various organs. A suspicion or guess may be formed from the circumstance, that when the skin is hot and dry, and the pulse feeble and frequent, we are more likely to have fever to deal with; and that when the skin is moist, the pulse firm and less frequent, the chances are in favour of inflammation. Pain, when complained of, may at once point out the seat of the disease when inflammation is present; but it is often absent; and in fever the sensation is only one of general pain or uneasiness, often spoken of as "pains in the bones."

Pain must be localized; that which is general, in the bones or in the muscles, a feeling of aching rather than pain, often accompanies fever: when the joints are affected and the limbs are more distinctly painful and tender, rheumatism is most probably its cause.

The essential element of fever is so entirely beyond the reach of our present means of investigation, that its diagnosis is partially imperfect. It must be made out to the satisfaction of the inquirer that no local disease exists of which febrile disturbance is a symptom, and that those local derangements which do exist are the legitimate consequences or natural signs of the presence of fever poison in the blood. Hence, if any local disorder be present, of which pyrexia is not a symptom, that must be for the

present set aside as not belonging to an inquiry into the causes of fever; and if no local inflammation be discovered, the febrile state must be taken as evidence of fever simply.

ERUPTIVE FEVERS.

The first diseases enumerated in the Nomenclature are those to which the title of eruptive fevers is commonly given. The cutaneous eruption is a necessary part of the disease when it runs its ordinary course, its absence must be regarded as an accident, and is generally of evil omen.

There may be much difficulty in deciding whether a case presenting itself with the general characters of fever may not terminate in some cutaneous eruption.

The probability is to be learned from the chances of exposure to infection, and also, in some measure, from the suddenness of the attack. The appearance of the eruption soon determines the point, and often has shown itself before the amount of febrile disturbance has been such as to call for medical aid. It is of importance to avoid mistakes in such matters, because an early isolation of the sufferer may prevent the spread of the malady to other members of the family, and blame greatly disproportioned to the extent of the oversight is always awarded to the attendant who has not foreseen the possibility of the occurrence.

In case of a sudden attack the age of the patient has some bearing on the possibility of eruptive fever, because so large a proportion of the cases occur in early life. Inquiry should also be made during the prevalence of smallpox as to vaccination, and in getting at the previous history of the case it is wise to ascertain whether the patient has had an attack of measles or scarlatina.

Children suffer more frequently from most of these fevers than adults. An attack of measles is rare after puberty, because so

few persons pass through the period of childhood without suffering from this disorder, and its recurrence is not a common event. The liability to scarlatina seems to be very greatly diminished in adult age. Unvaccinated children are especially liable to smallpox if at all exposed to its contagion; after vaccination the liability again increases as age advances, from twelve or fifteen up to twenty-five or thirty. Both in the modified and unmodified forms the first attack of smallpox may occur at any period of life, but is very much less common after the age of thirty. Each of these diseases affords a certain amount of protection from a second attack, but sufficient exceptions are recorded to prove that it is by no means absolute, and it is not uncommon to find among mothers and nurses a sort of hybrid attack, attended with some degree of fever, which puts on a resemblance to any infectious disease which may have spread among the children in the family.

The period of the illness, when the case is first seen, greatly aids in determining whether it may be one of eruptive fever or not; for, after three or four days, the chances of scarlatina or smallpox are almost gone—the eruption of measles is sometimes deferred to the sixth day of the fever; but these are the extremes, as the eruption is generally seen earlier. Definite rules are laid down in books; but these will be found in practice to be very frequently deviated from, if the history given by the friends or the patient himself be true.

In the preliminary stage the general symptoms are such as indicate a more active or sthenic type of fever than those which are not attended with cutaneous eruption; the skin is hot, and the pulse firm, and there is less of lassitude and depression. Cases of simple continued fever sometimes present similar symptoms in the early stage, and this may be accompanied by some general redness of the skin, which is apt to be regarded as the precursor of eruptive fever; it is, so far as we know, only accidental, and the progress of the case can alone determine its nature. On the other hand, in some of the very worst forms of scarlet fever, the general symptoms put on a typhoid type; and then the cutaneous eruption is scanty, or

may be even altogether absent; the depression is great, and the whole system seems overpowered by the poison. Less frequently an analogous condition is met with in smallpox, with this difference, that the cutaneous eruption is excessive in the early stage, but the constitution of the patient has not power fully to develop it; when antecedent blood-disease leads in such cases to the formation of petechiæ, the diagnosis is very obscure. Suppression of the eruption in measles seems to have more to do with the co-existence of internal inflammation than with the intensity of the disease.

The period of incubation is somewhat uncertain and cannot afford any help in diagnosis. The exact date of exposure to some infectious miasm may be known, but at the same time some unknown risk may have been run which may prove to have infected the system, and thus a child may really suffer from measles who has been supposed to have caught scarlatina.

During the incursion of the fever, prior to the appearance of the eruption there are various symptoms present which more or less point to what is about to occur:—1. In smallpox there is usually pain in the back. 2. In measles there is usually coryza. 3. In scarlatina there is sore throat, and the appearance of the tongue is sometimes characteristic.

1. The pain in the back in smallpox is occasionally a very striking feature. It is more intense than any similar condition observed in ordinary fever, in which pains in the limbs of a more general character are sure to accompany any local pain in the back, and depression is observed rather than excitement; the fever existing prior to the eruption of smallpox, when pain in the back is felt, is usually of an active form. A distinction between this local pain and that of lumbago, in the general acceptation of the term, may be drawn from its position: the latter affects the muscles at the side of the spine, and is, consequently, much aggravated by movement; the former is more central in situation and is less affected by change of posture. The subject of nephritis will occupy us at a later period. Other causes of pain in the back are not attended with symptoms of fever.

2. Coryza belongs also both to common catarrh and to influenza. In the former there is much less fever; in the latter, if the fever be equal, there is much more depression. The affection of the mucous membrane in measles is marked by injection of the conjunctivæ; in catarrh and influenza it is more confined to the throat and bronchi. I have felt for a moment perplexed by the effects of a fit of crying in a young person with slight febrile disturbance, and the hint may be useful to others.

3. The sore throat of scarlatina is characterised by diffuse redness of the fauces, without tumefaction to any extent in the first instance. That which sometimes accompanies simple fever presents less diffuse redness; in quinsy it is always associated with much swelling. In all of these the distinctions derived from febrile symptoms are to be viewed in connexion with the local state; when the characters of scarlet fever most nearly approach to typhus the redness is most marked, and it has a livid hue; in quinsy, when the swelling is so slight as to cause any doubt, the febrile state is scarcely appreciable. The sodden tongue of quinsy has always but little analogy to that of fever.

In a well-marked case of scarlatina there are generally to be seen on the tongue a number of round elevated papillæ, which, in the early stage, protrude through a white fur, giving it a dotted appearance, and at a later period stand out from the smooth red surface, producing what is generally spoken of as the "strawberry" tongue. This appearance cannot serve for the diagnosis of doubtful cases, except, perhaps, in a retrospective view.

Eruptive fevers vary very greatly in intensity prior to the appearance of the cutaneous affection; and it fortunately happens that, when the fever is most severe, the local indications just mentioned are most striking. In slight cases, where the practitioner is most likely to be thrown off his guard, he is seldom called till the appearance of the eruption leaves no room for hesitation as to the cause of the attack.

The eruptions present certain distinct forms, which, in their full development, become the basis of distinction between these diseases, as they also separate them widely from other forms of fever. Their characters are, however, occasionally so obscure, that, notwithstanding all the aid derived from antecedent and con-

sequent symptoms, cases do occur which are not free from ambiguity. In all eruptive fevers the temperature, as shown by the thermometer, rises rapidly, attains its maximum when the rash appears, and immediately declines. In smallpox there is a second rise at the suppurative stage, and the temperature continues high for some days. In measles the rapidity of the rise and fall is most marked, and the elevation often highest. In scarlatina the range of temperature is like that of smallpox, but without its second rise.

1. *Smallpox.* — The eruption usually appears first on the face, preceded by patches of redness which have a gritty feeling to the finger. A similar condition is soon seen on the rest of the body. Upon these patches minute vesicles, more or less numerous, form; some, or all of these, acquire gradually a larger size, and are filled with lymph, which soon becomes turbid and then passes into pus, each pustule being marked by a distinct depression in the centre.

When the disease is *confluent* the pustules in various parts coalesce at their edges, and large suppurating surfaces are produced. If only in a few instances this result occurs, while over the body generally the pustules remain apart, the term *semi-confluent* is employed; and it is called *distinct* or *discrete* when all the pustules are separate. It sometimes happens that the disease stops short at the stage of vesication, and only a very few pustules maturate; there is just evidence that it is smallpox and not chicken-pox, and hence by some it has been called varicelloid: it is better, perhaps, to avoid such terms, and to call it *abortive.*

These varicties form a sort of descending scale from the gravest to the mildest examples of uncomplicated smallpox. True confluent smallpox is rarely seen in a person who has been carefully and successfully vaccinated, and the abortive variety is exceedingly rare in an unprotected individual. The terms *modified* and *unmodified* are applicable to any of the varieties, and are employed merely to express that the course of the disease, whatever its form, has been shortened by the protection offered by efficient vaccination, or a previous attack of smallpox. It must be remembered that this protection is not invariable, and that the disease may follow the ordinary course alike after vaccination, and after a previous attack. In such circumstances it should not be called modified.

Sometimes the blood is so altered in character by the miasm and consequent fever, that hæmorrhage takes place, either as subcutaneous petechiæ, or from the various mucous surfaces. This establishes two varieties, the *petechial* and the *hæmorrhagic:* in both the diagnosis is often very obscure. The patient presents symptoms only of extreme depression, with a rapid and feeble pulse, the ordinary process of vesication is arrested in consequence of the blood change, and it may be only from the circumstance that smallpox is prevailing, and the impossibility of explaining the condition on any other hypothesis, that a diagnosis can at all be formed.

2. *Chicken-pox.*—Rarely seen in adults, it presents in the child little to distinguish it from the more ordinary cutaneous eruptions of infancy. A few vesicles are scattered over the body, which may be seen either as small red spots before vesication, or in their fully developed state as minute elevations filled with a serous fluid, or as small dry scabs after maturation. There is so little febrile disturbance usually that the case is not seen till it has reached the advanced stage. One rule, however, is applicable to all cases, viz., that the vesicles appear and disappear nearly simultaneously, and their duration is limited to about a week. Their first appearance and their desiccation each embraces a period of three or four days, but fresh vesicles are never seen forming, while others are dying away. This rule does not apply to any other cutaneous affection.

3. *Measles.*—The eruption consists of a mottled redness, which appears in the form of numerous rose-coloured spots, papular, very slightly elevated, and grouped in crescentic patches; the elevation is scarcely perceptible to the touch, and without any sensation of hardness. It is first observed about the back and loins, and subsequently spreads until it covers the whole body, in most instances.

In some cases the eruption appears early on the face, and in the adult particularly, if the cutaneous irritation be considerable, the patches are covered with miliary vesicles. Such cases may be readily mistaken for smallpox; but there are one or two considerations which ought to prevent any mistake. In the

first place the extent of the eruption is such as could only be seen in confluent cases, when the febrile symptoms must be marked and severe: then again the red patches themselves are quite free from the feeling of grittiness, so characteristic of smallpox.

4. *Scarlatina*—Here we find a diffused redness, of more or less brilliancy, especially affecting the front of the neck, spreading down on the chest, and also appearing at the bend of the elbow and on the legs, where, sometimes, it is more extended and general than on the upper part of the body. It commonly begins with the neck, and assumes the form of minute points of redness, which are in no way elevated, and rapidly coalesce; but the patches have no appearance of a boundary line, and the skin does not feel at all hard. It scarcely ever covers the whole surface like measles.

As in smallpox, the varieties of this disease represent the extremes of severity and mildness. Occasionally the blood undergoes such changes as renders it quite incompatible with the continuance of life, and a sudden illness and rapidly fatal termination can only be explained by the presence of an epidemic, and the hypothesis that the patient has caught the infection. In the *simple* variety there may be only slight sore throat and redness of skin, the patient suffers more than in the milder varieties of measles, there is always more fever and more distinct evidence of its presence in malaise and depression. The *anginose* variety is more severe: the redness and inflammation of the throat ends in suppuration; abscesses occasionally form in the neck, and sometimes the ulcerative inflammation spreads up the Eustachian tube and the ear is disorganized. The *malignant* type is only one degree removed from those rapidly fatal cases just referred to. The blood change is such that the rash can scarcely be at all developed, but its place is often taken by petechiæ, and if life be prolonged the suppuration of the throat passes into slough.

The more prominent complications of these several disorders have their uses in diagnosis, and therefore deserve enumeration.

1. Of measles—obstinate bronchitis, which often runs on to the deposition of miliary tubercle throughout the lungs.

2. Of scarlatina—suppressed action of the kidney, albuminous urine, dropsy.

3. Of smallpox—pleurisy, or pleuro-pneumonia.

CHAPTER V.

GENERAL DISEASES, CLASS A.

CONTINUED FEVER.

General Symptoms—Local Disorders and Complications—Typhus Fever—Temperature—Rash—Enteric Fever—Bowel Affection—Rash—Infantile Remittent—Relapsing Fever—Simple Continued Fever—Febricula.

By the term continued fever it was the custom in former times to designate a class of diseases which has now been broken up into several varieties. It was employed to indicate the absence of that interval between the paroxysms of fever which characterises the intermittent and remittent fevers, while yet the febrile attack was, in each case, the prominent circumstance to which attention was to be directed. Accurate diagnostic signs, which in their totality give pretty sure evidence of other diseases, are to a great extent wanting in fever. Cases fall under our observation in which a state of general discomfort, with very slight febrile disturbance, lasting only a few days, with no disorder of any particular organ, must necessarily be called fever, or febricula: at the same time it is quite certain that, from ignorance, or from imperfect examination, many cases are so classed which in reality ought to be called by some other name.

The history of the case may occasionally show that the individual has been placed in circumstances likely to engender fever; the fact of a previous attack of the same sort does not much diminish the probability of the present illness being fever. Its mode of commencement is very various; either there have been in the first instance some days of weakness and depres-

sion, and undefined feeling of illness, followed by rigor or cold chills; or there has been a pretty smart shivering to begin with, followed by considerable heat of skin. Loss of appetite is invariable, and observed early; thirst is later in its occurrence, headache is generally an early symptom, as well as a foul tongue and quick pulse.

In reviewing the general symptoms in detail, we find that the temperature of the skin is elevated; it has, in the majority of instances, a hot pungent feeling; but there are numerous exceptions, in which it is constantly or occasionally moist, nay, whole epidemics in which it is invariably so. The pulse is always frequent. This may amount only to very slight acceleration, or it may reach to more than double its ordinary rate; it may be more or less large, but is always soft and weak, and sometimes very feeble. The tongue is invariably furred in the commencement: subsequently, in some cases, it becomes peeled and chapped, having a tendency to be dry while fever lasts; in other cases the fur thickens and adheres, especially to the centre, leaving the edges bright and red; in the severer forms of the disease this coating is often brown or even black, and sordes collect on the lips and teeth; thirst is complained of in such cases while consciousness remains, and thus its absence may be of good or evil augury, as it indicates decrease of fever or diminution of sensitive perception. The bowels are sometimes confined and sometimes relaxed in association with certain varieties; the urine, always scanty, varies in its other characters according to the form and duration of the fever. There is usually a condition of listlessness and depression which, when present, is eminently characteristic of the presence of fever.

These general symptoms give the clue to the existence of fever, but it is next essential to determine whether the fever be idiopathic or symptomatic; itself the cause of all the changes observed, or only the consequence of some previous condition. The first feature that strikes the observation is that the blood

is in a state of depressed, not exalted vitality. This is exhibited by lassitude and weakness, great in proportion to heat and dryness of skin, and by feebleness of pulse, increasing in the ratio of its frequency. This character is so constant in the disease that it must never be forgotten. More mischief has resulted from a mistaken view of the symptoms observed in various organs in this respect than from any other cause. Local congestions occur in its course; and in consequence of the irritation thus caused, a sort of inflammatory action may be produced. In the peritoneum there may be actual inflammation in consequence of ulceration or perforation of the bowel; but these secondary actions are not of the essentials of fever, and the congestion itself has no element of inflammation in its origin.

In reviewing the various organs we find,

a. In the head delirium, insomnia, unconsciousness, coma. That these are not due to inflammation is proved by the history of the case. They have been gradually developed, beginning with restlessness at night, occasional muttering at that time, with perfect consciousness by day; there has been no intolerance of light; the headache is diffused and general; the pupils have not been early contracted; the symptoms have only attained in the later stages to their maximum, and even then they still continue to be much more marked at night; they are accompanied by listlessness and depression, as opposed to excitement. Deafness is a very common condition in severe cases of fever, sometimes persisting, more or less, during the whole period of recovery. It would seem to be only one expression of the general obtuseness of all the senses, which is often so remarkable.

b. In the lungs congestion almost always comes on more or less from position, and especially in those cases where the blood is most altered in character. This is not true pneumonia; it only degenerates into low inflammation in consequence of the stagnation of the blood in the pulmonary capillaries. Here, too, the history points out that cough and rusty sputa have not been the early indications of the attack, but have supervened during its continuance. A condition of the mucous membrane allied to that of the skin in fever may produce a certain amount of bronchitis. This sometimes occurs early; but it will be remarked that the febrile state is far greater than any that experience teaches us can be caused by bronchitis, however acute; in addition to which, the febrile state accompanying acute bronchitis, when it depends on an inflammatory condition of the membrane, is sthenic; that of fever itself is essentially asthenic. The combination of fever and bronchitis, bearing the name of influenza, will be noticed afterwards.

c. There may be tension and tenderness of the abdomen. Here we have quite a different class of phenomena; for ulcera-

tion of the intestines is peculiarly a concomitant of enteric fever, and of this symptom it is still more true than of the passive congestions already noticed, that subsequently a condition of real inflammation of a low type occurs; in fact ulceration is itself an action of this kind; and as it extends to the other coats of the bowel, and especially the peritoneal covering, the symptoms become more and more closely allied to abdominal inflammation.

In its earlier stage the state of the stools shows the tendency to ulceration; and after a very short time slight tenderness comes on, which may be soonest detected in the right iliac fossa —often not noticed by the patient, not complained of, and not produced by slight handling, but shown to exist, when gentle yet firm, deep pressure is made, by its causing a pinching of the features, and transient expression of anxiety, accompanied by a gurgling sensation. Subsequently great tympanitic distension occurs from loss of muscular contractility, which is an evidence of more decided inflammatory action; and this may pass, by almost unnoticed gradation, into peritonitis, or may end in sudden rupture and extravasation of the bowel contents. The tongue, as already noticed, shows in such circumstances a tendency to peel, especially along the centre; it becomes red and shining, often dry at the same time, and subsequently chapped, aphthous, ulcerated.

It would appear that this state of tongue is sometimes unaccompanied by other general symptoms of ulceration of the bowels, and is not always present when we believe ulceration to be going on. It seems to depend on a general cause, affecting most commonly the whole mucous tract, at least as far as the ilio-cæcal valve, but sometimes more limited and local. The one condition is not to be presumed to be derived from the other.

The fæces are thin, watery, curdy; sometimes of an ochrey colour, often very dark, and occasionally pitchy, from the presence of blood derived from an ulcerated surface; always fœtid and offensive. When consistent or natural in appearance, we may be sure that ulceration is not going on.

d. In milder cases we find an allied condition consisting of irritation of the mucous membrane, which may show itself in sore throat, or in gastric pain and tenderness, or in diarrhœa. Here the distinction to be drawn between local disorder *per se*, and such disorder arising out of, and accompanying a general state, must be arrived at simply on the principles already pointed out—first, febrile disturbance, out of all proportion to the local disorder; second, its character being asthenic, as opposed to inflammatory fever.

The character of the fevers of the present day most unques-

tionably tend towards debility; and we rarely find a pulse that has even any degree of hardness, never one that suggests the propriety of bleeding: the powers of life are wholly prostrated, the nervous centres are partially insensible to impressions from without, and are unable to exert steady muscular movement by energetic stimulus from within. But, if we trust the observation of men of judgment and experience who have preceded us, it was not always so; and at some future period the disease may again put on a more inflammatory character.

1. *Typhus Fever.*—In its most decided form this disease is always seen as an epidemic, spreading by some sort of miasm, the infection of which is most readily conveyed by the atmosphere; but the history of exposure is always so uncertain that this circumstance is not available for diagnosis, further than that the existence of an epidemic, or the presence of other typhus patients in the same house, offers a presumption that a person suffering from fever is affected with the same malady, and this in obscure cases is often of considerable value.

The seizure, by no means so sudden as in the eruptive fevers, is still much more pronounced than in enteric fever—a rigor or an intense headache, followed by feelings of alternate chilliness and burning heat, and a general sense of illness, leaves no doubt in the patient's mind that he is much out of sorts. During the first few days the general symptoms stand alone as indicative of anything being wrong, and among these none is so important as the thermometer. A daily rise of temperature, which is most marked in the evening, and may be accompanied by a very slight fall in the morning temperature, is a very certain indication; and though there be averages which represent the probable course which each form of fever will follow in this respect, yet no absolute rule can be laid down as a certain indication which is present in any given case.

As the disease advances the appearance of a cutaneous rash helps to give certainty to the diagnosis. In its more pronounced form a patient is found with a

dusky colour of face, depressed countenance, listless, or even partially unconscious expression, eyes suffused, tongue dry and brown, with a thick crust on the centre, lips and teeth covered with sordes, skin dry and hot, but not pungent (the vitality being so much depressed), his pulse is quick and weak, and his movements are few and tremulous, or accompanied by subsultus. In such a case the skin will often be found covered with a mottled measly-shaped rash, of a purplish or mulberry colour, with no perceptible elevation, and of more or less persistence under pressure with the finger, becoming fainter, but not disappearing altogether, and, in the worst cases, passing into or mingled with ecchymosed spots, which are wholly unaffected by pressure. In the latter case the colouring matter has actually become extravasated, as in purpura, and to this the name of petechiæ is applied; in the former there is merely a retardation or stoppage of dark-coloured blood in the cutaneous capillaries.

In such circumstances the diagnosis is no longer doubtful; but the spots may not be so characteristic, or may even be entirely absent. In the former case may be observed numerous distinct, rounded, scarcely elevated spots, not so dark, of a crimson colour, with a similar character of persistence, not wholly disappearing under the finger. Occasionally one or two of these may put on a blacker colour, and become altogether persistent by ecchymosis. Both varieties of spots may be seen in the same individual, either together or at different periods of the illness. They are found on the extremities as well as on the trunk, and commence from the fifth to the eighth day of the attack. After its first appearance the rash comes out pretty rapidly, is complete in a few days, and lasts, more or less unaltered, until convalescence begins, when the whole dies away together.

In hospital practice the patient often exhibits, especially about the neck and upper part of the chest, a number of minute puncta of a blood-stained appearance, perfectly unaffected by pressure

with the finger, and having more or less of a triangular shape; when once observed they can be easily recognised and distinguished. They are merely flea-bites, but they have this value in diagnosis, which is often overlooked, that the accompanying ecchymosis indicates depressed vitality. They have no real connection with fever, and are just as often seen in other acute diseases of a low type, but a flea-bite in a healthy subject never presents the same appearance.

Allusion has been made to the occurrence of true petechiæ—actual extravasations of blood. They are usually much smaller than those seen in purpura, and rarely so well defined; still the skin looks as if it were stained through with the blood colour, and they are wholly unaltered by pressure. They either take the place of some unusually dark fever spots, or appear independently of them, and may indeed be seen in cases in which there never has been any rash at all. In such cases their presence gives a very unfavorable prognosis.

2. *Enteric Fever.*—This form of fever generally commences with a varying period of malaise, in which the patient feels out of sorts, has occasional chills and hot flushes, very generally suffers from some diarrhœa, and complains of aching pains all over him, but is not able to say exactly what is amiss. The causation of this form of fever is so little understood, that it gives us no help in diagnosis. Just as in typhus, a daily rise of temperature, and the absence of any symptom betraying the existence of any other acute disease, serve as our most certain guides until the character of the stools and the appearance of the rash determine the question.

In a typical case there is much less general depression than in typhus, the face seldom dusky, the eyes rarely congested, subsultus is less frequently seen, the movements may be tremulous, but there is much less apathy and listlessness. The skin is hot and peculiarly pungent; the pulse, more or less quick, is not so feeble; the tongue, presenting at first very red edges, soon becomes peeled in the centre, is sometimes chapped, raw, and glossy, or occasionally with a dry thin crust over the abraded mucous membrane; perhaps it is evenly and thinly coated, or has a patchy

appearance, according to the condition of the intestinal canal. Diarrhœa persists, and is with difficulty held in check, accompanied by tenderness in the right iliac region. The spots are few in number, three or four over the chest and abdomen, rounded, slightly elevated, of a pink or rose colour, and disappearing entirely under the finger, but returning rapidly as soon as the pressure is removed, one of their chief features being that they appear on successive days one or two together, commencing from the seventh to the twelfth day, and after a duration of a few days disappear, leaving others in their place.

These characters are not invariable: sometimes the spots are considerably larger than those already described as dusky spots; occasionally, too, they are much more numerous, and the colour becomes deeper; they then assume some degree of persistence, but are very rarely, if ever, associated with, or transformed into, ecchymosis. In fact, the extreme blood change of typhus rarely exists in enteric fever. At the same time it is by no means easy to distinguish a case of this kind from the milder forms of typhus in which the mottling of the skin and the mulberry hue are wanting; especially if the bowel ailment be of slight or transient character. Here it would appear that the thermometer may throw important light on the diagnosis of the case. In typhus, when convalescence commences, there is a considerable fall of temperature, which is persistent during recovery, except when accidentally disturbed by any untoward circumstances: in enteric fever, on the other hand, the first fall of temperature, which usually takes place in the morning, is followed by a very decided rise at night, and for some days the thermometer indicates a series of oscillations which are not seen in typhus, in which evening exacerbations do occur, but they are comparatively slight.

The excitable frame of childhood portrays more vividly the exacerbations and remissions which, even in adult age, are in greater or less degree observable in a case of continued fever; and in them the remission becomes so marked that for a time the disease seems almost to be gone. The prominence of this one symptom has led to the disorder receiving the name of *infantile remittent fever;* but there is no sufficient reason for separating it from the enteric fever of

adults, to which class it is now usually assigned. It has to be distinguished from the febrile attacks due to worms, teething, and other sources of irritation; but it is of still greater importance to know how to distinguish it from the much more dangerous malady known as acute hydrocephalus. The same rule must be followed as in the study of continued fever in adults; our conclusion must rest more on negative than on positive evidence. We have positive evidence of an acute febrile disease; we seek for negative evidence that there is no inflammation of the head, the chest, or the abdomen. The investigation of these points will occupy our attention at a future period; and in the consideration of acute hydrocephalus reference will be made to the points of resemblance and difference, in so far as they can throw light upon the discrimination of these two diseases, which are unfortunately often mistaken for each other.

3. *Relapsing Fever.*—Before the observations were made which led to the discrimination of the various forms of fever the occasional occurrence of an epidemic in which the main features of the fever were so different from those seen in typhus was very perplexing. Its sudden incursion and the sharp fever of the first few days of its existence led to the free use of the lancet, which no doubt increased its mortality. At the same time the entire subsidence of the fever, after a few days, was apt to be regarded as proof of the benefit derived from venesection. An interval of about a week brought with it an abrupt relapse, and these alternations were occasionally repeated more than once.

The diagnosis of the disease rests simply on the observation of such a sequence of phenomena, and the care taken to ascertain that the symptoms, while they last, are simply those of fever, and that no evident cause of the relapse can be traced. At the same time, knowing the disease to be essentially epidemic, it

is hazardous to pronounce an isolated case to be one of relapsing fever when others are not known in the same neighbourhood.

4. *Simple Continued Fever.*—It has been already pointed out that the diagnosis of fever is to a certain extent negative ; and in the absence of cutaneous rash and bowel ailment this allegation is more unquestionable. Circumstances connected with the history of the case may, indeed, enable us to pronounce with much confidence that it is an example of either typhus or enteric fever, although no rash be seen, no proof of ulceration exist. On the other hand, cases present themselves of which we cannot speak with certainty, and some few in which the absence of diarrhœa throughout, renders it clear that the disease is not enteric fever, and the character of the general symptoms is such as debars us from calling it typhus. This point will probably be cleared up ere long, but for the present we must be content to refer all such attacks to this class. And when, as sometimes happens, it passes off in three or four days, in place of lasting ten days or a fortnight, the case will properly be called one of *febricula.*

CHAPTER VI.

GENERAL DISEASES, CLASS A.

INTERMITTENT FEVERS.

The Intermission—Varieties of Ague—Quotidian—Tertian—Double Tertian—Double Quartan—Irregular—Remittent Fevers.

The great distinction of this class of fevers is their perfect intermission. All fevers are liable to exacerbations; and the remissions were considered in former times no less essential than any of the other symptoms, such as hot skin, quick pulse, &c. They are now regarded rather as accidental, and dependent on extraneous causes, than as belonging to the necessary effects of the fever itself, when it comes under any of the classes already enumerated. But when complete intermission occurs, and when the patient for a long time feels tolerably well during the interval, the type of fever is wholly different. The history is, therefore, one of the most important guides to diagnosis. If a patient be seen just as the cold stage is passing away and the hot one commencing, during the first paroxysm, or if he have not sufficient intelligence to have marked the succession of its stages in a previous one, there is nothing to distinguish it from simple fever. The cold stage is more marked, and the heat of skin is out of proportion to the duration of the attack, and to the appearance of the tongue; but this is not sufficient to distinguish it from the incursion of eruptive fever, or of some inflammation, until profuse perspiration follows and the complete intermission arrives. The absence of the special indications already pointed out, and of local pain, probably contradict such an

idea; and we then inquire into the possible causes of the attack, and especially the exposure to local malaria in ague districts.

The rigor is generally intense, and the perspiration profuse,—such, indeed, as are never met with except in deep-seated suppuration; and if there be no history of any serious derangement of health, which would of necessity accompany previously existing disease of any internal organ, there need be little doubt of the nature of the case. These symptoms are soon followed by complete intermission; and, finally, the recurrence of the attack, after a longer or shorter interval, makes up the entire history of the disease.

The completeness of the intermission, the disappearance of everything like fever in these cases, deserves especial observation, because it forms the most trustworthy evidence of the true nature of the disease. Delusive hopes, and perhaps mischievous treatment, are not unfrequently based upon intermissions which have an appearance of regularity, but are incomplete in other characters. The intermittents of the tropics present anomalies which are sometimes very perplexing; but in this country, except the patient be worn down by oft-repeated paroxysms, I think it extremely dangerous in diagnosis to admit that any fever belongs to this class, simply because the remissions assume some regularity of type. The paroxysms in ague may recur at nearly the same time next day, when it is called quotidian; on the third day, tertian; or on the fourth day, quartan. These are all regular intermittents, and an approach to regularity in the period of recurrence is the rule in the greater number of cases. Occasionally an appearance of irregularity is produced by anticipation or postponement of the paroxysm; the former in the commencement, the latter in the decline of the disease; the rigor begins half an hour or an hour earlier or later on each recurrence. Another cause of an appearance of irregularity is the existence of what is called double tertian.

The paroxysms on the first and third day begin at the same hour, but on the second day the rigor comes on at some different period, and this is again repeated on the fourth day; it thus simulates an irregular quotidian. Similarly a double quartan is stated to exist, which is marked by the presence of fever at different hours on two successive days, while the third day is free. On the fourth day the same sequence again commences, the sixth day being passed without a rigor. The curative treatment is now so quick and efficacious in the early period, that opportunities are seldom offered in this country of studying such phenomena.

Sometimes the paroxysms recur at such irregular intervals that the disease must simply be called an irregular intermittent. These cases are rare; and when they supervene on previous disorder, the possibility of deep-seated suppuration must be considered and the judgment held in suspense, until their distinct recurrence on one or two occasions, and the condition of comparative health and freedom from disorder during the intermission, relieve the mind from such an apprehension. On the other hand, when serious derangement of health has preceded the first shivering, irregular paroxysms are most probably caused by suppuration; and when the patient continues ill during the intervals, this probability amounts almost to certainty, even when we cannot make out its exact seat. In short, the diagnosis must rest almost entirely in such cases on the condition of the patient during the intermissions.

The liability to a recurrence of aguish symptoms in one who has suffered from intermittent fever, most marked in the tropical form of the disease, is worthy of remark, differing so entirely as it does from the other febrile diseases in this respect. Smallpox, measles, and scarlatina, each confers on the sufferer a well-recognised immunity more or less complete from a second attack. The evidence is not so satisfactory in the case of continued fevers, but still the presumption is strong that they have a somewhat similar effect. The very opposite holds true

of ague, and the tendency to recurrence seems to be in the direct ratio of the severity of the attack. This fact is of some importance in diagnosis. A patient who has suffered from intermittent fever in the tropics will very often, without any fresh exposure to malaria, have an attack of ague merely in consequence of disorder of stomach or liver; and any acute disease will present well-marked shiverings and intermissions in a similar case, without the occurrence of suppuration. Here, it will be observed that, while the symptoms are due to malarious poison, the completeness of the intermission just referred to as one of the most constant indications of the true nature of the disease is obscured by the coincidence of some other affection which acts as its exciting cause.

Remittent Fever.

One of the diseases of hot climates with which we are as yet but very imperfectly acquainted. The exacerbations of the continued fevers become so prominent, and the intermissions of the malarious fevers so indistinct and incomplete, that it is exceedingly difficult to draw the line between the two, though in temperate climates it seems impossible to confound them together. It is generally received at present that yellow fever is the type of the miasmatic and continued fevers in hot climates, and that remittent fever includes all the varieties of the local malarious type.

CHAPTER VII.

GENERAL DISEASES, CLASS A.

Continued.

Specific Bowel Flux—Simple Cholera—Malignant Cholera—Special Characters—Choleraic Diarrhœa—Diphtheria—Paralysis— Hooping-Cough — Mumps —Influenza — Erysipelas, Simple —Phlegmonous — Diffuse Cellular Inflammation—Pyæmia—Secondary Deposits—Pustules—Abscesses—Mode of Formation—Glanders—Farcy.

SPECIFIC BOWEL FLUX.

1. *Simple Cholera.*—Commonly known as English or Summer Cholera, this form of bowel flux is chiefly remarkable for its occasional close resemblance to malignant cholera. Distinctive characters may be traced by close observation ; but the one striking fact, of the absence or presence of epidemic influence, is that on which we must chiefly rely. The diagnosis of the first few cases before the outburst of an epidemic must always to a certain extent be doubtful ; and while it is prevailing at a place at no great distance, they cannot be looked on otherwise than with suspicion. Yet the symptoms of a case of simple cholera may come very near to those of a mild attack of malignant cholera. The serous character of the evacuations, both by vomiting and purging, is very much the same ; the absence of pain is equally observable, except that caused by the cramps which are present in each ; collapse, too, is seen in both diseases, though much more intense in the one than the other. In their tendency to a fatal termination, however, there is a striking difference.

From all other forms of bowel flux it is distinguished by the absence of any assignable cause, by the painless character of the diarrhœa, the rice-water appearance of the stools, and the almost invariable concomitant of vomiting of similar secretion.

2. *Malignant Cholera.*—This frightful disorder, which has come to us from the tropics, and has visited us so frequently of late years, must be classed as one of the acute blood diseases, with evident febrile reaction after recovery from the stage of collapse. It must be admitted that in very many instances the fever, as such, is very slight in intensity, as compared with the previous depression; in others, however, it is a formidable event, and not unfrequently the cause of the fatal termination. One characteristic, which must not be lost sight of, is its epidemic character. Though we cannot exactly trace the manner of its propagation, it clearly follows the general laws of all epidemics—such, for example, as typhus, the commonest and best known of those of this country.

A correct history may ultimately be the means of our learning its mode of propagation, as it has already served to determine that its cause is not simply an atmospheric influence floating about over our heads. In diagnosis it is of little service, except so far as it may preserve us from paying too much regard to the presence of collapse as indicating cholera, when there is any other antecedent cause of exhaustion. Collapse is, in reality, only an accident, which may coexist with any condition of extreme depression, *e. g.* the colliquative diarrhœa of phthisis.

The general symptoms in the commencement of cholera are very different from those commonly seen in fever. The skin is cold and clammy; the pulse feeble and not frequent; the tongue cold, moist, and not much coated; the stools remarkably copious, pale, and free from odour; the urine suppressed; there is almost always severe vomiting; and the excessive

thirst is such as naturally results from the enormous discharges from the whole of the alimentary canal. As the disease proceeds to collapse, the symptoms increase in intensity, the coldness of the skin and its blueness or lividity become most striking; the pulse imperceptible; and the stools and vomit assuming the characters of a thin, colourless fluid, resembling rice-water. In reaction the skin sometimes remains cold for several days, and is, perhaps, never hot and dry, as in ordinary fever; the tongue becomes more coated; the pulse slowly returns, and is frequent and feeble; the diarrhœa ceases; thirst abates; and in favourable cases the urine, at first scanty and albuminous, is gradually restored to its normal condition. When this secretion is not re-established soon after reaction commences, the issue will probably be unfavourable.

The aspect of the patient is depressed, and the expression listless, and there is a remarkable appearance about the eyes, which, during the existence of epidemic cholera, has often served to warn myself and others that an attack of diarrhœa would proceed to the more fully developed disease. It is hard to describe in words; but consists of hollowness of the orbits and sinking of the eye, with a leaden colour around, and a listnessness of expression. The colour of the skin first assumes an earthy hue, subsequently passing into complete lividity, which lasts, especially on the hands, during the greater part of the stage of reaction.

The patient makes little complaint of pain, except of that dependent on cramps. By some the occurrence of cramp is regarded as *the* symptom which distinguishes cholera from simple vomiting and purging: it is simply an accident; a very common one truly, but one which may not occur in real cholera, and may be present when the case is unequivocally not malignant cholera. There is no complaint of nausea, though the constant and urgent vomiting can scarcely be supposed to exist without it; there is also no complaint of pain

with the purging: the sensations, no doubt, are blunted; but this painlessness is an important feature in the case, and it may even excite surprise on the part of the patient himself, that such enormous discharges take place from the stomach and bowels, when he has so little feeling of internal derangement. In the beginning of an attack, the existence of diarrhœa without pain or griping, will cause the medical attendant to be on the alert; but, unfortunately, it has just the opposite effect with the patient, who cannot fancy that anything is seriously wrong when he has so little feeling of discomfort. Another remarkable feature is the sensation of burning heat and oppression so often complained of, while the skin is cold and corpse-like; the patient obstinately resists every attempt to raise the temperature by artificial means, and in the restlessness of the disease, throws off the warm blankets in which he is wrapped. During convalescence the urine is generally albuminous for some days. This would seem to be merely the consequence of the general arrest of the circulation during collapse.

Among particular symptoms are ranked the change of the natural sound of the voice into a hoarse whisper, the *vox choleraica;* and the circumstance that the tongue and the breath are sensibly cold to the hand of the observer. These facts may be interesting in any particular case, but, as they belong to the accidents of the disease, they must not be elevated into diagnostic symptoms.

The mental faculties are not obscured till an advanced period, when the pupils become contracted, the brain oppressed, and the patient comatose. Prior to this, there is only a condition of restlessness of body and inactivity of mind.

3. *Choleraic Diarrhœa.*—During the existence of an epidemic of cholera there can be no difficulty in classifying the cases which present well-developed features of the disease; but its march is attended by coincident diarrhœa, and there is in reality no definite boundary between the one and the other.

Every link is filled up by cases of varying intensity, from the very worst of cholera to the mildest of diarrhœa. The indications by which we are guided, the characters of the evacuations, the existence of collapse, and the suppression of urine, are not directly connected with the essence of the disease, and do not show where the line is to be drawn. Hence it is that one observer records a smaller mortality than another, because he includes a larger class of cases; and that the same treatment appears to be followed by such varying success in different hands.

If it be sought to draw a line somewhere or other, it would, perhaps, be safest to fix it where there is no vomiting, and the absence of collapse shows that the case does not partake of the true character of malignant cholera.

During the presence of an epidemic of typhus, there is extreme difficulty in distinguishing cases dependent on the epidemic influence from those which might have equally occurred during its absence; so during an epidemic of cholera, there is often much difficulty in recognising a case of simply severe diarrhœa. In the one case or the other the distinction is only based on the totality of the symptoms, placing it rather under one denomination than the other; and until we know something more of the real nature of the disease, we must not forget to give its due weight to the *à priori* argument of its universality and its transmission from one place or person to another.

Some observations have pointed to impure water as one of the means by which the disease is propagated, and it has become almost a habit with some to look invariably to the water-supply as the cause of cholera. Were this view established, it might assist in the discrimination of doubtful cases, and would, no doubt, be of incalculable value in checking the spread of the disease. The best informed on the subject only speak of it as one of the modes of propagation, certainly not as the only one.

DIPHTHERIA.

This name has been substituted for the older one *diphtheritis* (French, *diphthérite*), which was applied to an epidemic disease seldom observed in this country, but fully described by French authors. Of late

years it has prevailed pretty extensively, and it is worthy of notice that it has been so associated with scarlatina, that in numerous cases it has been impossible to say whether the throat affection belonged to this peculiar disorder, or whether it was only what used to be called malignant sore throat, a form of scarlatina in which the eruption on the skin was prevented or suppressed. Indeed, it has seemed that in many cases the disease commencing as an exudation on the fauces has terminated in sloughing ulcer.

Diphtheria, properly so called, is attended with less febrile disturbance than scarlatina, and does not usually present the typhoid characters of malignant sore throat. There is usually some degree of fever, with malaise and general discomfort, and feeling of soreness in the throat: it is quite remarkable how, in the very gravest cases, the disease may proceed almost to its fatal termination without the patient imagining that there is anything seriously amiss. On inspection patches of whitish lymph are seen more or less extensively covering the uvula, tonsils, and pharynx; when these are detached the mucous membrane is left raw and inflamed. In milder cases the affection terminates after a few days in gradual recovery: in the more severe forms the patient sinks exhausted from the persistence of the fever, and inability to take nourishment; or sloughing of the throat may supervene. The fever, though not very pronounced, is always of an asthenic type, and this character continues to be seen during convalescence. One of the most remarkable facts connected with the disease is the occurrence of paralysis, which is not confined to the muscles of the neck in proximity to the site of diseased action, but extends to various parts of the body.

It is a disease especially of childhood, and indicates a constitutional tendency to that form of plastic exudation which is of so much moment when it invades the trachea in croup. When the exudation tends to spread in this direction it becomes very formidable. In other instances the exudation takes place on

other mucous surfaces, especially the vulva, or on a portion of skin deprived of its cuticle.

From croup it is distinguished by the site of the false membrane, and the epidemic tendency which diphtheria always presents. Croup seems to be a non-infectious inflammation of the mucous membrane of the larynx and trachea, differing only from other similar inflammations in the presence of plastic exudation; while diphtheria is a specific infectious fever with exudation on a mucous surface, and only accidentally affecting the larynx or trachea, because of their proximity to the fauces.

Occasionally, cases are seen in which white patches on the tonsils accompany ordinary sore throat. These are, no doubt, in some cases of the same nature as diphtheritic exudation; in other instances they seem to be the inspissated secretion of the follicles; in a third set of cases they are probably of the nature of aphthæ, or, yet again, they may be small spots of ulceration. In all such the absence of constitutional symptoms is the leading feature in diagnosis.

HOOPING-COUGH.

As in many other diseases in which the group of symptoms is better known than the nature of the internal lesion, hooping-cough, when well marked, cannot be mistaken; and diagnosis has only to do with those cases which are obscure, because the whoop is imperfectly developed, or because the disease is simulated by or complicated with other affections. Simple catarrh of childhood may very readily pass into hooping-cough if it be at the time prevailing epidemically: in such circumstances we may reasonably conclude that it is only the precursor of such an attack when the cough is at all paroxysmal, or is an urgent or an early symptom, when the fever is slight, and there is but little derangement of health, especially when auscultation fails in detecting bronchial irritation proportionate to the severity of the cough. When the disease is fully formed, if a paroxysm occur in our presence, the case can scarcely be mistaken; but we must often trust to the report of others; and there is a tendency to error in listening to the statements of mothers and nurses, who usually anticipate us in the conjecture of its possible presence, and are disposed

at once to attribute any peculiarity in the child's cough to this cause. The presence of vomiting often helps to throw light on the case when the account of the paroxysm is imperfect. In hooping-cough it is frequently excited by the cough itself, which is very unusual in other affections of the chest: in the one case it is caused by the cough, without sickness or loss of appetite, and the child will take his food directly afterwards; in the other, the stomach and bowels must be disordered, and the relation to the cough is far less evident.

In the early period of an attack of alleged hooping-cough, the presence of much bronchial secretion should make us cautious in accepting the statement of the friends as to the nature of the disorder; similar caution is necessary when the disease is said to have attacked a child who has been long suffering from cough before anything like a whoop was observed. In its latter stages there is usually much bronchial secretion, and the disease is frequently complicated by inflammation of the lung or effusion into the venticles of the brain; in very protracted cases it may terminate in the development of tubercle: diagnosis must then take account, not only of the present symptoms, but of the history at a time when the characters of the affection were simple and unmixed with those of subsequent complications. An ill-developed child in whom an attack of bronchitis is attended with excessive secretion, or one whose lungs are becoming stuffed with tubercles, when the secretion is scanty and adhesive, are each of them very liable to fits of coughing, in which, while there is no real whoop, the struggle for breath is very analogous to the abortive paroxysms which occur before hooping-cough is fully developed, or when it is passing away. It is worthy of note that the premonitory catarrh is occasionally limited to the nares, and may never pass into the bronchial tubes.

MUMPS,

Though unquestionably an infectious disease, and properly finding its place here, will be better discussed with reference to diagnosis among the diseases of the mouth.

INFLUENZA.

This disorder is characterised by an irritation or inflammatory condition of the mucous membrane of the lungs, implicating also that of the nares and the conjunctivæ; but, superadded to this, and constituting its essential feature, is the lassitude and exhaustion of fever. A common catarrh, or an attack of bronchitis, it is now the fashion to call influenza. In scientific diagnosis they ought to be distinguished; still, cases must occur in which these different diseases so merge into each other as to render it difficult, or even impossible. Thus, in an enfeebled constitution the least disturbance may provoke symptoms of general derangement, with fever of an asthenic type, closely allied to influenza; exactly as more severe disease may in the same constitution cause typhoid symptoms, or symptoms resembling typhus. The determination will be much aided by observing whether the attack occurs as a solitary instance, or whether similar cases are numerous at the same time.

It is unnecessary to enter much into detail, with regard to the history and the symptoms. Whatever is true of simple continued fever in its milder form, is likely to be true of this disorder, bearing in mind that the mucous membrane of the lungs is the principal seat of morbid action. The history points out its recent commencement, even when supervening upon previous ailment. The general symptoms indicate a febrile state; the aspect of the patient is more or less depressed; his sensations lead him to complain of a sense of lassitude and general discomfort; and of cough, tightness of chest, &c., such as are usually present in catarrhal affection. The chest symptoms are those of acute bronchitis.

Influenza differs from continued fever with superadded bronchitis, chiefly in the greater prominence of the symptoms of

irritation of the mucous membrane of the lungs, and the affection of the nose and eyes, as well as in the comparatively milder character of the fever; but this is often only a question of degree.

ERYSIPELAS.

Erysipelas is not marked by any special prodromata; there is a general sense of malaise, sometimes sore throat, and, not unfrequently, a dull, aching pain, or pricking sensation, in the part that is to be attacked. There seem to be good reasons for considering it a febrile disorder, though the surface attacked be limited and its manifestation so entirely local. The fever is not to be regarded as inflammatory fever dependent on local inflammation, even in cases in which the exciting cause would seem to be the presence of some wound of skin or other injury. Erysipelas is no part of the ordinary process of suppuration. It is something superinduced upon this, and is constantly seen without any traumatic origin.

The causation is somewhat obscure, and, for the present, three diseases are grouped together, which may ultimately be separated from each other, but which present considerable analogies on close examination:—

1. Simple or Cutaneous Erysipelas.
2. Phlegmonous or Cellulo-cutaneous Erysipelas.
3. Diffuse Inflammation of the Cellular Tissue.

In *simple erysipelas* we find a diffused redness, confined to a particular locality, with considerable tumefaction, and a sensation of superficial hardness; it appears much more commonly about the head and face than elsewhere. In *phlegmonous erysipelas* there may be the same diffuse redness and tumefaction, but the sensation, on touching it, is rather that of tension than hardness: in the one, the skin itself is thickened by infiltration; in the other, the redness is only sympathetic, and the tension comes from the infiltration of the deeper lying structure, just as happens in the redness over a joint affected by acute rheumatism.

Diffuse cellular inflammation is undoubtedly the same disease as phlegmonous erysipelas, except that the skin is not involved—the affection is too deep seated for this external manifestation of its existence. Its history classes it at once as an acute febrile disease; from the first rigor till its distinct localization there is nothing to indicate what or where the inflammation is to be. Deep-seated pain first calls attention to the part affected, and is very likely to be referred to some internal organ, because it has not the burning or stinging character which in erysipelas draws the attention of the patient or the attendant to the skin: cases of this kind have been treated as some curious or anomalous example of internal disease, until accident has revealed the mistake. This lesson should not be forgotten. When near the surface, the skin presents a lurid redness, and is tense, but not hard to the touch; pain is aggravated by pressure, but there is not much superficial tenderness; the border of the redness is not defined, but gradually dies away in the surrounding skin. These characters are quite sufficient to mark the disease: to erysipelas it is allied by the fever and the redness, but the colour and the sense of touch at once distinguish it: the condition of the skin is more like erythema, but there is no fever or tension in that disease. From the swelling accompanying phlebitis it is completely removed by the redness of the one affection, and the white œdematous condition of the other.

In its progress suppuration always supervenes: rigors, which have been absent since the commencement of the attack, recur, and are followed by sweating; the inflamed surface becomes less angry, and assumes a more livid colour; the tension subsides, and is followed by what is called a "boggy" feeling, which is partly produced by superficial œdema, partly by purulent infiltration and deep-seated fluctuation.

Erysipelas, especially when occurring in persons of dissipated habits, is often associated with head symptoms, very analogous

to delirium tremens. It does not appear that these are necessarily inflammatory, but they may be produced by meningitis, which is probably erysipelatous in its nature. (See Semeiology of Brain—Delirium.) This is most frequently the case when the head is the seat of the affection.

Phlegmonous erysipelas is occasionally one of the forms in which secondary suppuration presents itself, or it may give rise to purulent deposits in other parts of the body. In both cases the characters of pyæmia may be traced in addition to the cellular inflammation; the local abscesses, the inflamed absorbents, and the profuse perspirations, suggest what is going on.

Diffuse cellular inflammation is usually regarded as a surgical disease. When the cellular tissue is involved, the necessity for deep incisions rather takes the case out of the province of the physician.

PYÆMIA.

This disease is one of not unfrequent occurrence and of grave import: it is characterised by contamination of the blood from an admixture of pus. Not unfrequently arising in unhealthy subjects after operation, it has been argued that the pus secreted in the wound actually finds its way into the blood; but it is by no means limited to such cases, and is constantly met with under circumstances in which there is no channel by which the pus-globules could find their way into the circulating system. Its probable source in all cases is the lining membrane of the veins, which is affected by suppurative inflammation and secretes pus; this is washed into the general current of the circulation, and so produces purulent contamination of the blood; its existence must therefore be secondary to this form of phlebitis. We find it as a sequence of almost any extensive suppuration, but more especially after diffuse cellular inflammation. It very rarely appears at the termination of phlegmasia dolens, the "white leg" of parturient females —the plastic form of phlebitis unattended with the formation of pus. This circumstance seems to negative the idea of its existence being ever due to the absorption of pus; the direct admixture of pus with

blood has been shown to produce rapid coagulation, and the phlebitis of childbirth probably arises in consequence of a coagulum being formed by the entrance of unhealthy fluid, purulent or sanious, into the open mouths of the uterine veins. The condition which we call pyæmia must therefore have some different cause, and none appears more rational than that the pus is secreted from the lining membrane of the veins.

The history of the case is therefore important; but most commonly the disease commences under the practitioner's own eye, because it supervenes on one which has already required medical treatment. Sometimes, however, the cause of the primary suppuration has been so insidious and obscure, that the first evidence of the presence of pus is derived from its general diffusion through the blood.

It is marked by fever of an adynamic type, quick feeble pulse, dry brown tongue, shivering, often intense, followed by copious perspirations. These are only the general signs of extensive suppurative action, and it is to be presumed that they indicate a further formation of pus, not improbably in the blood itself, but still more certainly in the various organs in which what are called secondary deposits are found. These, in their turn, become the direct evidence of pyæmia; the pus or some coagulum associated with it, is believed to be obstructed in its passage through the capillary vessels, and at each point where it rests to become a focus of inflammation which rapidly terminates in a small abscess.

When seated in internal organs, the existence of secondary deposits can only be inferred from the previous knowledge of suppuration elsewhere, taken in conjunction with the general evidence of its extension, and the local symptoms of pain or altered function in the particular organ. Those most liable to be so affected are the lungs and liver, and secondary deposits are rarely found elsewhere without their being also found in them. Sometimes the suppuration

takes place near the surface; it commences with a patch of intense redness on the skin, accompanied by but little tension or tenderness, and thus proving that the inflammatory action is of a very low type; it passes in a few hours, perhaps, into suppuration and abscess, becoming soft and fluctuating, or it suddenly disappears. Erythema nodosum occasionally presents characters which might be readily mistaken for the early stage of these small abscesses; the previous history ought to preserve us from such a mistake, and the course of the disease will soon clear up any doubts that may have remained. In cases of erythema the redness acquires a bluish tint, as the inflammation subsides, and though the swelling feel soft, there is no fluctuation and no formation of pus.

In other instances the presence of pus in the blood leads to the formation of small pustules on the skin itself; not very numerous, they are prominent, fill rapidly, do not pass through any preliminary stage of serous exudation, but evidently from the first contain purulent fluid; they can only be confounded by a very superficial observer with a varioloid eruption. These two forms of deposit are each very characteristic, and are generally associated with larger collections of pus around the joints, or spread abroad in the cellular tissue and burrowing among the muscles. In the absence of the pustules and small abscesses just mentioned, the inflammation around the joints may be mistaken for acute rheumatism, which it simulates in attacking several in succession; but it will be observed that the swelling is very much more extensive, and the redness more erysipelatous-looking than ever happens in rheumatism. This is caused by the tendency to diffuse cellular inflammation, which generally also shows itself in other parts, at a distance from any joint, over the thorax, or about the eyes and face.

Cases of pyæmia bear a close analogy in many respects to glanders, and when the primary suppuration cannot be discovered, they are somewhat perplexing. A sallow aspect, and a

peculiar odour of the breath have been both urged as characteristic of the disease; but while they may aid the diagnosis, they cannot be made the principal grounds of discrimination.

It is not sufficiently considered, in speaking of the secondary suppuration of pyæmia, that the pus-globules must travel with the current of the circulation towards the heart, and that except in the comparatively rare event of their being formed in one of the veins which contribute to supply the portal circulation, their progress must necessarily be from smaller to larger vessels until they enter the pulmonary artery. Consequently if the arrest of a pus-globule in a capillary vessel be the cause of the formation of the small abscesses, they will be found first in the lungs; the same law will hold good if a small friable coagulum, rather than a globule of pus, be the focus of suppuration. It cannot be maintained, as it seems to me, that all the pus-globules are arrested in the lungs, and the conclusion is a more natural one that the globules themselves can pass, but any coagulum formed in the vessel by the pus is arrested.

When secondary suppuration occurs in other parts of the body a similar sequence of events must have taken place in the lungs, whence a soft coagulum is carried into the left side of the heart, and so into the systemic circulation. Such an event is not to be confounded with embolism, although the course of the small mass be the same in each case. Here the very same difference is observed as has been noticed with reference to uterine phlebitis: in embolism the coagulum is fibrinous and excites plastic inflammation around; in pyæmia the coagulum is mixed with pus, and excites suppuration at the spot where it is arrested.

The origin of the disease in some existing suppuration renders its diagnosis very difficult in the early stage. In fact, it is almost impossible in any given case to point out the exact date of the commencement of the attack.

GLANDERS AND FARCY.

These diseases, which are well known to veterinary surgeons in the chronic as well as in the acute form, would seem in rare cases to be transferred to man; in the human subject the attack is always acute, and rapidly fatal. In its general features it resembles so much the effects following upon the condition of pyæmia, that it might admit of question whether the symptoms are not really rather due to this circumstance than to any specific character of the poison itself, were it not that in one or two essential points they seem to differ.

The history of the case records the very speedy supervention of the disease without any previous ailment, and sometimes without any adequate cause being assigned; and the social condition

of the patient, indicating his being employed among horses, may serve to suggest a solution of a set of anomalous symptoms, which, as they are so rarely seen, can seldom be recognised by practitioners from experience. Most of our students must have finished their hospital attendance without having seen a case of glanders.

The symptoms are those of fever of a low type, accompanied by inflammation of the glands, which rapidly suppurate, forming red and painful swellings over various parts of the body; these terminate in pustules of some size, surrounded by a red line, which is again bounded by a white wheal: they stand in connexion with inflamed lymphatics, which may sometimes be traced along their course. The disease almost invariably ends with ulceration of the mucous membrane, and fetid discharge from the nose, and occasionally this is one of the earliest symptoms. The more chronic form, which approaches more nearly to the characters of farcy, is marked by the formation of one or more abscesses of some size; this is probably explicable on the ground that, though the lymphatic system is that primarily affected, the symptoms in such cases are rather due to an altered condition of the blood, acting through the capillaries. The inflamed glands correspond to what farriers are in the habit of calling "farcy buds;" the abscesses are more properly what in medical language have been denominated "secondary depôts;" they form in simular situations, and the joints are especially liable to become the seat of local swelling and inflammation.

CHAPTER VIII.

GENERAL DISEASES, CLASS I.

RHEUMATISM AND GOUT.

Pain and Stiffness—Active and Passive Movement—Acute Rheumatism—Obscure cases—Complications—Sub-acute Rheumatism—Simple Synovitis—Gonorrhœal Rheumatism—Synovial Rheumatism—Muscular Rheumatism—Lumbago—Stiff-neck—Chronic Rheumatism—Distinguished from Neuralgia—From Diseases of Joints—Complications—Gout—Acute—Chronic—Complications—Gouty Synovitis—Chronic Osteo-arthritis—Duration.

RHEUMATISM.

It has been already noticed that the objective phenomena grouped under position or posture have a direct bearing on the diagnosis of rheumatic affections. In general terms the indication is derived from the limited movement of certain joints, either in consequence of the pain produced by motion, or of the stiffness arising from alteration of texture. Along with this we may observe swelling, thickness, or distortion, more or less marked in different cases.

The history is simply comprised in an account of pain, of longer or shorter duration, with or without the coincidence of general febrile disturbance; and in some cases the swelling of the joint is more spoken of than its painfulness. The complaint on the part of the patient, that he is suffering from rheumatism, is very liable to mislead the medical attendant—no expression is in more common use, and none more open to fallacy: the much-abused term "inflammation" is not more false in its application. The student should be especially careful to resolve all such statements by further inquiry into their true and simple meaning;

"rheumatism," in the majority of cases, is no more than an assertion of the existence of pain. Another source of fallacy connected with the patient's description is, that he speaks of having "lost the use of his limb," when its immobility is due to pain or to stiffness of the joint, as well as when it is caused by paralysis. Handling the limb is the most effectual mode of discriminating these three conditions.

The history of the case may be also available for distinguishing between the various affections embraced under the head of rheumatism, as it points out the severity of the sufferings and the duration of the attack, its limitation to one limb, or its transference to others. We should never omit to inquire whether this be the first attack, both because of the bearing this has on disease of the heart, and also because the characters of the affection are apt to be less pronounced in proportion to the frequency of their repetition.

The effect of both active and passive movement is of great importance in obscure and doubtful cases. The extent to which the joint may be flexed by the action of volition, and the amount of pain, if any, excited by the effort, have to be compared with the effect produced when the medical attendant himself endeavours to flex or extend the limb. If there be any imperfection in the attempt at voluntary movement, he has next to observe whether there be any resistance to his interference, and further, to make out how far that resistance is under the control of the will. It will be found in three distinct degrees:—(1) A simple act of volition, which the patient has perfect power to suspend; (2) an act partly voluntary and partly involuntary, excited by the consciousness of pain on movement, which cannot, therefore, be voluntarily checked, but will cease when the patient is under the influence of chloroform; (3) a reflex action in a paralysed limb, over which the patient has no control whatever.

He has also to endeavour to ascertain how far the movements of the joint are interfered with by alteration of structure independent of the resistance of muscular action. This can, in the majority of cases, only be guessed at, so few persons being able to suspend entirely the muscular resistance when a joint which has been the subject of disease is being handled. Great accuracy is unnecessary, but the fact may be easily placed beyond doubt by inducing anæsthesia, when all muscular action is suspended,

except that which is purely reflex, and the absolute degree of stiffness will be readily determined.

In all the acute and sub-acute varieties, and in some also of the chronic forms, the presence of an excess of acid in the secretions is traceable. Its presence, however, cannot be relied on in diagnosis as a certain indication, though it may be of use as a confirmatory test. The acid may be unmistakably present, though the rheumatic affection be wanting.

1. *Acute Rheumatism.* — The general symptoms indicate the presence of a febrile or inflammatory disorder; the sensations of the patient refer especially to the existence of pain. Our next step is to ascertain its locality,—whether felt in the limbs, and spoken of as "pains in the bones," so common in fever; or in some defined situation, as the effect of simple inflammation: or whether confined to the joints themselves. If the patient, in his description, follow it from one joint to another,—the ankles, the knees, the hips, the wrists, elbows, and shoulders,—we may be sure that the disease is acute rheumatism.

In that form, the pain is severe,—not coming in twinges, nor accompanied by startings (muscular spasms),—but continuous, aggravated by motion, and intolerant of pressure; sometimes so intense, that the weight of the bed-clothes cannot be borne: every posture alike uneasy, the patient would fain alter it, but that the dread of increased suffering in the attempt commonly restrains him. Flying from one limb to another, or affecting all nearly alike, the wrists and ankles are more especially prone to suffer in acute rheumatism; and these joints are commonly tumid and extremely tender, and marked by a superficial erythematous blush. Along with these evidences of general disturbance and local suffering, the profuse perspiration, of a peculiar odour, distinguishes it, in a most unmistakable manner, in its severer forms. But the student must remember that sour-smelling perspiration, though very constant in this disease, will certainly mislead him if the more essential indications be overlooked. This acid odour has sometimes a

certain rancidity combined with it, which, when present, is perhaps more diagnostic: in all cases, however, solitary signs are not trustworthy. The urine is usually more remarkably acid, and loaded with lateritious sediment, in this than in most other febrile disorders.

Fever may run high, the tongue be foul, and the pulse quick, and the local indications of pain and swelling be very slight at the time of observation. This may be caused by various circumstances.

a. The case may be one of continued fever, with slight rheumatism superadded. The pain will at no time have been intense, the limbs never having been rendered motionless from suffering; the febrile symptoms present somewhat of an asthenic type; the pulse is weak as well as quick, and perspiration is less common. In acute rheumatism it may be remarked, that the general symptoms of a febrile state differ in many important respects from those of continued fever, as they indicate a certain amount of inflammatory action: on the other hand, they form a striking contrast to most of the sthenic inflammations in the presence of excessive perspiration.

b. In children, when evidence of the disease being acute is not wanting, the local affection may be comparatively slight, the joints, perhaps never tumid or red, the patient tossing about in bed in such a way as to lead us to doubt whether there be any real inflammation of either ligaments or synovial membranes. Yet serious mischief may result from inflammation of the lining membrane of the heart or the pericardium. In forming a diagnosis in such cases, it is also to be remembered that children are not conscious that perfect stillness will best remedy their sufferings, and the internal inflammation may prevent any external development of the disease. The continued or remittent fever of childhood is never accompanied by local pain, and, therefore, when pain in the limbs is observed as a concomitant of a febrile state, rheumatic affection is at least to be suspected.

c. Not merely in childhood, but also among adults the occurrence of severe internal inflammation will often abolish the signs of local affection of the joints; and here we shall derive most aid from a careful inquiry into the patient's previous state. In comparatively rare instances, the external signs of the disease only follow after the subsidence of some internal inflammation. These occurrences are most particularly associated with pericarditis; but endocarditis and pleurisy may also become

causes of obscurity in febrile conditions connected with rheumatism.

There is really little practical difficulty in recognising a case of acute rheumatism; we have only to distinguish it from gout, and from the inflammation of the joints attending on secondary deposit: the diagnosis of gout must be more fully considered in a subsequent section. A first attack is generally the best defined: the patient is probably under thirty; the redness of the skin confined to the part immediately over the joint, the pain and tenderness out of all proportion to the aspect of inflammation, and various joints suffering simultaneously. In any other than a first attack, the history of the former seizure may prove that to have been gout, and will naturally lead us to suspect that this, though less defined, is probably gout too. The previous occurrence of either renders it probable that the present illness is not connected with purulent contamination of the blood. The history of its commencement, when the attack is either gouty or rheumatic, is very different from that of previously existing suppuration or inflammation of veins or absorbents, which was perhaps recognised long before inflammation attacked the joints; and we are thus prepared to look for its occurrence: sometimes, however, the process is a very rapid one, and the attack exceedingly like acute rheumatism to the inexperienced. One or two points aid very much in the discrimination, as they are connected with the essential nature of the disease. The inflammation round the joint is more erysipelatous in appearance, and is combined with œdema, and the pain is less severe; other parts, at a distance from any joint, are similarly affected; or there may be inflammation about the eye-lids, soreness of throat, &c.: the fever is adynamic, and the patient depressed; the inflammation constantly passes on to suppuration—which never happens in acute rheumatism.

Delirium is occasionally associated with acute rheumatism, and we may satisfy ourselves, in the majority of cases, that it is not due to inflammation of the brain, but merely an evidence of deterioration of blood, or of laboured circulation, consequent upon inflammation of the heart. It can only cause anxiety when the disease has suddenly receded from the joints, and has not affected the heart; because, as will be shown when speaking of delirium, we may then possibly have metastasis to the brain. In the chest are to be found the most constant complications of acute rheumatism. By far the larger number of cases of pericarditis which have been recognised during life occur in the progress of this disease, and a considerable proportion of the permanent valvular lesions may be observed to take their rise in rheumatic endocarditis, or may be traced back, with very great probability, to it. The condition of the heart must therefore be

watched from day to day: we must also be prepared for the incursion of pleurisy; and bronchitis sometimes becomes a serious and troublesome complication.

2. *Sub-acute Rheumatism.*—When the febrile state is less marked, when the inflammation of the joints is less severe, and the number affected smaller, we have a form of rheumatism which has been called sub-acute. It may differ in no essential particular from acute rheumatism, except in intensity; in no one symptom, probably, so much as in the amount of tenderness; there is generally considerable swelling, and, in some instances, a good deal of redness; but the exquisite sensibility of acute rheumatism is wanting. Some of the cases belonging to this class are of short duration, as if they were abortive attacks of the acute form. Some continue for a long period, and ultimately present appearances which are very analogous to osteo-arthritis. In fact, no small number of the examples of this disease commence exactly like sub-acute rheumatism. In other instances the rheumatism is in great measure, or entirely, limited either to one joint or to a single extremity. The symptoms connected with the local disturbance may be tolerably severe, but it remains fixed there, and the disease is commonly very obstinate and much prolonged in its duration.

Such cases are liable to be taken for simple inflammation of the joint, or synovitis. The best guide in determining their nature is to be found in the history of the case. Rheumatism almost always appears in several joints before it becomes located in one; and, on inquiry, perhaps we learn that the patient has had previous attacks of rheumatism or gout. The history of simple inflammation generally points to some accident or injury, acting as the exciting cause, or it tells of syphilis, with nodes or lichenous eruption. The diagnosis is necessarily imperfect, inasmuch as both diseases have an inflammatory character; and it is remarkable that, in persons of gouty or rheumatic habit, the inflammation, set up by accident or injury, often assumes a specific type, just as we find inflammatory action modified, in other instances, by some peculiar diathesis of the patient, *e. g.*, the scrofulous.

In sub-acute rheumatism affections of the lungs and heart are much less common than in the acute form.

Synovitis is the disease which most nearly resembles sub-acute rheumatism; and from this, as we have already seen, it can only be distinguished by analysing the causes of the affection: the local action is the same in each. Other diseases of the joints are more liable to be confounded with chronic rheumatism, under which head their distinguishing characters will be more fully considered.

3. *Gonorrhœal Rheumatism.*—Chiefly distinguished by its association with gonorrhœal inflammation of mucous membrane. It presents the closest analogy to subacute rheumatism, especially to that variety in which the affection is located in one joint or in one member. There is usually a good deal of tumefaction about the inflamed joint, but it is not accompanied with much tenderness, and is out of proportion to the fever present. It may look not unlike pyæmic inflammation, but does not run the same course, and like all true rheumatism never goes on to suppuration.

4. *Synovial Rheumatism.*—The varieties of sub-acute rheumatism are sometimes indicated by the circumstance that, in some cases, the fibrous structures around the joint, in others the synovial membrane, is the seat of the local inflammatory action. In acute rheumatism the two are more intimately blended; in the sub-acute form it is not difficult to distinguish the thickening of the ligamentous structures, which are firm and resisting, from the puffy elasticity and feeling of fluctuation communicated by the presence of fluid in the cavity of the joint. The first is more frequently met with in the smaller joints of the wrists and fingers; the other, by far the most frequently, in the knee, where the accumulation of fluid is very remarkable.

Here we have only to notice, that in certain cases in which the knee-joint is affected with absolute thickening and degeneration of the synovial membrane, the external aspect closely resembles that which is produced by the presence of fluid in synovial rheumatism. The history of cases of joint-disease is

generally obscure, and extends over a long period; their progress is insidious, and they are especially distinguished from rheumatic affections by the absence of pain in their commencement. The degeneration of the synovial membrane last alluded to is, indeed, almost painless throughout: its shape sufficiently characterises it as an affection of the synovial membrane, while the feeling of elasticity and absence of fluctuation show that there is no accumulation of fluid.

A very serious affection of the brain is occasionally seen as a complication of synovial rheumatism, when, during its progress, the sudden absorption of the fluid is followed by delirium and coma.

5. *Muscular Rheumatism.*—Pain and stiffness of rheumatic origin may also attack the muscular structures. It occurs with or without attendant fever; but it cannot be supposed that, in so slight a malady, the fever is symptomatic, the two are rather coincident affections; and we must be careful to make out distinctly that such is the fact; for when the pyrexia arises from a local affection, tension and hardness will be observed as well as tenderness, indicating the presence of the products of inflammation, in the effusion of lymph or serum, and proving that the disease is not rheumatism. In the absence of fever, the disorder cannot be called "chronic," because of its short duration and transient nature; but we may call it "slight" rheumatism. In a diagnostic point of view, we recognise the existence of pain, more or less constant, aggravated, or only called into existence by muscular movement; passive motion not being attended with pain, as it is in rheumatism of the joints, except when, by antagonism, some muscle is called into action.

This is one of the causes of *lumbago*, the most severe form of muscular rheumatism. Its diagnosis must not rest upon this one symptom, however prominent. Careful inquiry must also be made into the condition of the spine and the kidneys, which may each be the cause of pain in the loins. Muscular pains, unconnected with rheumatism, will occupy our attention at a later period. *Stiff-neck* is another very

common form of muscular rheumatism. These attacks are usually preceded by exposure to cold, especially to a "draught," but there would seem to be in addition the presence of acid in the system.

6. *Chronic Rheumatism.*—Pain and stiffness of the ligamentous structures, often of long duration, with or without thickening of parts, and increased by motion of the joints or handling of the limb, when unaccompanied by marked tenderness or febrile action, is to be classed under the denomination of chronic rheumatism.

It is not possible to specify, with any degree of accuracy, the exact element of this form of disease; but it is very important that the practitioner should be able to distinguish painful affections dependent on other causes from those which, in the absence of positive indications to the contrary, must be regarded as rheumatic. In the subsequent recurrence of the disease, patients themselves are often able to discriminate very exactly between the pain of rheumatism and that of other disorders, but too much reliance must not be placed on such statements.

The early history generally points to pain as the first or the only indication, altered form or structure being a later or secondary effect. Occasionally, it occurs as the sequel of an acute attack which has not been followed by complete convalescence, but more frequently it has no such origin; nor does it appear that the subjects of chronic rheumatism have been, in any large proportion, affected with acute rheumatism at former periods. It is much more common in advanced than in early life. Simultaneous affection of several joints, indicating the constitutional nature of the disease, is not so frequently met with in this as in other forms of rheumatism; nor are there any general symptoms constantly associated with it. The inquiry into the condition of other organs often brings to light disordered functions or impaired nutrition, which have an indirect but im-

portant relation to the disease, and are even more essential to its correct treatment than perfect knowledge of the local condition.

When affecting the smaller joints, alterations of form are more frequently seen as its result than when the larger ones are especially attacked, and, at all events, from their situation, the swelling or distortion is more readily perceived; but its site is rather in the latter than in the former.

With reference to diagnosis, we have to discriminate diseases accompanied by pain in situations where chronic rheumatism is usually met with, and diseases of the joints which are not rheumatic. The painful affections are chiefly neuralgic or sympathetic: in the shoulder and upper part of the back, those connected with disorder of the liver and dyspepsia; across the loins, those produced by affections of the kidney; at the lower part of the back, in females, those associated with vaginal discharges and uterine disease; while in the hip and thigh it is often very difficult to make out whether the pain is of the ordinary rheumatic character or is dependent on sciatica, which itself may be only a manifestation of rheumatism. In all of these cases we derive great aid from the consideration, that in rheumatic affections the pain is increased by movement; each, however, presents peculiar characters, which serve to confirm our diagnosis. In disorders of digestion, the prominence of the symptoms bearing more directly upon the function itself; in nephralgia and nephritis the pain described as shooting down to the groin, thigh, or testicle; in uterine affections, the seat of pain corresponding to the sacrum, where movement cannot be its exciting cause; and in sciatica, the pain following the course of the nerve down the back and inside of the thigh, serves to discriminate it from one spoken of as extending from the hip to the ankle, simply because all the joints of the limb happen to be simultaneously affected.

The diseases of the joints do not properly fall under our notice in medical diagnosis, but yet it is very necessary we should be able to satisfy our own minds whether, in any given case, there be not some more definite disease going on than that which, for want of more accurate knowledge, we call rheumatic. We have already noticed the degeneration of the synovial membrane, and we have still to mention ulceration of cartilages, scrofulous disease of bones, and caries of the spine. In regard to all we observe, that their course is very protracted, their commencement insidious, and that they are chiefly characterised

by absence of pain in the early stage; pain, when it does come on, is shooting, transitory, and frequently attended by starting of the limbs; it is only in the advanced stages that it presents any permanence of character. We may further observe, not only that there is absence of pain in the quiescent state, but that cautious movement does not bring it on, while the slightest jar, causing concussion of one bone against another, is sure to cause pain, and that sometimes of very severe kind. The patient who cannot bear his own weight on the ground while perfectly motionless, is capable of much movement in bed without suffering, when the pressure is removed from the affected joint. A very frequent source of obscurity in the early history of these cases is the circumstance that pain is not referred to the joint itself, but to a more distant one, in which it is only sympathetic: this point, when ascertained, serves as an additional ground for diagnosis. The age and aspect of the patient are suggestive with reference to the nature of the affection; thus we look for disease of bone in the young and delicate, ulceration of cartilages in the early part of adult life, and chronic rheumatism, after its middle period, in persons who are fat and flabby or cachectic and anæmic. In caries of the spine, the early progress of the case is scarcely marked by any feature which can distinguish it, till the prominence of one spinous process at the seat of pain indicates the irreparable mischief which has already taken place. In connexion with this we must not forget that lumbar and psoas abscess, or deep-seated pelvic inflammation and suppuration, when advancing slowly, are apt to simulate rheumatic affections of the loins and hips.

In chronic rheumatism we chiefly meet with two important complications, which seem each to have more or less to do with its development when present—constitutional syphilis and granular degeneration of the kidney. It is also intimately connected with mal-nutrition, whether tending to accumulation of fat or to general cachexia.

GOUT.

The researches of recent times have gradually led to the discovery of an important element in gout—the presence of an excess of uric acid in the blood. This knowledge holds out a prospect of our arriving ultimately at more accurate diagnosis; at present it is only in the hands of a few that such a chemical test can be relied on. But we may derive, from the mode of its attack, pretty certain indications of the nature of this disease.

In regard to history, an attack of *acute gout* is usually ushered in by dyspeptic symptoms and feeling of discomfort, for some period before it becomes localized in the joints; and this, it may be remarked, is not generally the case with rheumatism. Further, in the first seizure, the pain and redness are almost invariably confined to the smaller joints, especially those of the foot. In any subsequent illness, where the evidence is at all indistinct, the manner of its first incursion must be carefully inquired into, because the statement of the patient that he has previously suffered from either gout or rheumatism is generally not trustworthy.

When the joint is already attacked, and this is very commonly the great toe in the early seizures, the disease is marked by intense pain, redness, and inflammatory swelling, just as an acute rheumatism; but there is no great amount of inflammatory fever. If it tend to pass from one foot to the other, it does not fly from joint to joint all over the body; but, as it appears in one extremity, it usually recedes from the other. The pain is commonly aggravated at night. There is none in the shoulders, the hips, or the knees; and while, in these respects, it resembles the abortive attack of rheumatic fever which we have described as sub-acute rheumatism, confined to one joint or to one extremity, the inflammatory action is very much greater in intensity and painfulness. In a few words, the condition of the joint resembles that seen in acute rheumatism, while the state of the patient is more analogous to the sub-acute form of the disease, in the absence of fever, perspiration, &c., while there is at the same time much disturbance of stomach.

It is very rare that a first attack should localize itself anywhere but in the foot; and this fact, therefore, becomes a great help in determining the nature of subsequent illnesses, when the hands, or even the knees, the shoulders, and the hips may be the seat of the gouty paroxysm. Repeated attacks of gout very

frequently leave chalky deposits in the textures around the joints, and these serve as landmarks to distinguish cases which would otherwise be very perplexing. The more frequently the patient has suffered, the less defined does the character of each seizure become, until the description of the case, but for these two circumstances, is scarcely to be recognised as at all different from sub-acute rheumatism. All the conditions are then greatly modified; the pain and swelling are less severe; the number and variety of joints implicated much increased.

During the intervals of the ever-recurring paroxysms, the condition of the joints, altered in form and stiffened by exudation, is described as *chronic gout*. There is very often for long a certain amount of pain on any attempt at movement as well as stiffness, and sometimes even when there is no evident inflammation a good deal of constant pain is complained of. But, on the whole, there is not much suffering when simple tophaceous gout becomes chronic.

Gout can scarcely be confounded with the local suppurations in and around the joints seen in pyæmia, the general disturbance of suppurative fever being so different from the dyspepsia preceding gout. It may be useful to add that, while the redness and swelling are in both cases well-marked and of limited extent, the one is a much more painful affection than the other: it is quite remarkable how very little suffering is occasioned by these secondary suppurations.

The history of any previous seizure may be made available for diagnosis by a comparison of the age of the patient with the date of the first appearance of the disease. Gout seldom shows itself before the middle period of life, while a first attack of acute rheumatism is rarely met with after that age. The different duration of the attack in each case should also be borne in mind.

Along with these we must take into consideration the habits and aspect of the patient; for, while it is true that no degree of abstemiousness will serve to ward off the occurrence of gout when the predisposition is strong, it is unquestionably among the over-fed and the plethoric that it is most constantly found.

No positive rules of diagnosis can be laid down for determining the nature of what has been called erratic or unfixed gout; but we shall very generally be right in concluding that anomalous

cases of disorder in gouty habits are more or less due to, or modified by, the existence of that state of system which gives rise to the set of symptoms which we recognise as gout. A large number of the anomalous or irregular symptoms may be referred to inflammation of mucous membrane. Discharge from the urethra, catarrh of the bladder, bronchial catarrh, and probably, too, some form of inflammatory action to which the name "gout in the stomach" is given, are all occasionally seen in gouty people. They have all one feature in common, that the inflammation is short and sharp, and subsides as rapidly as it arises.

An ill-defined form of chronic gout is often seen along with disease of the kidney; and so frequently has this been observed, that some pathologists have spoken of the gouty kidney, a phraseology which is highly objectionable. We may be also prepared to find other ill effects of intemperance in those who have brought on themselves the disease, but none of them have any definite relation to it, and to a certain extent the existence of one malady as the consequence of excess precludes the concurrence of others. If gout sometimes comes on in consequence of disease of the kidney, it is by no means a constant result; and it is no less certain that gout may last a lifetime without the kidneys being in the least degree impaired in their function. The presence of the poison of lead in the system seems to render the liability to gout greater in a person suffering from albuminuria.

Corresponding to synovial rheumatism we find a condition of joint to which the name *gouty synovitis* is given. Inflammation of the synovial membrane may be excited by various causes in persons who are free from either diathesis; but just as in rheumatism so in gout, the tendency to joint affection may be seen in inflammation of the lining membrane of the joint in place of that of the surrounding tissues. In diagnosis we rely simply on the absence of external cause sufficient to account for the presence of fluid which is so easily recognised, and on our knowledge of a gouty or rheumatic tendency, which can only be learnt from the history of the case. The discrimination of the two diseases is too often neglected or ignored, and yet the difference in treatment is of considerable importance.

CHRONIC OSTEO-ARTHRITIS.

The peculiarities which mark this disease, and separate it alike from gout and rheumatism, have only of late years received due consideration. Its origin is somewhat obscure, but in well-marked cases the peculiar twisting and distortion of the joints, when the patient has suffered for any length of time from its effects, is such as cannot pass unobserved by any one who is familiar with the aspect of disease.

In its early history it partakes most of the character of sub-acute rheumatism. It differs from an acute attack chiefly in the absence of fever, and in the circumstance that comparatively few of the joints are under its influence at the period of its commencement; there is a good deal of swelling, and perhaps of redness, of one or two joints, but these are not marked by the extreme tenderness and pain so distinctive of rheumatic fever or of gout: while the local inflammation is more decided than in the sub-acute form of the disease, if we except a few cases which we have characterized as abortive attacks of acute rheumatism. If due consideration be given to these circumstances, the practitioner will be prepared for the incursion of a most inveterate and most hopeless malady. And, let it be remembered, that diagnosis has in this case very much to do with prognosis: where we recognise rheumatic fever, we know that, except the heart become implicated, the patient will be in a few weeks at most, as well as ever, and that he is not very much more liable to a second attack than his neighbours: when gout is clearly established, we are sure that the patient will be, for a time, in better health than usual after the present pain and distress have subsided; but that all the care possible will scarcely serve to ward off a second attack: when we have only sub-acute rheumatism to deal with, we look for either a trivial and passing affection, or for a lingering illness, as we find less or more of local action: but, with osteo-arthritis,

we ought to know that our patient is exposed to protracted suffering, and is liable to remain a cripple for life. When this is not foreseen, much discredit may unnecessarily be brought on the profession—much undue praise be given to the quack, into whose hands such cases are very apt to fall; he will not scruple to throw on the regular attendant the blame of all the mischief which has happened, and claim for himself the credit of any improvement which, under favourable circumstances, nature herself may slowly produce.

As the disease proceeds, its peculiar characters begin to develop themselves: the swelling subsides in some measure; the redness, if any, is gone from the joints first attacked, but they remain stiff, tender, and useless; while others, in succession, become the seat of inflammatory action; until, at length, the unfortunate patient is reduced to a condition of utter helplessness. When convalescence has slowly been established, as it may be, after either months or years of suffering, considerable distortion and permanent stiffness are the invariable results.

Observation seems to prove that this form of disease is especially prone to attack females at the two great periods of the commencement and cessation of the menstrual functions. It is also frequently associated with constitutional disorder, in the form of scrofula, tubercle, or disease of the kidney; but we know not in what relation they stand to each other. There is good ground for the belief that its permanence is in great measure due to the supervention of local disease upon the primary constitutional disorder; and for this reason it has received from some authors the name of "Chronic Rheumatic Arthritis," or "Rheumatoid Arthritis."

In addition to the more general or diffuse form of the disease just referred to, it also comes before the surgeon especially as an affection of one joint only. The diagnosis is in such cases more obscure, and it is only from a careful consideration of the history, as well as of present symptoms, that anything like certainty can be attained.

CHAPTER IX.

GENERAL DISEASES, CLASS B.

MORBID GROWTHS.

Indications—§ 1. *Of Local Enlargements—Their Causes*—§ 2. *Of the Locality of Tumours—on the Surface Generally—on the Head—in the Neck—Chest—Abdomen*—§ 3. *Of the Characters of Tumours*—§ 4. *Cancerous Growths—Scirrhus—Medullary Cancer—Epithelial—Melanotic—Osteoid Cancer*—§ 5. *Colloid*—§ 6. *Non-malignant Growths—Fibrous and Fibroid Tumours — Adenoid Tumours — Cystic Growths.*

The evidence of the existence of any form of growth is, to a certain extent, distinct from its character; and in diagnosis the one determination usually precedes the other. We must first know where the growth is before we can know what it is. Sometimes this process must be reversed, and the proof of the presence of cancer from general symptoms, leads to the inquiry where the disease has located itself. It is viewed as a constitutional malady, and its local development, though a necessary part of the disease, is often more or less accidental. General symptoms are, however, very uncertain, and the student must really rely more on the local signs.

1. *Of Local Enlargements.*—Local increase of size, as one of the objective phenomena of disease, requires careful study. It may be found in any part, whether of the trunk or the extremities: it embraces the whole class of abnormal growths, but it may also be caused by hypertrophy of natural structures or a

deposit of fat; or it may be due to an effusion of serum, of blood, of lymph, or of pus; or it may depend on periosteal thickening or inflammation of bone.

In simple hypertrophy there are no symptoms of disease present except those attendant on increase of size: the natural structures hold their due relation to each other, and are all increased in equal proportion.

Adipose tissue is more liable to general than to local increase. It is in the abdomen where its accumulation is most likely to occur; the parietes, when pinched up, feel sensibly thicker when the deposit of fat is in the subcutaneous tissue, and an elastic fulness of the whole region, with considerable flaccidity, is given by its occupying the folds of the omentum. We are led to the conclusion that this is the true nature of such an enlargement by the absence of indications of disease, beyond the existence of dyspeptic symptoms, and by the persistence of general roundness and fulness of the limbs, which we know to be incompatible with organic disease.

The presence of serous effusion gives rise in the head to the chronic hydrocephalus of childhood, with its unnatural enlargement; in the thorax it causes bulging of the intercostal spaces and enlargement of one side of the chest; in the abdomen it produces ascites and ovarian dropsy; in the scrotum it occurs as hydrocele; in the limbs it is the evidence of general dropsy or of local œdema.

An accumulation of blood contained within the distended vessels, or in a pouch communicating with them, is found as aneurism or varicocele. When extravasated, it quickly coagulates and forms a firm tumour of undefined outline, as may sometimes be seen after a strain, or more distinctly in the testicle as hæmatocele; within the cavities it can only give rise to symptoms of the presence of tumour when it exists as an aneurism.

Effusion of lymph, as the consequence of local inflammation, is commonly followed by the formation of pus; but it may remain stationary at the first stage, and be removed by absorption, the tumefaction being very generally increased by the coexistence of serous effusion around. Such swellings are to be met with among the muscles, but more especially in the lymphatic glands.

Pus can of necessity only exist after inflammation ending in suppuration; but yet large collections of matter sometimes form when the signs of inflammatory action are almost wholly wanting, and this is especially true of scrofulous subjects. As with serous effusion, the presence of pus may cause bulging of one side of the chest: in the abdomen, collections of pus are more commonly local, and limited by surrounding adhesions of the

peritoneum; one form of abdominal suppuration is entirely without the peritoneal cavity, psoas or lumbar abscess, pushing outwardly over the edge of the pubis in front, or above the sacrum behind. In addition to these, the parietes of the cavities may become the seat of local collections of pus, from diffuse cellular inflammation, or caries of bone. Similar events occur in the extremities, and especially in the proximity of the ends of the long bones of scrofulous children. The lumbar abscess, already mentioned, is very frequently connected with caries of the spine. Inflammation of the glands not unfrequently terminates in abscess, especially in scrofulous subjects, with whom those situated in the neck seem more liable to suppurate than any others.

Periosteal thickening and inflammation of bone are more commonly met with in the long bones of the extremities than elsewhere; the former so often forming rounded painful nodes on the shin-bone, the latter giving rise, by the deposit of fresh osseous matter, to enlargements of very irregular form and outline.

The details of many of these subjects belong to surgery; the remainder, so far as diagnosis is concerned, must be considered with reference to the organs or regions in which they exist.

§ 2. *Of the Locality of Tumours.*—In the diagnosis of tumours, properly so called, there are two very distinct sets of symptoms, which are derived, the one from their local action, as they interfere with function by mere size and pressure, the other from their general influence upon health; the former common to all, the latter belonging especially to malignant tumours. It is therefore necessary first to inquire into the localities in which they are found, and the evidence of their presence there, although this cannot be wholly separated from a consideration of their nature.

A tumour lying superficially with reference to any of the great cavities, or on any of the extremities, leaves no doubt as to its existence; one that is deep-seated in the abdomen, when its margins can be felt, or its resistance detected by firm pressure with the points of the fingers, may be recognised with equal certainty; on the other hand, if contained within the cranium, or deep in the thoracic cavity, and, in some instances, when situated close to the lumbar vertebræ

its existence can only be inferred from symptoms derived from the organs contained in the cavities, and must remain more or less uncertain. The indications are most indefinite in regard to the cranium; they are more easily made out when the tumour is in the chest, and are seldom wholly unaccompanied by more direct evidence when situated in the abdominal cavity. They must each be discussed in considering the phenomena peculiar to various organs at a later period; and for the present we must assume that the tumour is palpable.

It is of importance to study carefully the history of all such cases. In some it will be found that the symptoms detailed correspond with the commencement and development of the tumour; in others, they are only those of its later stages; while, again, the history sometimes points to a totally different disease, and it is only while pursuing this investigation that a tumour is accidentally discovered. This division corresponds in some measure to real differences of character, and roughly points out those having an inflammatory origin, those whose character has more or less of malignancy, and those which are slow in their growth, and comparatively harmless, except in their secondary results. To this, however, there are numerous exceptions.

When the patient has already become conscious of its existence, we seek to ascertain its specific history so far as it is known to him, the progress of its development, and the symptoms which have been associated in his own mind with its presence: as well as those bearing upon his general state of health, and the affections of other and more distant organs which have been observed since it was first recognised.

In a class so extensive as tumours it is vain to look for general symptoms which shall characterise the whole of them, but there are many which are of much value in discriminating the nature of the disease, and the special locality where it is situated. It is, there-

fore, our next business to observe each of those circumstances carefully which have been mentioned as indications of the general state of the patient. Thus, as we know that the history is very often faulty, it is important to consider whether there be febrile symptoms, either such as usually accompany inflammatory action, or those more distinctly pointing to suppuration; or whether there be only the quick pulse of debility or tubercular deposit. Again, we have to consider the appearance of the patient, calculating how much of the change reported is due to the presence of the tumour, and how much may be accounted for in other ways; and to note whatever strikes the eye as a deviation from the normal ideal standard.

This part of the inquiry has perhaps to do more with the nature of the tumour than its locality. Rapidity of growth is a very decided indication in favour of malignant disease; such are also the evidence of general derangement of health and affections of distant organs, other than can be accounted for by nervous sympathy and inter-communication; they show the existence of a taint of the blood different from what accompanies non-malignant growths. The local signs of greater or less derangement of function in contiguous structures have also an important bearing on the question. The aspect of the patient may be of service in so far as the physiognomy of disease enables us to discriminate between the tubercular and cancerous diatheses for example. Changes of colour, again, rather point to the organ in which the disease is located. These general considerations are also of value, as they afford evidence of obstruction to the nutrition, or the circulation, in different parts of the body. Not less important, sometimes, are the indications derived from position, as the patient is obliged by pain, or other uneasy sensations, to maintain a fixed posture, or to prefer one to another.

We have next to note the relations and connections of the tumour itself; with the skin, with muscles, with bone, with glands, or with internal organs; and it must be evident that very much will depend on the correctness of the antecedent knowledge of the observer. He must be familiar not only with the relations of deep-seated parts in health, but also with the changes of position that they are subject to in disease,

inasmuch as the direction of the displacement may serve to point out the true origin or starting-point of the tumour. Not less needful is a correct knowledge of structure and of function, in order that he may be able to distinguish alteration of form from change of position, and to recognise symptoms of disease in particular viscera.

The simplest form in which we can recognise the existence of tumour is when swelling is the result of inflammation, with effusion of lymph and serum, which terminates either in resolution or in suppuration. It can scarcely be mistaken for growth of any kind, because of the pain and superficial redness in its early stage; it is very closely adherent to the skin and muscular structures, which cannot be made to move over it. In the iliac region, and over the surface of the chest, such swellings in their advanced stage are apt to be taken for growth from bone; the diagnosis, when the history fails to indicate the origin of the tumour, rests upon two points, viz., that inflammatory effusion is evenly spread out among the muscular structures, while morbid growth presents a more defined edge; and that the one adhering more to the skin can be made to move over the bone, while the other, adhering directly to the bone, does not become attached to the skin till it has attained considerable magnitude. In the chest, we may be also guided by the circumstance that more than one intercostal space is equally filled up by superficial inflammatory action, whereas the fulness is almost entirely limited to one, or at most two, when growth of any sort from the rib is its cause, until its size is such as to leave us in no doubt.

Enlarged synovial bursæ, and lymphatic glands, give rise to tumours in various regions. The former have a very elastic feeling, and are generally somewhat tender, or rather, one might say, a cause of aching than of pain; the latter are hard, very constantly tender, and often inflamed: they can only exist in the situations in which anatomy teaches us these structures are to be found in health. This forms the first ground for diagnosis; and in regard to the glands, we have the further knowledge of the ordinary causes of their enlargement,—the existence of some wound of skin or irritation at a distance, and the scrofulous diathesis.

Scrofulous enlargements are much more frequent in the neck than elsewhere. Difficulty is most likely to be experienced in deciding whether a swelling in the groin be an enlarged gland or a small hernia. The history will very generally serve to clear up any doubt, because the descent of a hernia is sudden, commonly

after a strain or muscular effort, and if it continue to enlarge it soon exceeds the magnitude of a gland. In addition to this, a hernia may be almost always pushed back, and protrudes sensibly on forced expiration in coughing. Enlargement of the mammary gland is another form of superficial tumour; its consideration belongs entirely to the domain of surgery, as also does that of fatty tumours.

In reviewing the various regions, we find on the scalp encysted tumours, periosteal thickening, and fungoid growth, the former distinguished by their not being adherent to the bone, the latter by their hardness and tenderness. The face and tongue are especially the seat of epithelial cancer. In the neck we encounter enlarged glands, both lymphatics already mentioned, and salivary glands, which will be noticed in speaking of affections of the mouth and throat. We also find occasionally a chronic enlargement of the thyroid gland, in the form of goitre. This is a tumour, soft and painless, and generally very moveable, extending across the trachea below the larynx, commonly more to one side than the other. There are no general symptoms connected with its presence; it may indicate faulty nutrition, but the health is unimpaired, and it is more a matter of inconvenience than actual disease.

The region of the neck is closely connected with the thoracic cavity, and deep-seated tumours there, may come within reach of the finger as they rise in the neck. We are not now to enter upon the consideration of such as can only be recognised by auscultation; our present purpose is only to speak of those which are superficial. Mention has already been made of tumours upon the ribs, and inflammation and suppuration of the wall of the chest. Where matter has already formed, a soft tumour is found on the surface of the chest: this may have its origin in a local collection of pus in the pleura making its way out. The history of internal inflammation and superficial abscess is in general different, and if there be any doubt on the subject, recourse must be had to the evidence which the stethoscope affords of the state of the lung and pleura.

Aneurism also gives rise to a soft tumour when it reaches the surface, but this commonly pulsates; a collection of pus can only do so under peculiar circumstances. The pus generally tends to the lower part of the chest, aneurism more frequently shows itself at the upper. In both cases the lungs and heart must each be examined; and some trace of disease in the one or the other will serve to determine us whenever there is any obscurity about the symptoms.

A firm elastic tumour protruding above the ribs, is generally an advanced stage of malignant growth in the chest. It is associated with general dulness on percussion either on one or

both sides, and with indications of pressure on the bronchi, the vessels, and the nerves; with local pains in the arms, local œdema, venous tortuosity, occlusion of arteries, &c. These symptoms will be taken in detail hereafter. It is to be remembered that the sallow hue of malignant disease is generally obscured by the obstruction to the circulation.

Fungoid tumour, attached to the interior of the ribs, and pressing out between them, is not very easily distinguished from superficial swelling. It very often happens that the patient has first noticed it after unusual muscular effort, and its progress has caused such infiltration and even protrusion of the parietes, that it is liable to be regarded as having been caused by the strain, and to consist merely of an effusion of blood under the muscles. When close to the sternum, its characters are more palpable, as a rounded, firm, and elastic swelling; it has not the softness of a collection of fluid, but it may pulsate, from its proximity to the heart. After a time the cachexia of cancer, or the appearance of a second tumour, may remove all doubts.

In thoracic tumours recourse may sometimes be had to the introduction of a grooved needle. It must be admitted that this is only a refuge for ignorance; but ignorance is sometimes unavoidable in such obscure cases.

In the abdomen, a tumour may be simulated by mere muscular resistance. Knotted contraction of the rectus, or even of some portions of the transverse muscles, may give rise to doubt; some patients cannot be brought by any inducement, perfectly to relax the muscles, partly, perhaps, from unwillingness, but partly also from abdominal irritation. This feeling of hardness is less local than tumour; it is also perceived to move with the parietes, and cannot be pushed aside. A jerking movement with the tips of the fingers in making pressure over different parts, will often serve to determine whether there be any hardness behind the abdominal walls; or by slow, firm pressure, we may overcome the parietal resistance. It is also important to ascertain whether there be dulness, on percussion, over the part, where the existence of a tumour is suspected.

When a tumour is made out, its relation to the abdominal viscera must next be considered; if small, its present position; if of some size, its point of origin. But patients very often give the most extraordinarily inconsistent accounts of the origin of these growths.

In the right hypochondrium it is probably connected with the liver, and the symptoms of disease of this viscus must be studied. It may be simply enlarged, from congestion or inflammation, or from chronic disease; or it may be displaced from the pressure of a belt in men or of tightly-laced stays in women. Under such circumstances, the edge of the liver of nearly its natural

form may be felt somewhat below the margin of the ribs, with firm resistance above and dulness on percussion. Sometimes on the surface of this enlarged mass a rounded fulness is observed, giving a sense of obscure fluctuation. It is important to distinguish that it is on the surface, and not at the edge, where a distended gall-bladder may be felt in the same way. If the history and symptoms are those of acute disease, this will indicate suppuration; if they are chronic, it is more probably due to the presence of hydatid cysts. In place of the regular form of an enlarged liver, several rounded masses may be felt in this region, extending more or less across the epigastrium. This is undoubtedly malignant, and the diagnosis of its connection with the liver depends both on the general symptoms of disease of that organ, and on the circumstance that, by percussion and palpation, it is ascertained that they are continuous with it. This point must always be thoroughly investigated, because, of necessity, when enlarged, it extends into the epigastrium, as it is limited by the ribs in the opposite direction.

One or even more hard masses in the centre of the epigastrium, or lower down towards the umbilicus, not connected with the liver, are most commonly caused by cancer of the stomach. The general symptoms are more especially referable to that organ, and there is almost always vomiting, which at one period or other has been grumous or like "coffee-grounds." The sallow, anæmic hue of malignant disease is especially marked, from the combination of cancerous growth and mal-nutrition.

In the left hypochondrium, simple enlargement of the spleen produces a tumour of an oval figure, which is perfectly even on the surface. This mass has sometimes been of such size as to reach quite down into the right iliac fossa. Its attachment is in the left hypochondrium, and the diagnosis will be more or less certain, as this fact can be made out.

Occasionally a firm, hard tumour may be felt to the left of the epigastrium, which cannot be traced into the hypochondrium, and which, though accompanied by mal-nutrition, has not been associated with symptoms distinctly traceable to disease of the stomach; such tumours have been found after death to be owing to scirrhus of the pancreas. The diagnosis is very difficult, and the position of the stomach is often such as to render it impossible to feel the hardened mass during life.

In the lower part of the abdomen in females the conditions of the organs of generation, the uterus, and ovaries must be considered; these will be discussed in their proper place. Tumours connected with these organs all spring out of the pelvis. In the right iliac region accumulations of fæces may simulate a tumour; this, though their most common, is not their only locality; and I would take the opportunity of reminding my younger readers

that, in all examinations of the abdomen, care should be taken to obtain a full and free evacuation of the bowels before a diagnosis is pronounced. Similarly, in the centre of the hypogastrium, a hard round tumour may be discovered, simply due to over-distension of the bladder. By careful manipulation, fluctuation can be discovered; but here, too, caution must be exercised, and, in cases of doubt, a catheter should be introduced, to ascertain its exact condition.

Tumours below the level of the umbilicus, not traceable to these causes, generally have their origin in diseased conditions of the omentum, or of the lymphatic glands of the abdomen, or in local peritonitis. The two former present more decided characters of tumour, defined and indurated; the latter is more diffuse, and very generally adherent to the parietes. They differ, too, in their history, as peritonitis is associated with pain and febrile disturbance, which are not essential to the others; and while the disease lasts, the symptoms are those of a partially acute disorder. It very often terminates in abscess; it may be caused by a blow, or by inflammation or ulceration of some part of the bowel. In females, it may be confined to the structures round the uterus, and is best distinguished from the specific diseases of the generative organs by ascertaining whether they have become adherent to the surrounding parts, and by the undefined character of the swelling itself, and its tenderness on pressure.

Disease of the omentum comes on gradually; it may be associated with irregularity of the bowels, sometimes marked by constipation, and not unfrequently by some form of hæmorrhage, but not attended with fever. The general state of the patient is anæmic and cachectic: the tumour itself is generally hard, and often nodulated, and may be made to move by turning the patient in bed from one side to the other. It often gives rise to pain, but is not essentially tender.

Disease of the glands very generally causes œdema of the feet and legs; and sometimes also ascites, which much obscures its diagnosis; in this case, its characters are ill defined, but the tumour is generally found firmly fixed, and deeply seated towards the spine.

Almost all abdominal tumours are apt to be obscured by effusion into the peritoneal cavity. Tumours in the abdomen are very liable to pulsate; and the question will occur, whether it be aneurism. Abdominal pulsation is of comparatively little value, because all the contents of the abdomen, lying as they do above the aorta and great vessels, are liable to succussion at each systole of the heart; neither is the presence of a "bruit" to be too much regarded, because, even in health, considerable pressure, and, in anæmic states, very slight pressure on a large

vessel, is sufficient for its production. Enlargements of the liver and spleen are least likely to simulate aneurism.

§ 3. *Of the Characters of Tumours.*—After what has been said upon the localization of tumours, there is little to add on the subject of their discrimination, as that can only be dealt with on certain broad principles, when internal organs are concerned. To the surgeon it is all-important to be able to determine whether an external tumour belong to the class of malignant or non-malignant disease; whether the condition of the patient be such as to lead him to recommend its removal with the knife, or to abstain from so doing; or whether the character of the tumour be such as gives him ground to hope for its diminution or disappearance by the employment of remedies of a less formidable character. To him, however, the question involves a great deal more than the consideration of the mere palpable characters of the tumour; he, too, has to consider its history, its mode of growth, and its effects, as well as the condition of his patient, both with reference to circumstances connected with his previous life and his present state. To the physician these are the questions of real moment: many anomalous conditions are found after death which had, and could have no history during life; many which, while offering few analogies to the post-mortem inquirer, have histories scarcely distinguishable the one from the other; while, again, many of which the histories differ, present lesions closely corresponding.

The knowledge of these difficulties must not deter us from making the inquiry, so far as practicable, into the exact nature of the disease; but it ought to lead us to embrace in our view the whole of the circumstances of each individual case. To these we especially look for guidance in determining the very important question, whether we have to do with the results of inflammation, or with a true or false hypertrophy of the organ, or with a malignant and necessarily fatal

disease; and we must place in a subordinate rank the suggestions that may be received from the locality or the sensible qualities of the tumour.

We find in the Nomenclature five varieties of cancer, (*a*) scirrhus, (*b*) medullary cancer, (*c*) epithelial cancer, (*d*) melanotic cancer, (*e*) osteoid cancer; next stands colloid, which is now separated from ordinary cancerous growths; these are followed by a list of non-malignant tumours and cysts which are classed as simple local diseases, though their names are given in this place for the sake of uniformity. It includes (1) fibrous tumour, (2) fibro-cellular tumour, (3) fibro-nucleated tumour, (4) fibro-plastic tumour, (5) myeloid tumour, (6) fatty tumour, (7) osseous tumour, (8) cartilaginous tumour, (9) glandular tumour, (10) vascular tumour, (11) nævus, (12) sebaceous tumour, (13) molluscum, (14) warts, (15) condyloma, (16) cheloid, (17) villous tumour, (18) simple or barren cysts, (19) compound or proliferous cysts.

§ 4. *Cancerous Growths.—a. Scirrhus or hard cancer* exists in the largest proportion of cases of cancer of the stomach; it attacks the rectum, and in rarer cases, other portions of the alimentary canal: in all of these we rest our diagnosis chiefly on that which is known to be its constant result, partial occlusion of the passage, which is not unfrequently combined with subsequent ulceration; evidence proving this event is therefore very confirmatory. Scirrhus of the uterus and vagina are often spoken of, and no doubt exist in many instances: most commonly, however, it is combined with fungoid disease, and very often cases are called scirrhus which ought to be called fungus and belong to the following class.

b. Medullary or *soft cancer*, known also as *encephaloid*, is the form of malignant disease commonly found in the chest, whether it be attached to the pleura or mediastinum (in both of which it is sometimes a matter of doubt whether its first point of departure be not from bone), or whether it be developed from

the intrathoracic glands, or, as happens in rare instances, from the glands in the axilla. In the abdomen, it is the character which cancerous growth generally presents in the liver, it is that which is always developed when its origin is in the deep-seated lumbar glands, and it forms the most numerous section of cancers of the uterus and vagina.

In the liver it frequently presents such a degree of firmness that it is called *hard encephaloid;* on the other hand, when ulcerated as it frequently is in the vagina, or when otherwise approaching the surface it protrudes in large masses which tend to bleed. This is what is called *fungus*, the epithet *hæmatodes* being sometimes added when the hæmorrhage is considerable and the vascularity great.

c. Epithelial cancer (*cancroid epithelioma*) is only distinguished by its being found in parts of the body supplied with epithelium, and its cells resembling those of epithelium.

d. Melanotic cancer, again, is simply a fungoid growth with much colouring matter in its interior.

e. Osteoid cancer presents this peculiarity, that as it springs from bone, and often contains bony plates in its interior, so when it occurs as a secondary growth similar bony plates are reproduced in organs which have no association with bone whatever.

§ 5. *Colloid* seems most readily developed in the loose structure of the omentum and of the peritoneum generally; and its existence can only be inferred from the fact of abdominal enlargement, which cannot otherwise be accounted for, coinciding with constitutional disturbance. This disease, however, is one in which cachexia is less marked than in cancer; and I must again repeat that that is the most important point in medical diagnosis when we speak of malignant disease. It is at least unwise to give an opinion implying the existence of cancer when the general indications do not point to something more than can be traced to local disorder; and while it is quite true that all in-

ternal growths are of serious import, because they are so little amenable to treatment, we must exercise great caution in attempting to analyse further, and say what is the exact character of the growth.

§ 6. *Non-malignant Growths.—Fibrous* and *fibroid tumours* are now made to include a large number of cases which used at one time to be regarded as cancerous. Their variety is almost unlimited, as they partake so much of the characters of the surrounding tissue. To the physician they are, perhaps, of most importance when springing from the uterus, where their presence is not unusual.

Growths connected with bony structures scarcely belong to medical diagnosis except when developed in the mediastinum, on the ribs, or on the bones of the pelvis: in these localities they are usually of a malignant character; the slower growing enchondroma or cartilaginous tumour is less common in them than in the long bones of the extremities, and the same is true of the myeloid growths which have of late occupied the attention of surgeons.

Glandular and *adenoid tumours* are chiefly of importance to the surgeon, as they resemble cancer of the breast. Occasionally they approach in character to scrofulous enlargement of glands, especially in the neck.

Cystic growths must, for the purposes of diagnosis, be made to include the acephalo-cyst, which is entirely adventitious, and those simple or compound cysts which consist of an abnormal development of natural structure. The former is entirely due to the presence of the echinococcus or the hydatid of some other tænia: the latter is either the abnormal development of some cell or natural sac, or it contains the elements of growth and formation which have been perverted by diseased action.

Thus it is not uncommon in the ovaries to find the ovarian vesicle developed into a compound cyst, or containing portions of hair, skin, or teeth. Practically

there is no advantage in discriminating cystic growths except in so far as the knowledge of the presence of fluid derived from its fluctuation leads to the evacuation of the contents. They all have this property in common, that their destructive tendency is limited to the organ in which they are situated, and they affect the general health no further than as the function of that organ is of importance, or their size interferes with the integrity and usefulness of surrounding structures. The hydatid is especially prone to infest the liver; and there it is alone that its presence can be made out with the remotest degree of confidence during life: of the other forms of cyst those only claim any notice which are found in the mammæ and in the ovaries. Pathological anatomy, indeed, teaches us that other organs are liable to become the site of cystic growth, but I know of no test by which they can be brought under the province of diagnosis.

In history and physical characters each form of tumour really differs from another, and these differences aid in their discrimination.

Those connected with the female generative organs will be again referred to, more specifically, as well as those of other organs, when their importance demands it.

Serous cysts in internal organs are distinguished by their even, rounded surface, and the sense of fluctuation given to the finger of the observer; from their history we learn that the development has been slow, while the condition of the patient proves that health is only interfered with so far as pressure impedes circulation, nutrition, or secretion. Encephaloid cancer is also rounded; but its surface is seldom even, it is nodulated and irregular, firm and elastic to the touch. Its history is of decidedly rapid growth, though it varies much in this respect; the patient suffers not only from the destruction of the organ which it affects, and the evils arising from interrupted function, but also labours under a cachexia which infects his whole system. Scirrhus feels very hard, and presents only one or two distinct nodules with more or less irregularity of surface. Its progress is slow; its history details disordered function long before any tumour has been noticed, and the cachexia of the patient derives increased intensity, from the interference with due nutrition, when the disease is situated in the alimentary

canal; pain is more constantly present in this than in any other morbid growth. Colloid presents an unevenly rounded, highly elastic surface; it may give a sensation to the finger nearly akin to fluctuation; the secondary nodules, which would serve very often as a pretty certain index of its nature, cannot be detected during life. Its growth is rapid; it does not greatly impregnate the system at large, but its position is such as commonly interferes very considerably with the assimilative process. The malignant growths from bone belong to the more rapid-growing cancers, although generally firm and inelastic. This fact in their history serves to distinguish them from the non-malignant osseous growths, but their diagnosis need not go much beyond the question of the real or simulated connexion with bony structure; this is proved by their immobility and position. They take more or less the direction of the bone to which they are attached, and while some degree of movement can be made out between the superficial structure and the tumour, none can be obtained by any manipulation between that and the bone.

Enlarged synovial bursæ and fatty tumours are recognised by their general indolent character, their locality, and the sense of fluctuation and elasticity which each presents.

CHAPTER X.

GENERAL DISEASES, CLASS B.

SCROFULA, SCURVY, AND ANÆMIA.

Symptoms of Scrofula — General Condition — Local Affections — Tubercular Meningitis — Pulmonary Tubercle — Acute and Chronic Phthisis — Tabes Mesenterica — Tubercular Pericarditis and Peritonitis — Scurvy and Purpura — Anæmia — Causes — Complications — Chlorosis — Anæmic Blood-murmurs — Arterial — Venous.

A. SCROFULA WITH TUBERCLE.

B. SCROFULA WITHOUT TUBERCLE.

THERE are some specific forms of mal-nutrition, derived in all probability from hereditary taint, of which scrofula is one of the most important. The exact element of the disease is unknown, and must probably ever remain so, but its essential character consists in the combination of constitutional taint and local action. Until the affection becomes localized, its existence can be but faintly traced as a tendency or diathesis. In some cases the local action ends in the deposit of scrofulous or tubercular matter; in other instances the disease is only recognised by its altering and modifying the course of inflammatory action.

In its simplest form it will be observed that, along with general derangement of health and imperfect growth of structure in childhood, the lymphatic glands tend to enlarge and to form an ill-organized yellow deposit in their interior, which readily suppurates, and yields unhealthy pus. This condition is most readily noted in the superficial glands of the neck, where casual exposure to cold is very likely to excite the

quasi-inflammatory action which leads to the enlargement.

The history of the case probably shows that the child was always delicate, suffering more than usual from teething, perhaps liable to convulsions; or if itself healthy, other members of the same family have suffered in this way. The ailment comes on insidiously, without any assignable cause; and when first seen, there may be unhealthy discharges of an acrid and semipurulent character from the eyes and nose; or abscesses may have formed on various parts of the body, of an indolent character, which, when they open, leave unhealthy ulcers. Very often cutaneous eruptions, particularly of an impetiginous character, are found spread over the head and face; these are obstinate and intractable, and are not unfrequently the cause of the enlargement of the cervical glands. To this general state we give the name of *Scrofula.*

The tongue is often habitually coated, and the intestinal discharges unhealthy; such children are very liable to be infested with ascarides; the aspect is generally characteristic; the skin is clear and thin, the face often anæmic; the limbs soft and flaccid, and the belly tumid; the upper lip is sometimes thickened and projecting, but this would appear to be chiefly a result of acrid discharges from the nostrils. A scrofulous child may very readily become tubercular, but the two diseases are seldom fully developed together.

There is scarcely any organ in which scrofula may not be met with, but in some it is much more constantly seen than in others, and the symptoms to which its presence gives rise are frequently so definite as to give the disease a distinct place in nosology. For the purposes of diagnosis it will be more convenient to consider the scrofulous diseases of organs along with the more distinctly local affection; here a short reference must be made only to the most important.

1. *Tubercular Meningitis.*—Under the name of

acute hydrocephalus, this special inflammation of the brain in infancy has been long known. Its relation to scrofula is unquestionable, clinical observation and post-mortem examination alike proving that inflammation of the brain attended with the effusion of serum, is constantly associated with the presence of tubercle in other organs. We shall have to analyse its symptoms at a future period, comparing them with those of simple inflammation. We shall then also have to consider the symptoms which may result from the actual presence of a tuberculous deposit in the brain itself; but we may remark that the tubercle is often solitary, and that it may have attained a very considerable magnitude without making its presence manifest by any symptoms uutil the more acute disease supervene; it is only rarely that its absolute size or peculiar position impedes by pressure the transmission of nervous energy, so as to produce paralysis or loss of sensibility. The symptoms due to meningitis are wholly distinct from those dependent on tubercle.

2. *Phthisis Pulmonalis and Acute Miliary Tuberculosis.*—True tubercle has the peculiarity of being chiefly developed in the lungs; it may exist in other internal organs, but it is very unusual in such cases to find the lungs wholly exempt. Its commencement is always insidious, and its subsequent progress is sometimes tardy; but, more commonly, it proceeds with considerable rapidity.

This circumstance has given rise to the division into acute and chronic phthisis; the distinction being based upon the extent of structure simultaneously attacked, and the rapidity with which it spreads to surrounding parts, and not on any difference in the nature of the disease. It is practically useful because of the different train of symptoms set up by a speedy invasion of the whole lung, or a gradual disintegration of successive portions of it. Exposed as all ages are to the ravages of this disease, it especially prevails soon after puberty, when both forms are constantly observed,

and seem to merge into each other. In elderly persons acute tuberculosis never occurs; and, on the other hand, it may at least be said that true chronic phthisis is extremely rare in children.

The acute form sets in as an attack of influenza—that is to say, with symptoms of bronchial irritation and adynamic fever, the preceding coryza, however, being generally absent. This condition becoming persistent, the pulse continues rapid and feeble; the cheeks are flushed; perspirations occur, especially at night; emaciation and increasing weakness follow in rapid succession, even before any physical signs in the lungs themselves indicate the presence of tubercular matter.

The full consideration of this subject can only be entered upon after the physical signs of disease of the lungs are detailed; here we have only to do with the general features of the diathesis. While the pulse is quick, the condition of the skin alternates between dryness and moisture, is never harsh or burning, as in fever, and the perspirations are sometimes excessive; the state of the tongue is very various; and the bowels may be either natural in action or inclined to diarrhœa; the aspect is often instructive; a certain degree of anæmia prevails, with a bright colour on the cheeks; the eyes are soft and brilliant, with large pupils, and frequently fringed by long eyelashes; this is especially to be seen in childhood. The accompanying emaciation, and the languid manner and sense of feebleness, afford additional grounds for a suspicion of the presence of tubercle.

In its early stages accurate diagnosis is, perhaps, impossible, even with the aid of physical signs; in children the supervention of cough and emaciation upon measles is most probably due to this cause, especially if the patient has previously suffered from any of the symptoms of scrofula, or if scrofula or phthisis exists in the family of either of the parents, or has been evidenced in others of the children. The absence of coryza in the first onset of the disease, points to some local cause of bronchial irritation, and not to a general affection of the mucous membrane;

the persistence of adynamic fever shows that the attack is not one of influenza or bronchitis properly so called, in each of which the febrile state is more transient; the condition of the tongue is seldom that of common continued fever, it is only at an advanced stage that it presents at all the patchy redness or chapped appearance of fever accompanied with diarrhœa, and it is very seldom dry; indeed it is rather aphthous or ulcerated than patched and chapped: the recurrence of perspirations is also unusual in fever. The whole characters of the case are more closely allied to those presented in a tardy convalescence, and then the previous history of an acute attack with much thirst, loss of appetite, wandering delirious nights, &c., is quite different from the history of a gradually increasing malady; but it must be remembered, on the other hand, that the debilitating effects of an attack of fever predispose to the incursion of tubercles, and it may be impossible to say when the one has terminated and the other begun.

The march of chronic phthisis is always somewhat slow. Here the deposit of tubercles is much more local and more easily made out by a physical examination of the chest; but in the earlier stages the signs may be dubious, or null. The more important general symptoms are emaciation, night sweats, and hæmoptysis; when these exist along with a dry hacking cough, wandering pains in the chest, a habitually quick pulse, a degree of huskiness in the voice, and diarrhœa, scarcely a doubt can remain that the disease has commenced, even though the stethoscopic signs be very obscure. It is remarkable how unwilling patients generally are to confess to "spitting of blood;" and when the amount has been trifling, it may require much cross-questioning to elicit the truth. As it proceeds, the hectic flush on the cheeks contrasts strangely with the clear, transparent pallor of the rest of the face; the eyes are often bright and luminous; the skin becomes soft and velvety, and, when pinched up, is found to be thin, and detached from the subjacent muscles; the ends of the fingers become clubbed, and the nails unciform; the gait is stooping; the shoulders curved forwards; the chest flattened, and but little expanded in breathing; while every move-

ment of the body gives token of feebleness and languor.

Any of these symptoms may be absent, and on a just appreciation of their collective value often depends the correctness or incorrectness of diagnosis. Emaciation is never wanting, but is often associated with other affections, of which cough may be a concomitant: night-sweats, though more frequent in this disease than any other, may be merely the effect of debility: hæmoptysis does generally appear at some time or other in chronic phthisis, but not necessarily so, and the disease has already made some progress in most cases before the symptom is seen; when present, and there is no disease of the heart to account for it, and it cannot be explained as the result of hysteria, or as vicarious of menstruation, it is more to be relied on as an indication of phthsis than any other. A dry, hacking cough without expectoration, or with mixed mucilaginous-looking sputa, where it is accompanied by pains in the chest, and there has been neither coryza nor sore throat, to indicate a simultaneous affection of the whole mucous membrane, may be very safely set down as having a tubercular origin. Huskiness of the voice, caused by slight laryngeal affection, derives its sole value from its association with other symptoms; but it may owe its existence to previous syphilis, it may be simply due to an ordinary cold with sore throat, or it may even be caused by pressure on the trachea or larynx. A habitually quick pulse, when coinciding with cough and other indications of affection of the chest, is exceedingly suspicious; but both may be caused by obscure disease of the heart, and, on the other hand, phthisis has often proceeded to its most advanced stage without this symptom being present at all. Diarrhœa tends greatly to confirm our fears, because, although there be no specific ground on which its tubercular origin can be determined, yet the liability to it is greater in phthisis than in any other disease, except enteric fever; in both a specific affection of the intestinal glands exists. The further symptoms are those of hectic fever, and its accompanying emaciation; and as such they generally serve to stamp the phthisical character of cough, but they may be very closely simulated in cases of persistent bronchitis.

The correct diagnosis of phthisis depends upon the harmony of general symptoms and physical signs, and while a complete array of symptoms, or very strong evidence derived from signs, may lead to the conclusion that in all probability this disease is present, a combination of the two can alone justify a decided opinion. To this subject we must again recur. (See Diseases of Lungs—Phthisis pulmonalis.)

Much attention ought to be given to the liability to hereditary

transmission, which certainly in some families is very marked; strict inductive evidence of its relative power is yet wanting, and its subordination or superiority to other predisposing causes is not determined; but the existence of scrofula or tubercles in the parent is a sufficient ground for leading us to suspect their presence in the child when other indications point in that direction.

3. *Tabes Mesenterica.*—Sometimes, in conjunction with some of the external symptoms of scrofula in childhood, emaciation proceeds to a greater extent than usual; the limbs dwindle, the skin becomes dry and shrivelled, the abdomen is hard and tense, and the little patient appears to suffer pain when pressure is made; the evacuations are very offensive, and the bowels irregular in their action; there is a tendency to diarrhœa, which may become urgent and obstinate. In such a case we have great reason to believe that scrofulous or tubercular matter, or a mixture of both, in what has been called scrofulous tubercle, has been deposited in the glands of the abdomen, and especially in the mesenteric glands: hence the name tabes mesenterica has been applied to this form of the scrofulous cachexy.

4. *Tubercular Pericarditis and Peritonitis.*—In each of these serous cavities the ordinary inflammation may be modified by the presence of tubercle, or the inflammatory action may be entirely due to this cause. In pericarditis the evidence of its presence is extremely vague and indefinite, in the peritoneum the development of tubercle stands next in frequency and importance to that in the lungs. It is unnecessary at this stage of the inquiry to go into the evidence of the existence of these two diseases, we have here merely to consider the influence of the scrofulous element.

In children tubercular peritonitis sometimes occurs alone, or with scrofulous tubercle in the mesenteric glands, when there is no corresponding deposit in the lungs; in adults it is seldom separable from phthisis. Its symptoms are those of peritonitis, and the tubercular

form is to be distinguished by its gradual and insidious incursion, and by the presence of general symptoms corresponding to those seen in phthisis, if due allowance be made for the difference of the region in which the tubercular matter has been developed. Thus there are the same quickness of pulse, accompanied by perspiration, the emaciation and languid feelings, and very often the diarrhœa of early phthisis; to these are superadded, a sense of tension in the abdomen, which has a tumid feeling, and does not bear pressure without pain; the tongue is very commonly furred, but not to any great degree. Evidence of tubercle in the lungs is of much value in aiding diagnosis; as is also the presence of diarrhœa, because it is less common in simple peritonitis, and is probably caused by the existence of tubercle in its very common locality —the solitary glands of the intestine. But we may be defeated in our endeavour to form a correct diagnosis, either by the history recording that the attack has been, or has appeared to be, sudden, or by limited suppuration, in the form of deep-seated and confined abscess of the peritoneum, producing symptoms of hectic. To this it must be added, that perplexing symptoms sometimes present themselves as the effects of pressure on the nerves, the blood-vessels, or the absorbents, or as the more remote consequences of adhesions between the various coils of intestine. Perhaps our best guide is to be found in the general adynamic character of the symptoms throughout, and in the early history of the cachectic state which preceded them.

SCURVY AND PURPURA.

These two diseases have this feature in common, that they are forms of subcutaneous hæmorrhage, occurring spontaneously without pain or injury, and having no assignable cause other than a peculiar condition of the blood. Their phenomena are essentially objective; the existence of the disease being proved by the presence of dark-coloured persistent spots or

patches of varying size, having the appearance of purple stains or livid bruises of the skin.

These states are not identical with what is denominated the hæmorrhagic diathesis. Spontaneous hæmorrhages are liable to occur in both conditions; the external characters differ in this respect, that in the one blood is effused under the skin without assignable cause, and with no apparent alteration of texture, while in the other it is only poured out where there is some breach of surface, and is then stanched with extreme difficulty; fatal hæmorrhage has in such circumstances followed the extraction of a tooth. It is probable that the spontaneous internal hæmorrhages in each case follow the same rule, and that there is really some abrasion of the mucous membrane, or rupture of a small vessel, in the one and not in the other.

They differ from each other,—(*a*) in scurvy being very frequently accompanied by sponginess of the gums, which is never the case with purpura, but this indication is not always present; (*b*) in the characters of the spots themselves. In purpura they are generally small and of a very dark colour; the skin seems to be stained through with a purple dye: when larger patches exist, they seem to be composed of innumerable smaller ones run together, some of which are found quite distinct in the immediate neighbourhood, or in other parts of the body; the spots are soft and flaccid. In scurvy the patches are generally large, and always more or less hard; their colour is more livid than purple, resembling bruises rather than stains of the skin.

Purpura is not unfrequently associated with hæmaturia, or intestinal hæmorrhage; it is then usually called purpura hæmorrhagica. It is liable to occur in any circumstances which deteriorate the quality of the blood, and is consequently found in disease of the kidney, liver, and spleen, and is, therefore, a constant concomitant of dropsy. It is also occasionally met with in conditions of blood-poisoning, such as pyæmia and severe smallpox: it forms the true petechiæ in typhus fever. When it arises spontaneously there must have been some antecedent cause for the altered

condition of the blood, though this cannot always be traced. Scurvy, on the other hand, is especially associated with deficiency of some element ordinarily derived from the vegetable kingdom, and generally believed to be an acid, because of the prophylactic as well as curative powers of lemon-juice: it was much more common than usual at the first outbreak of the potato disease, when the poor were deprived of this their ordinary vegetable.

Scurvy offers one of the most remarkable instances in which the prophylactic and the curative powers of the same agent are closely associated together. At the same time it must be confessed that there are circumstances (especially diet) which have power to prevent the incursion of the disease, but yet are powerless to arrest it when fully developed. Perhaps in no point are the two disorders shown to be more perfectly distinct than in their relation to remedial agents.

ANÆMIA.

In the classification of symptoms which afford indications regarding the general state of the patient, reference was made to those derived from the aspect and colour of the face. None of these is more striking, or perhaps more valuable, than that presented by anæmia;—loss of that natural complexion which is produced in health by the fine network of capillaries spread over the skin, especially of the cheeks, and also over the mucous membrane bounding the lips and the nose; by inference deficiency of blood, but more particularly of the red colouring matter. This condition depends therefore either on absolute want of blood, or on disproportion between its various elements.

1. *Simple Anæmia.*—The causes which have given rise to this state may very often be detected in the history of the case. The exact duration of the disease can seldom be ascertained, except when loss of blood has been occasioned by hæmorrhage, because its commencement is generally insidious. Patients cannot associate their pallor with those conditions out of

which it has arisen; but more commonly, in describing the commencement of their illness, refer to those secondary states which have first made them conscious of loss of health, such as palpitation or dyspnœa, headache, dyspepsia, general weakness, and among females diminution or suppression of the menstrual discharge. The history ought, if possible, to go beyond these, to the antecedent state out of which the whole category of symptoms has sprung, and to take note of the order in which the circumstances of which the patient is cognisant have successively appeared.

The inquiry on the part of the physician embraces the following points:—*a*. The existence of hæmorrhage. *b*. Want of proper nutriment. *c*. Causes which prevent the nutriment from being converted into healthy blood. *d*. Conditions of system which directly tend to deteriorate the blood.

We put aside for the present that special form of anæmia to which the name of chlorosis is given, and limit ourselves to the circumstances by which simple anæmia is brought about.

a. Hæmorrhage diminishes the quantity of the circulating fluid; and when the loss is made up by the absorption of liquid, its quality is impoverished. The hæmorrhages most commonly producing this effect are from the uterus in females, and from the bowels in both sexes; anæmia frequently follows on hæmatemesis, and more rarely on prolonged epistaxis; it is also to be seen in patients who have been frequently bled. When associated with hæmoptysis or hæmaturia, the anæmic state is rather the result of disease of the lungs or kidney than of the loss of blood. It must not be forgotten that the hæmorrhage may be the consequence and not the cause of the changed qualities of the blood.

b. Simple anæmia is generally the effect of insufficient nutriment: when the food is improper in quality, special forms of disease are more liable to be engendered, cachexia, purpura, scurvy, &c. Starvation implies absolute want of blood, and the disproportion of the constituents is only referrible to excess of water.

c. The causes which prevent the formation of blood include especially disorders of the digestive apparatus, the stomach, the liver, and the intestines; as well as obstruction to the absorb-

ents, as seen in mesenteric disease. We must bear in mind, however, that derangements of all possible kinds may result from the anæmia in place of causing it. We may be somewhat guided in forming our judgment by the history of the case, pointing out priority of occurrence either in the dyspeptic symptoms, or in the general feeling of weakness, and by the relative intensity of each class of indications; the anæmia is much more intense when it produces the dyspepsia than when caused by it. There can be but little difference between the want of blood arising from imperfect assimilation, and that from insufficient food.

d. Special forms of anæmia are directly traceable to conditions which, without interfering with digestion and absorption, seem to act by deteriorating the quality of the blood, inducing especially disproportion among its constituent elements. Of this kind are the effects of cancer and of disease of the kidney: to the same class we must refer chlorosis and leucocythæmia. All these subjects must again occupy our attention in considering various regions of the body; meanwhile it is only needful to remark, that the anæmia is rather an accidental symptom in the case of cancer and albuminuria, but is an essential one in chlorosis and white-cell blood: in the latter, too, it serves to draw our attention to the spleen, and we have no other direct evidence of splenic disease.

In cancer the pallid appearance is combined with a sallow hue, which has been called the "malignant aspect;" in disease of the kidney there is usually some puffiness of the face, and the cheeks are occasionally mottled; in chlorosis, as its name implies, there is a slight tinge of green, with a transparency of skin which makes the face look like a wax model; in leucocythæmia the aspect is muddy, earthy, and a similar appearance may be seen in the tuberculous cachexia of early life. These differences, well-marked in advanced cases, and frequently sufficient to an experienced eye for the discrimination of the disease, must not be much relied on by the student. They are to be regarded simply as aids to diagnosis, not as the grounds on which it is based.

In rare cases none of the conditions just mentioned can be made out as having had any share in the production of anæmia: even when fatal, no organic disease has been detected. This anæmia is of slow development; it seems to exist alone, and is marked by no symptoms except such as are referrible to a deterioration of the circulating fluid. For the present we must rest satisfied with determining its presence,

and ascertaining that it is uncomplicated; we cannot get beyond the fact which the name anæmia, or spanæmia, as used by some pathologists, implies.

The general state, from whatever cause derived, is followed, in most cases, by the symptoms already enumerated—dyspnœa and palpitation, headache and general weakness, and frequently by emaciation, the latter being least observed in those associated with hæmorrhage and chlorosis. Having got the clue from the objective phenomenon of aspect, we have only to observe what are primary and what secondary affections among the symptoms present. The pulse is pretty full when the change is rather in quality than quantity: if weak and small, there is certainly deficient amount of blood; with a soft pulse—both conditions are probably present. The tongue is very generally clean, always remarkably pale, and sometimes slightly furred and inclined to be œdematous, bearing marks of the teeth on its edge. The coincidence of depraved appetite and irregular bowels with anæmia is rather the rule than the exception. Local congestions of various organs are very frequently met with, and the full recognition of the general condition of anæmia is essential to their rational treatment. The association of œdema is also not uncommon; probably every case of anæmia, at an advanced stage, would become more or less dropsical in circumstances favorable for its development; but we must be particularly careful in investigating the origin of this symptom, and must not rest satisfied with the ready explanation that the condition of anæmia offers, till all the other causes of its existence are fully examined.

2. *Chlorosis.* — Although essentially a form of anæmia, this condition demands separate notice, from its peculiar association with perverted function of the uterus. It seems to exist under two primary forms: (*a*) previous anæmia, followed by scanty menstruation, terminating in complete suppression of the menses; (*b*) sudden suppression of the menses, ter-

minating in general alteration of the blood; the aspect betraying something more than mere anæmia.

In the former case, the limits of the disease are not well defined; in the latter, the peculiar characters are unmistakeable: but in both there is some specific relation between the symptoms, and in order to constitute chlorosis this relation must be clearly made out.

Suppression of the menses under the name of amenorrhœa belongs especially to the diseases or disorders of the uterus. Any female may be anæmic from some one of the causes already enumerated, and, as a casual result of debility, the catamenia may be scanty or absent; but this ought not to be called chlorosis; neither should the name be given to amenorrhœa when there is no condition of anæmia associated with it. But when in a young person there is no distinct cause for the anæmia, and when along with it, deficiency of the menstrual flux occurs early, and total suppression soon follows, or when suppression precedes anæmia, the classification seems legitimate and useful.

3. *Anæmic Blood-murmurs.*—The diseases which we have just been considering are characterised by a deficiency of red blood. When the condition is produced by a change in quality rather than quantity, when the red globules are diminished greatly out of proportion to the loss of other constituents of the blood, unnatural sounds are often to be heard with the stethoscope at various points in the course of the circulation; over the heart, the arteries, or the large veins, while there is but little obstruction to the current to account for their production. This subject must be again referred to in speaking of diseases of the heart and great vessels; but its importance seems to justify a few words here to point out to the student how he may make himself acquainted, so far as possible, with the diagnosis of a "blood-sound."

The essential point which must ever be borne in mind is, that all "bruits" whatever are produced

chiefly in the blood itself, and not in the solid structures; they are supposed to depend on vibrations among the particles, or globules; the sound is really quite independent of the nature of the disease in which it is heard, although modified by it, as it causes alterations of form in the channels, or simply gives rise to changes in the qualities of the blood. Such vibrations may be produced in any fluid by placing some obstruction in the course of its movements, and much more readily in thin fluids than in those which are more tenacious. The aptitude for their production in disease therefore varies with the quality of the blood, and the chance of their occurrence, with the condition of the solid structures. In a perfectly healthy condition of the blood they can only be produced by changes of certain amount in the form and calibre of the passages, or by counter-currents; in slight deviation from health, less important alterations will serve to throw the particles into vibration; in the more advanced forms of anæmia, the natural obstacle to its progress which it has to overcome in passing through channels of varying size is sufficient to produce the effect, which will be more or less marked in proportion to the force and rapidity of the circulation. No such phenomenon is observed in health, simply because a due proportion exists between the tenacity of the fluid and the form of its canals.

Bearing in mind these different elements in the production of the sound, it will be readily understood that no certain diagnosis of the nature of the disease can be formed from its tone or intensity. Generally speaking, those which are unaccompanied by structural change have a very decided character of softness; but this is by no means peculiar to murmurs of this class. On the other hand, in considering the locality in which it is heard, we have to remember that the true blood-sound is only secondarily dependent on local causes, because we know *à priori* that a very slight impediment is sufficient for its production; and it is

reasonable to expect that, if any circumstance give rise to its presence, it will be heard most readily where the current is most superficial. Another consideration affecting its situation is, that when the blood is thus liable to be thrown into sonorous vibration, the sound is propagated in every direction, after it has flowed past any trifling obstacle, to a much greater extent than when healthy blood is forced into the same vibration by some more powerful cause. Accordingly, we find it very readily produced by slight pressure on a blood-vessel; *e.g.* the carotid artery: again, in traversing the heart, the blood passes through channels of varying size, and it is churned and mixed together in the ventricles in such a way as would naturally lead to the production of "anæmic murmurs," whether on the right or the left side: the pulmonary artery is most superficial in the chest, and therefore the sound is more frequently heard there; but when the apex of the heart comes much forward, and its base is thrown back, the arteries being deeply covered by lung-structure, the murmurs may be best heard through its walls, and even towards its apex. In decided anæmia, a blood-sound can also be heard in the veins; a little management in tilting over the stethoscope towards the patient's head, so as partially to impede the returning current through the jugular veins, will generally develop this venous hum. It differs from the arterial blood-sound in being continuous, and not intermittent: its tone varies in different individuals; but the best general idea of its character may be obtained from the roaring of a large shell, applied to the ear; it is called by the French "bruit de diable," from the sound of the humming-top; but this is both louder and shriller. Both sounds may often be heard together in the neck, as pressure is made with the edge of the stethoscope next to the thorax, or the most distant from it—more firmly, so as to stop the venous current altogether—or more gently, so as merely to impede it. When the experiment is well

performed, the short whiff of the arterial sound contrasts strikingly with the prolonged continuous hum of the vein.

If the venous murmur be heard, there can be no doubt that the blood is in a condition in which *bruits* are readily produced. The same conclusion may be safely arrived at if slight pressure on an artery develop a short whiff, which seems close to the ear, is synchronous with the pulse, and ceases to be heard when the pressure is removed. Similarly, but not so certainly, may a blood-sound be diagnosticated if it occupy the whole of the region of the base of the heart, being especially audible in the pulmonary artery, where the blood is generally most superficial, but evidently not confined to that locality. The question is one of considerable difficulty, and can only be fully understood when the diagnosis of true valvular murmurs has been discussed. The diffuse character of the sound does not exclude the possibility of valve disease; it merely affirms the condition of blood-disease. It is only in extreme cases that this diffuseness of sound, and the impossibility of tracing it back to any one set of valves as its cause, can determine the fact that there is no organic disease present, and then our judgment will be greatly influenced by other considerations which will be referred to when the diseases of the heart are under consideration.

CHAPTER XI.

DROPSIES AND HÆMORRHAGES.

I.—Dropsies.—§ 1, *Anasarca—the Type of General Dropsy—Acute—Chronic—Local Œdema*—§ 2, *Ascites—Association with Anasarca—Detection—Causes.*—§ 3, *Local Dropsies.*

II.—Hæmorrhages—§ 1, *Epistaxis*—§ 2, *Hæmoptysis—Causes and Associations*—§ 3, *Hæmatemesis—Characters and Causes*—§ 4, *Hæmaturia*—§ 5, *Intestinal Hæmorrhage*—§ 6, *Uterine Hæmorrhage.*

Before proceeding to the consideration of the diseases of organs, it seems desirable to bring together the indications by which we recognise the occurrence of two well-marked states which might rather be described as the accidents than the diseases of those parts of the body in which they are found. The chief reason for adopting this course is the circumstance that in the same locality their presence may be due to a variety of causes, and on the other hand the exciting cause, whatever its nature, may give rise to their occurrence now in one, and now in another situation.

In a strictly scientific point of view, it may be alleged that they ought to be studied simply as symptoms; but for the purpose of diagnosis they must be considered in their relation to each other, as we shall thus be enabled to compare their extent and situation, and to ascertain with more exactness the deductions which they warrant with reference to internal organs. The classification which separates them from the deeper-seated disease is justified by the circumstance that they may be the only definite symptom of its presence; they are the subject of complaint and the object of treatment, and it is only by inference that we are led to suspect the existence of anything more.

They also differ from mere symptoms in presenting decided and broadly marked characters, which are uniform and consistent, whatever be their situation or supposed cause. They do

not necessarily accompany the more important lesions with which they are usually associated, but seem only to supervene under certain circumstances, of which the most important probably is an altered condition of the blood itself. Further, although they are most frequently dependent on some form of organic lesion, yet occasionally the very same appearances may be observed when the disorder is solely in the circulating fluid itself, and thus they become allied with what may be called the chronic blood-ailments.

Our inquiry will be here limited to their distinguishing features, pointing out wherein they resemble or differ from each other in situation and appearance, and indicating only in a general manner their probable causes. The more minute examination of the diseases with which they are allied must be deferred till we come to the consideration of those organs in which they are situated.

I.—Dropsies.

Increase of size has been mentioned as one of the objective phenomena of disease, with especial reference to its frequent dependence on the presence of dropsy. This condition may be defined as consisting in the effusion of fluid, either throughout the general areolar tissue, or within some cavity. But it is not possible to regard every local effusion as a disease necessarily arising out of a general condition of system; and it is therefore important to note its simultaneous occurrence in more than one locality, as giving more certain evidence of the operation of general causes. Anasarca will, for this reason, be taken as the type of general dropsy.

The local accumulations of fluid which occur in association with general disease, are as numerous as the serous sacs which are found in all the great cavities, and we need not attempt to enumerate them all; they are to be viewed as subordinate to anasarca. Local effusions, on the other hand, limited to one serous membrane, must be excluded from our consideration at present, when they are only the evidence of the previous existence of inflammation. Ascites is less frequently the consequence of inflammation,

and it acknowledges at least more than one cause for its production, and consequently demands separate notice.

Serous cysts are a very common cause of local dropsy: they have already been considered under the head of cystic growths; those connected with the ovaries are alone referred to here, as it is important to point out the characters by which they are distinguished from ascites.

§ 1. *Anasarca.*—Marked by painless swelling, which is free from the redness of inflammation, except in so far as tension produces tenderness of the skin; it receives and retains the mark of the finger when pressure is made. General dropsy is very frequently associated with disease of the heart or of the kidney; so much so, indeed, that these organs must be carefully examined in all cases of anasarca.

When such an association is made out, the disease is very often called cardiac or renal dropsy; but these terms are objectionable, because both organs are often found simultaneously affected, and the relations which they express convey an idea of causation which is not true. There are various points of detail in which the dropsy principally associated with cardiac disease differs from that of renal disease; these will be learned by experience, and give a certain readiness in diagnosis, but are not altogether trustworthy, and are only of use when taken in connexion with a more extended examination. Among these, the complexion of the patient is the consideration of most moment, because of its bearing on treatment; whether it be dusky and bloated, or pale, waxy, and ex-sanguine. All the intermediate conditions will be found in cases of dropsy with disease of these organs; but, while the one extreme indicates obstruction to the venous circulation, the other marks deterioration of the blood, and thus they point to the heart and the kidney respectively as the chief seat of disease.

The next consideration has reference to the extent of the effusion, whether the dropsy be universal or local. The effused serum necessarily tends to gravitate towards the most depending parts; and this is aided in the erect posture, by the weight of the column of blood

pressing with greater force on the capillaries of the lower extremities: limitation to the feet and ankles must, therefore, be excluded from the idea of localization, except when one leg only is œdematous.

The history, again, divides the cases into those in which it has come on suddenly, and those in which it has been more gradually developed, disappearing and reappearing during a long period, or steadily increasing from the time it was first observed.

a. The sudden form, or *acute dropsy*, generally arises from exposure to cold, and is very common, either with or without exposure as a sequel of scarlatina; the urine is very often albuminous, but not always so. When albuminuria is present, disease of the kidney sometimes seems to commence in such an attack, from which the patient never thoroughly recovers; more commonly, the appearance of albumen in the urine is quite transient, merely indicating congestion; on the other hand, acute dropsy with albuminuria may be the first evident symptom of disease of the kidney. When unassociated with albuminuria, it probably depends on a slight degree of capillary phlebitis, causing retardation of the cutaneous circulation; it is then accompanied by a febrile state, and may be the direct consequence of checked perspiration, or of the exposure which produced this effect. The same condition of the cutaneous capillaries probably accompanies the kidney congestion in all cases where fever is present. If the exciting cause be more local, and its action more intense, diffuse cellular inflammation is set up in place of anasarca; the two diseases are thus pathologically allied though presenting appearances totally distinct.

b. Chronic Dropsy is that which more usually attends upon cardiac or renal disease. We also find either œdema of the feet and ankles, or still more general anasarca, depending simply upon deterioration of the blood, with excess of serum.

Of this, the most common causes are:—1. Exhausting diseases—phthisis, cancer, chronic bronchitis (when

not acting, as it commonly does, through the medium of the heart, the first part of the circulatory apparatus affected by obstruction in the lungs), and disease of the liver, especially when associated with ascites. 2. Want of food, or improper nutrition. 3. General poverty of blood, as in anæmia and chlorosis. The diagnosis of these disorders will be considered in their proper places in the sequel; but we may learn, from their number and variety, how false is that theory which is expressed in the terms cardiac and renal dropsy. Disease of either organ may aid in its production, but probably in every case blood changes must have occurred before the serum exudes through the coats of the capillaries.

c. When local, the term *œdema* is more commonly applied than anasarca. The cause must be referred to some obstruction to the returning current of the blood, pressure on the veins from without, or occlusion from within:—an unnatural condition of the parts through which the venous trunk passes, or inflammation of its internal coat. The extent of surface œdematous, and a reference to the distribution of its blood-vessels, will greatly aid in determining in what portion of its current the blood is obstructed. Acute phlebitis is almost always associated with œdema, but the occlusion may also be one of long standing. When obstruction is produced by pressure, and its cause is situated externally to the great cavities of the chest and abdomen, the diagnosis must be extremely simple; but when the pressure is occasioned by some tumour lying within, it is oftentimes made out only with extreme difficulty and by very careful examination.

Local œdema also accompanies inflammations of limited extent, whether in the skin, such as erythema and erysipelas, or as diffuse inflammation of the cellular tissue, or even in suppuration of bones, joints, and ligaments; and cases will occur in which it is difficult to determine whether the inflammation of the skin and cellular tissue is caused by some irri-

tation of a limb already tense from œdema, or the effusion of serum is the consequence of the local inflammation.

§ 2. *Ascites.*—Depending, as has been stated, upon more than one cause as its source, and demanding treatment often distinct from that of the disease from which it springs, ascites claims our notice when it is either unassociated with anasarca, or itself forms much the most prominent feature of a case in which there is more or less general dropsy. In rare instances, too, it appears to have sprung from some transient morbid state, and to persist merely because the accumulation of fluid, by its pressure, prevents the due action of the absorbent and eliminating process by which it might be removed.

When associated with anasarca, it is very important to determine whether it is to be classed as one of the many local effusions which acknowledge the same general causes ; or as having an independent origin and cause, which simply co-exists with the others ; or, lastly, whether the anasarca may not itself be only the consequence of the ascites. The history, if absolutely correct, would always decide the first and last of these questions, especially if taken in connexion with the inquiry, which ought never to be omitted, into the several conditions of system usually associated with general dropsy. When these have been for some time in operation, and œdema has been observed distinctly prior to effusion into the abdominal cavity, the presumption is strong that ascites is merely casual and coincident, an evidence of a general tendency. When, on the other hand, fluid has been first detected in the peritoneum, and the more commonly acknowledged causes of anasarca are absent, it is highly probable that an œdematous state of the lower limbs is produced only by obstruction to the returning column of blood through the distended cavity, in an impoverished state of system. Unfortunately it very often happens that

accumulations either of flatus or of fæces are mistaken for dropsical swelling, or that the enlargement of the abdomen is not taken notice of until after anasarca has supervened: it is, therefore, very generally necessary to inquire into the causes of each condition separately, and not to rest satisfied with the hypothesis that they are both part of the same disease.

To a certain extent, information may be acquired from the history of the case, regarding the causes and progress of ascites; because we either learn that it has been preceded by pain in some part of the abdomen, or that, to the patient's own consciousness, there has been nothing but a gradually increasing fulness and tension. The history also enables us to exclude local enlargements which have been first observed in some particular region of the abdomen; and affords *primâ facie* evidence of the case being one of ascites depending on disease of the liver, when the patient has been a person of intemperate habits, or has had an attack of jaundice.

The presence of fluid is learned from the existence of fluctuation; by which is meant the impression received by the hand, of a wave-like movement through the fluid, across the abdomen, when a blow is struck at a distant point. The accurate determination of this fluid-motion requires much care and frequent practice: the extreme mobility of the contents of the abdomen, or an accumulation of fat which, at the temperature of the body, is in a semi-fluid state, are each liable, in certain circumstances, to give rise to a sense of resilience, extremely like the feeling of fluctuation. On the other hand, the intervention of a portion of bowel distended with gas may annul the wave of fluctuation when fluid is really present. The first step in the examination of a distended abdomen ought to be to place the patient flat on the back, and observe the general contour of the abdomen, and then to proceed to determine by percussion the position of bowel resonance; next, to seek for evidence of fluid where that

resonance ceases or is greatly diminished, observing how far the fluctuation extends in various directions from the part struck; and, lastly, by change of posture to satisfy ourselves as to the relation of the fluid to the other abdominal contents, whether it be freely movable or comparatively fixed in one locality. And, having made out to our own satisfaction that fluid is present within the cavity of the peritoneum, we may then, from a consideration of the whole history of the case, the various symptoms which have attended the origin and progress of the disease, and the present condition of the patient, form some idea of its cause. And, if we would avoid false deductions and injudicious treatment, the actual state of all the organs of the abdomen must be analysed with great care.

The history of the case affords more assistance in determining the particular cause of the effusion than in assuring us of its locality, except when it speaks positively of local enlargement. Students must guard against either confounding for themselves or leading the patient to confound, pain for enlargement; a mistake which, in my own experience, has led careless observers astray. Patients are very generally first conscious of abdominal tension by a feeling of fulness at the waist; and both sexes will alike assert that their increase of size began there, when we are perfectly certain that the fluid was at the time collecting in the lower part of the abdomen.

The patient's statement of local enlargement may be often verified by the peculiar shape which the abdomen presents in the horizontal posture: in ascites it is usually uniform. Percussion resonance determines the relative position of the intestine, in which gas is almost always present, and of the foreign substance, whatever it may be. It may indicate a distinct level line all round to which fluid rises, or it may show that one coil of intestine dips down below it, or that a very large portion of intestine on one side is altogether below the level of the dull part on the other; on the other hand, it may prove that the whole surface is resonant, or that dulness is very limited and local.

The evidence of fluctuation is much more liable to be indistinct when the fluid is contained within some cyst, than when it is free in the peritoneum. Fallacy is best avoided by producing the effect in various ways; tapping gently, giving a short sharp stroke, or rubbing the finger rapidly along; fluctuation

will result in each case if fluid be present. In addition to the evidence it gives of the actual presence of fluid, we learn from fluctuation its amount and distribution, by comparing the effect at different distances, and observing their relation to what we have already ascertained of the position of the bowel by percussion. In very many instances, the remarkable distinctness of fluctuation when the hands of the observer are placed near to each other, and its entire absence at a greater distance, afford conclusive evidence of the limitation of the space in which it is contained; or, on the other hand, its indistinctness when the hand is placed over the surface of tympanitic bowels, and its precision when the hand is passed beyond them to the lumbar region, prove with equal clearness that it is free in the abdomen. But the examination is not complete till we have observed the effect of change of posture. Immediately on any change, fluid which is unlimited by membrane gravitates to that which is now the lower part of the cavity, and all the relations of percussion and fluctuation are more or less altered. This cannot occur to the same extent when the fluid is encysted; but it is to be remembered that it is specifically heavier than intestine, and, though more slowly, it will still obey the laws of gravitation, as far as its mobility will permit.

The cases in which diagnosis is most difficult are, (*a*) when a unilocular cyst in a female has come to occupy the whole of the abdomen, (*b*) when fluid contained in the peritoneum is limited by adhesions.

a. The history shows, perhaps, that the disease began on one side, and the patient's health is not seriously affected, except so far as inconvenience and derangement are caused by pressure. For further particulars on this subject the reader is referred to the chapter on diseases of the ovaries. The physical examination has reference to two great considerations: first, that in the necessary displacement of the viscera, they are pushed to one side by a cyst which has grown up among them, either in the iliac region or in the hypogastrium, while they are forced directly upwards, by fluid which has been always free, and has, therefore, necessarily accumulated in the most depending part of the peritoneum. The second consideration is, that fluid having always this tendency to gravitate among the intestines, will naturally, in change of posture, flow to that part of the cavity which is made to assume the lowest level, except it be restrained by the cyst membrane which surrounds it; and, connected with this, that the intestines being fastened to the body by long loose folds of peritoneum, float at the surface of a fluid which immediately surrounds them, but cannot so float, if the fluid be separated from them by being contained in a distinct bag; although it be true that the fluid is heavier than they, and, if the cyst have

room to change its place, it will tend to occupy the lowest position.

If these principles are steadily kept in view, the details of their application will readily occur to the mind. Thus we map out by percussion the relative positions of the fluid and the more resonant contents, and observe whether the line of dulness passes horizontally or in a curve, when the patient is in an erect or semi-erect position. We make her change her posture and again observe the course of the resonance, whether it dips down below the fluid at any part. We place her horizontally on her back, and mark whether resonance about the umbilicus appears, and move her from side to side, in order to observe whether there be any indication of the intestine floating in the fluid. Such experiments, conducted with a right understanding of what we want to prove, will generally leave no doubt as to the nature of the case.

b. It now and then happens that, when ascites exist, old adhesions of the intestines are found binding them down in certain positions; nay, more, almost the whole of the bowels may be fixed in their place, and the fluid poured out into one portion only of the cavity, where it is retained even more firmly than when contained in a cyst. In considering such cases, information sufficient to put us on our guard against mistake may be derived from the early history of the case and the condition of the patient, with reference to the date of formation and the actual size of the supposed cyst. The pain of peritonitis, such as must have existed to cause the adhesions, and the whole character of the seizure can never be simulated by the pain occasionally attending the first appearance of ovarian dropsy. Neither does the same disturbance of the general health manifest itself when an ovarian cyst has become filled to the same extent for the first time, as must of necessity accompany ascites with adhesions so extensive. A mistake is most liable to be made when the patient asserts that swelling existed before the occurrence of pain, and other causes have led to derangement of health.

Hydatid cysts are much less liable to be mistaken for ascites. They are discriminated by the history and mode of growth, their firm feeling and less distinct fluctuation, and often by their irregularity of outline; but they are even more readily distinguished than ovarian dropsy by the position of the fluid with reference to the intestine, as ascertained by percussion, not obeying the laws of gravitation.

Hydro-metra is only liable to be confounded with the earlier stages of ovarian dropsy. A distended bladder cannot lead to any mistake, except by neglect of one of the essential inquiries—

the condition of the urine, and extreme carelessness in investigating the case.

Diagnosis is necessarily incomplete, except we can ascertain with more or less confidence the cause upon which ascites depends. This is most apt to be overlooked when anasarca exists to such an extent, and its causes appear to be so definite, that the ascites is considered as only one manifestation of general dropsy. Unquestionably its most common cause is obstruction of the portal circulation in disease of the liver, causing effusion of serum from the capillaries of the various venous branches which unite to form the vena portæ. When this is produced by chronic inflammation and shrinking of the liver, inflammatory thickening of the peritoneum often goes along with it, and probably aids the effect by interfering with absorption. It is also believed that chronic peritonitis may thus, without influencing the portal circulation, lead to accumulation of fluid, but acute peritonitis is rarely in the first instance associated with effusion. In the recognition of these two causes we are greatly aided by the history of the case; the symptoms which more or less directly point to either condition will be reviewed in discussing the diseases of the liver and peritoneum. Occasionally no distinct indication is afforded, but the kidneys refuse to act, and the intestinal secretions, though goaded on by drastic purgatives, are insufficient to pump off the accumulated fluid, until the abdomen is tapped, and then there is no further difficulty in keeping the accumulation under control. In the diagnosis of such cases we must not pretend to refine too much.

In a small number of cases occlusion of a vein produces ascites, just as it produces local œdema. Where the obstruction occurs before the intestinal veins reach the liver, the fluid will be limited to the peritoneum; when it affects the inferior cava, anasarca of the lower limbs is also present. All of these are exceptional; but when the cava is obstructed, evidence of an attempt

at collateral circulation over the surface of the abdomen will give a clue to the true explanation.

A genuine case of tympanites, when from distension with gas, the abdomen is everywhere excessively resonant, cannot be mistaken for one of ascites; but let us avoid the opposite error of overlooking the presence of fluid when much typanitic distension exists. A very small amount of fluid, sinking low in the cavity of the abdomen, may readily escape observation, and yet it may be of much importance, as leading us to seek out the concurrent disease in the liver or peritoneum.

§ 3. *Local Dropsies.*—Under this head only those accumulations of fluid are to be included which are not the result of inflammatory action. They are passive not active effusions. In so far as diagnosis is concerned they differ chiefly in their origin, the evidence of the presence of fluid being the same in either case. They need not, therefore, detain us now, such affections as *hydrothorax* and *hydropericardium* must necessarily be reviewed along with pleurisy and pericarditis. In a few cases such as *chronic hydrocephalus* and *hydrocele*, the local dropsy has no analogue in any acute disease. They, too, will fall naturally under the head of the organ in which the accumulation of serum exists.

II.—Hæmorrhages.

The diseases included in this division are in great measure independent of the lesion in virtue of which the blood is poured out. They are only met with casually during its existence; each of them is found in association with a considerable variety of causes; and they form well-marked subdivisions, according to the organs from which the hæmorrhage occurs.

The distinctive character by which they are recognised is essentially an objective phenomenon;—blood is poured out, and is to be known by its sensible qualities. Those forms of disease are no less genuine hæmorrhages in which blood is poured into an internal cavity; but, fortunately, they are not of common occurrence, and must be regarded merely as the effect of internal injury, just as the bleeding of a wound is the effect of laceration. The cases which we have to consider as belonging to the class of hæmorrhages occur either as the result of a general condition of system, or as the effect of local disease; this distinction is more evident in some members of the class than in others.

§ 1. *Epistaxis.*—In young persons, bleeding from

the nose is no necessary indication of disease: slight exertion, wringing of the nose, or a blow in the face readily excites it in those predisposed to its occurrence; it seems, indeed, to act as a sort of outlet by which injury to the brain from an excessive supply of blood—"plethora," is obviated. It may become a habit, and under such circumstances be excessive, or more than the necessities of the system require. In adults, a general condition of plethora demands more attention; when it is merely local, and cephalic congestion is associated with epistaxis, it is frequently dependent on disease of the heart.

Epistaxis is sometimes the form of bleeding which indicates the existence of the hæmorrhagic diathesis. In this condition, the bleeding from a slight wound is stopped with difficulty, and hæmorrhages from various organs are met with when there is no other evidence of disease. It also accompanies poverty of blood, with wasting of the albuminous principle and coloured corpuscles, in anæmia, and especially in albuminuria. In such cases, a condition of simple hypertrophy of the heart, so often associated with disease of the kidney, may possibly have something to do with its occurrence; but this is certainly not its constant cause. As a consequence of local disease, it most commonly arises from polypoid or fungoid growths in the nose.

§ 2. *Hæmoptysis.*—Literally, spitting of blood; the term is now restricted to hæmorrhage from the lungs. The appearance of blood in the sputa from any other source may be called spurious, that from the lungs genuine hæmoptysis.

A. Spurious: a very frequent occurrence in hysterical females; or a consequence of a relaxed or aphthous state of the tonsils, or sponginess of the gums: it is derived in both cases from the mouth or fauces. In the latter their altered condition will be seen on inspection; in the former the general state of

health, and the presence of hysterical symptoms, will serve to confirm the opinion we are led to form from an examination of the sputa. The blood, which appears as streaks or small clots, is mixed with brownish and sometimes fœtid saliva, which has a glairy appearance, is free from froth, and is only partially intermixed with bronchial mucus; the secretion from the lungs floats upon the saliva, is untinged with blood, and does not differ from that which is occasionally expectorated by all persons in health.

B. Genuine hæmoptysis occurs in very varying quantity, from a slight streak in the frothy mucus secreted by irritated air-tubes, such as is met with in early phthisis or bronchitis, to an incredible amount of pure unmixed blood. In the former there is little difficulty in making out that its source is pulmonic, when we have the evidence of existing cough, accompanied by expectoration clearly coming from the lungs, with which blood of a florid colour is evidently intermixed: but when the quantity is larger, it is sometimes not easy to say whether the blood come from the trachea or from the œsophagus—whether the case be one of hæmoptysis or hæmatemesis. We are guided in great measure by the history of the precursory symptoms, and especially by the existence of cough; this one fact, indeed, is often conclusive. Pain, if it exist, is referred to the middle of the sternum, or said to extend right across the thorax in hæmoptysis; it is referred to the epigastrium in hæmatemesis. In hæmoptysis there is first a sensation of tickling in the throat, and then the blood comes up with a hawking or a cough: in hæmatemesis the first sensation is of sickness, and an effort of retching is accompanied by a free discharge of blood, or of blood and glairy mucus: subsequently, if a considerable quantity continue to be brought up, it seems to be accompanied by retching in both cases, and then the diagnosis may be more obscure.

If the patient be seen during its continuance, there

is little chance of mistaking the two. If he have not been seen till afterwards, the persistence of cough, with a few blood-stained sputa or clots of blood surrounded by frothy mucus, decides in favour of hæmoptysis: the appearance of black altered blood in the stools proves it to have been hæmatemesis, especially if hæmorrhage by the mouth have entirely and at once ceased; it can only get into the stools by being swallowed, when it comes from the lungs. Both conditions may be simulated by blood from the back of the nares trickling down into the œsophagus or the trachea; but here epistaxis indicates its source.

Hæmorrhage from the lungs is associated with four different conditions of disease: (*a*) phthisis, and more rarely bronchitis: (*b*) disease of the heart, especially with mitral regurgitation; (*c*) aneurism; (*d*) intra-thoracic fungoid growths.

a. In phthisis the quantity is very variable. It may be little more than a few streaks mixed with the purely bronchial expectoration of early phthisis, or with the muco-purulent fluid of its more advanced stages. This slight streaking, always an important symptom, is of more weight when appearing in a chronic affection of the lungs than when the expectoration consists of simple mucus. It may be impossible to assert positively in any given case that the lungs are entirely free from tubercles; yet when no trace of their existence is detected, the strain of a laboured cough with scanty expectoration, especially if emphysema be present, and the mucous membrane congested, occasionally seems to give rise to a very slight amount of genuine hæmoptysis; and in such circumstances experience teaches that we may be justified in taking a more favorable view of the case. A cough of longer standing, with any opacity of the sputa, makes the appearance of blood to the very smallest extent a serious and alarming symptom.

It may be in very considerable quantity, while yet the disease has made comparatively little progress. In these circumstances it causes obstruction to the passage of air through the tubes, and its particular locality may be traced by the sounds heard with the stethoscope at or near the apices of the lungs. In some rare instances, when it is very abundant, coming, perhaps, with a sudden gush, it proceeds from the erosion of a vessel in a vomica or abscess: the other signs of phthisis are then well marked.

The blood is at first always florid, and except when in very great quantity, also frothy; it becomes scanty and brown, or blackish, as the attack is passing off, when no more is poured out and that which remains in the tubes is gradually being got rid of by expectoration.

b. In diseases of the heart the amount is seldom or never great, and it is more variable in appearance, partly florid and frothy, partly mixed with darker clots, which generally indicate the existence of what is called apoplexy of the lungs. The blood is mixed with mucus or muco-pus, according to the previous condition of the patient, as suffering more or less from bronchial irritation. Dyspnœa is its invariable precursor, from the retardation of the passage of the blood through the lungs; and this very frequently gives rise to œdema of the lung, bronchorrhœa, or bronchitis. The essential condition is one of obstruction to the onward current, as the blood enters or leaves the left ventricle of the heart; and the effect becomes most marked when this obstruction is caused by a backward flow of blood through the mitral orifice, in consequence of which a double supply of blood is thrown upon the pulmonic veins. The examination of the heart ought to leave no doubt as to this cause of hæmorrhage, and sometimes auscultation and percussion indicate with great precision its exact seat.

c. In aneurism the gush of blood is generally great, sometimes terrific, followed by almost instantaneous death. This is what we should expect from the very nature of the disease; because, though partial hæmorrhage may occur from erosion of lung tissue, by pressure, or from partial obstruction of vessels, in by far the greater number the blood comes from actual bursting of the sac. The indications by which aneurism may be discovered will be afterwards considered. (See Diseases of Blood-vessels—Aneurism.)

d. In fungoid growths the blood is never brought up in any quantity. It has sometimes very much the same appearance as that caused by disease of the heart, and then it would appear to be the result of pressure and obstruction; more frequently it is seen as small clots, or as a sanious discharge, or it has the appearance of currant jelly. The diagnosis of intra-thoracic tumour will be afterwards discussed, as one of the forms of disease of the chest.

In addition to these, the more ordinary associations of hæmoptysis, it must be remembered that the sputa of pneumonia are really tinged with blood, which, though in the later stages it acquire a brown or rusty colour, may be in the first onset of a severe attack, quite florid in appearance. Conditions of congestion from gravitation, in fevers and blood diseases generally, may be accompanied by an oozing which gives the expectora-

tion more or less of the same character. Bleeding from the lungs may also go along with other hæmorrhages in cases of purpura hæmorrhagica; but such conditions, although they may rank hæmoptysis as one of their symptoms, cannot be classed under that head.

Vicarious hæmorrhage, in suppression of the habitual flow from the uterus, or of that from the hæmorrhoidal vessels, is alleged sometimes to put on the characters of hæmoptysis. Among females such a condition usually belongs to the spurious form; the blood comes from the mouth and fauces, and not from the lungs at all. It is very often entirely hysterical; an excited fancy finding something in the teeth, the gums, or the throat to work upon, and the blood being really produced by suction. Strange to say, this incident very often occurs, without any intention of deception, at or about the time when the catamenia should have appeared; probably from a notion being very widely spread among mothers and nurses that the blood is liable to "come some other way" in amenorrhœa.

Well authenticated cases of hæmorrhage from the lungs for the relief of plethora, an event so common in the mucous membrane of the nose and rectum, are very rare indeed. Perhaps scarcely one is on record which is unexceptionable; at all events, the probability is very greatly against genuine hæmoptysis depending on such a cause.

§ 3. *Hæmatemesis.*—It is unnecessary again to go over the points which serve to distinguish between hæmorrhage from the stomach, and hæmorrhage from the lungs. The history must be our guide; and not whether the patient say he brought it up from his chest or his stomach; a statement which, from the confused ideas generally entertained of the relation of internal organs, is quite valueless: the question is, whether he felt sick or faint before he brought it up, or whether he had a cough. This faintness is often well marked, in consequence of a large quantity of blood being poured out into the stomach before its action is inverted so as to produce vomiting; but this is by no means constant.

In quantity the blood is sometimes very considerable; in consistence clotted, or grumous, and mixed with the contents of the stomach; in colour it is almost always dark: occasionally the clots are par-

tially decolorized, indicating that the blood has lain some time in the stomach. The formation of a true clot leads rather to the suspicion that a vessel is ruptured; but in any form of hæmorrhage, where the quantity of blood poured out is great, it is more or less clotted. The action of the acid in the stomach has the effect of blackening the colouring matter; but occasionally the discharge of blood goes on for so long that the stomach becomes entirely emptied of its natural secretion, and then the later efforts of vomiting bring up pure florid blood. This condition is that which is simulated by prolonged and profuse hæmoptysis when retching accompanies its advanced stage.

The blood in hæmatemesis is derived from three sources: (*a*) from erosion of a vessel; (*b*) by exudation from the surface of the mucous membrane; (*c*) by oozing from a diseased portion of the stomach in cancerous formations.

a. Erosion of a vessel occurs either in consequence of ulceration of the mucous membrane, or from the pressure of an aneurism when it bursts into the stomach. Both forms of hæmorrhage are severe, and very often fatal. Ulceration of the stomach, however, is generally preceded by symptoms of dyspepsia and a burning sensation after eating; it is more common in young females than in males or persons of advanced age. The evidence of the existence of aneurism is less direct. The pressure which causes the absorption of tissue is generally attended with gnawing pain, which is pretty uniform in character.

b. Blood may exude from the surface of the mucous membrane under a variety of circumstances; and this is especially associated with disease of the liver and spleen. In quantity often great, the exudation may go on for a considerable period, so that the stomach may be emptied three or four times in succession; the intervals are usually long, so that the colour continues dark throughout. The age and habits of the patient are to be considered, as well as the evidence derived from other sources indicating hepatic or splenic disease. Hæmorrhage from such causes very seldom occurs in early life, and persons of dissipated habits are more liable to it than others. Hæmatemesis is sometimes vicarious of menstruation: this is by far

the most common and the best established of the instances of hæmorrhage recurring at pretty regular intervals in cases of amenorrhœa; hence it is always important, when hæmatemesis is present in a young female, to make inquiry into the state of the uterine functions.

It is not uncommon as one of the forms of hæmorrhage in purpura and scurvy; it occurs as black vomit in yellow fever; it sometimes follows the ingestion of some irritant poison. All of these are purely symptomatic, and their diagnosis is based, not on the mere existence of hæmatemesis, which is casual, but upon the other symptoms of each form of disease.

c. A certain admixture of blood with the contents of the stomach in persistent vomiting is an early and only too certain indication of commencing scirrhus; after ceasing for a time, it is very apt to reappear as ulceration proceeds. Its distinctive characters are a grumous and scarcely clotted appearance, much resembling "coffee grounds," and its small amount on each occasion, even when ulceration has proceeded to its greatest extent. This is to be explained by the circumstance that previous disorganization has generally rendered the vessels impervious before they are perforated by the ulcerative process.

§ 4. *Hæmaturia* is the name given to any escape of blood with the urine. The presence of blood must not be assumed from its colour: some vegetable colouring matters give to the urine a pink or bright red hue; in some disorders, deposits of a red colour closely resemble it; and an admixture of bile produces an appearance very similar to that caused by dark and altered blood. The details of this subject will be given afterwards; but, as a ready test, it will be observed that, when blood is present, the urine is not only changed in colour, but has lost its natural transparency, and this opacity is increased by heat and nitric acid. When the microscope can be employed, blood-globules will be seen, and give certainty to the diagnosis. In females it is further necessary to ascertain that the blood does not come from the uterus or vagina at the time of micturition.

Its source may be in any part of the urinary apparatus, from the minute tubes of the kidney to the extremity of the urethra: in quantity and colour it varies very much. When the amount is considerable

and the colour florid, it probably proceeds from some abrasion of surface, caused either (*a*) by the presence of a calculus, or (*b*) by ulceration or other injury, or it is the result of fungoid growth; (*c*) similar discharges occur in purpura and the hæmorrhagic diathesis: (*d*) when in smaller amount, and of a pink, brown, or smoke colour, it is generally a symptom of chronic disease of the kidney.

a. Calculus.—Generally occurring in middle life, or in advanced age, the concretion may have lain quiescent in the kidney for a long period, until some sudden shock or movement causes its displacement, when its sharp edges wound the delicate membrane of the infundibulum, and give rise to a pretty copious flow of blood. This varies remarkably from day to day, till at length the membrane becomes adapted to the new position of the stone, or it passes out of the body. The blood has a tendency to coagulate, and small clots are seen at different times in the urine; they are sometimes partially decolorized, having the shape of the ureter, and appearing like small white worms. The passage of the stone along the ureter is generally attended by symptoms very analogous to those indicating its presence in the kidney. Pain is always present; it is situated in the region of the kidney, confined to one side, extending along the course of the ureter, and shooting down the groin and the thigh, with retraction of the testicle. The circumstances connected with this event will have to be more fully discussed when we speak of diseases of the kidney, under the heads of Nephritis and Nephralgia.

When the calculus is situated in the bladder, or has passed into the urethra, before it can become the cause of hæmorrhage, there will be other symptoms of its presence; mucous or purulent secretion, sudden stoppage in the urine, and pain referred to the glans penis, &c.

b. In disease of the bladder the largest amount of pure blood is passed, not unfrequently almost unmixed with urine, coagulating into a solid mass in the utensil, or even entirely filling the bladder with a firm clot. The disease is generally of a fungoid nature, but occasionally a similar amount of hæmorrhage is produced by chronic ulceration; in the latter, the previous history ought to indicate its cause; in the former, the introduction of the catheter is attended with deep-seated pain and a flow of blood from the fungous surface. Fungoid disease of the kidney is also sometimes attended with pretty copious discharge of blood, but there is little to point out its true nature.

Hæmorrhage from the bladder may be also caused by the injudicious introduction of the sound, or catheter. Prostatic hæmorrhage is rare: disease of this gland is chiefly indicated by constant difficulty in emptying the bladder, and its condition must be ascertained by examination *per rectum*; in hæmorrhage from the urethra the blood is not passed at the time of micturition, but flows without any attempt to empty the bladder. Both these affections are regarded as surgical.

c. As an accompaniment of purpura, blood, when present in the urine, is generally of considerable amount and bright colour; the diagnosis rests on the other signs of the altered condition of the blood which it exhibits. Hæmaturia is comparatively very rare as an idiopathic disease: it is important to inquire into the previous existence of other hæmorrhages, of which it may be vicarious, such, for example, as piles; or of epistaxis and copious bleeding from slight wounds, which may be taken as evidence of the hæmorrhagic diathesis.

d. In chronic disease of the kidney the urine is often tinged of a smoky colour by the intermixture of a small quantity of blood, which has been altered in appearance by the action of the acid present in the urine. When the urine is alkaline, the colour has a pinkish hue; it has seldom the florid look of unaltered blood. Exactly the same appearances are often found in the urine passed after an attack of scarlatina when dropsy occurs.

In both cases the distinguishing feature of the disease with which this form of hæmorrhage is associated is that there is a much larger amount of albumen present in the urine, as proved by chemical re-agents, than could have been derived from simple admixture of the actual quantity of blood necessary to produce the red or brown colour.

These observations all tend to show that hæmaturia is almost constantly a symptom, though a casual one, of disease in some portion of the urinary apparatus; and all the points which have been alluded to require further study, if more than a mere guess at its cause be sought for. In giving it a place among the hæmorrhages, we only seek to point out its accidental and uncertain character; and that it is to be regarded in most instances as an intercurrent disorder, making its appearance in the course of some more severe malady.

§ 5. *Intestinal Hæmorrhage.*—When blood is passed by stool, it is necessary to determine whether there be hæmorrhoids, internal or external. In their absence, we must proceed to inquire into the constitutional and precursory symptoms; whether it have been preceded by hæmatemesis, by fever, by diar-

rhœa, or by dysentery. The colour of the blood will aid in determining from what portion of the canal it comes: the darker in colour, the higher up is its source; the brighter, and the more nearly it approaches to the ordinary colour of blood, the nearer is its point of discharge to the anus; black and pitchy after hæmatemesis, it is bright and florid in dysentery.

When not proceeding from the stomach, its most common source is ulceration of the mucous membrane in some part of the canal. It is not unfrequently present in purpura, and sometimes appears to depend on a state of simple debility and extreme relaxation of the mucous membrane; but when such cases terminate favourably, there must always remain a doubt whether ulceration did not exist.

§ 6. *Uterine Hæmorrhage* may occur in seemingly perfect health, or as a consequence of disease: the mere fact of the continuance or frequent recurrence of hæmorrhage is not of itself any sufficient indication of disease of the organ. The character we would assign to it, as distinguished from menorrhagia, is the irregularity of the periods of its occurrence; but so great is the tendency to periodicity in this organ, that such a rule is liable to error. Menorrhagia, properly so called, consists in an increased flow of the menstrual discharge, the actual quantity being greater, the time of its duration longer, and the intervals of repose shorter, but all perfectly regular in their recurrence, and gradually developed. Hæmorrhage, again, comes on suddenly, and is quite independent of the menses; if it happen at one period, it does not follow at the next, but may again recur at some future one, or at any intermediate time.

a. When it is found in apparent health, it is generally the consequence either (1) of sudden alarm, especially soon after the usual menstrual period, or (2) of abortion: in such cases it may continue at in-

tervals for weeks or months afterwards, from want of care and proper management.

b. As a consequence of disease, it is most commonly associated with (1) polypus or fibrous tumours; (2) fungoid growths and cancer; (3) sometimes with the hæmorrhagic diathesis, when it is followed by intense anæmia, and may even prove fatal. The local diseases which give rise to hæmorrhage from the uterus must be ascertained by tactile examination: their consideration will be resumed at a later part of our inquiry.

CHAPTER XII.

GENERAL EXAMINATION OF REGIONS AND ORGANS.

Disease often a Compound Phenomenon—All Organs ought to be examined—Negative as well as Positive Results stated—Examination of Brain and Nerves — of Chest — of Digestive Organs — of Urinary Organs — of Uterine Functions — Appearance of Skin.

We come now to the consideration of particular organs, and it will be found that many of the more general indications sought for in the earlier part of the investigation have an especial bearing upon the diseased states to which each organ is liable. These the student has been advised to note as he proceeded in his inquiry, whether observed in the details of the history of the case; or in the general symptoms pertaining to the skin, the pulse, the tongue, the bowels and kidneys; or in the appearance and position of the patient. He has also been advised not to attempt to form a judgment on the case before each indication has been fully investigated, and the seat of any complaint of pain or uneasiness has been thoroughly examined: but he must be further warned that, although the history of the case, the general symptoms and the particular disorder, correspond to each other and make up one intelligible whole, he has not done his duty to himself or his patient unless a survey, however rapid, have been taken of the condition of each particular organ. This course is absolutely necessary, not only

because the discovery of some obscure change may throw fresh light upon the totality of the symptoms, and ultimately lead to a different and more correct diagnosis; but for the no less important end of ascertaining whether any distinct and separate ailment exist, which may most materially modify the treatment.

The order in which it is proposed to examine these organs follows the usual division into regions,—the head, the chest, the abdomen, and the extremities,—taking the dependent structures connected with the principal organs situated in each of these regions as they successively come before us. We commence with those of innervation,—the brain, spinal cord, and nerves. We then take those of respiration and circulation,—the lungs, the heart, and the blood-vessels; next, those connected with digestion,—beginning with the mouth, the stomach, and intestines, with their investing membrane, followed by the liver, spleen, and kidneys; and, lastly, the generative organs. After these will be noticed, the skin, cellular tissue, bones, and muscles.

Throughout the inquiry the importance of system in every step of the investigation has been pointed out, and I recommend to the student either to adopt the arrangement just mentioned, or to form for himself some other plan more consonant with the theory of disease which he has been taught. In every case which presents itself to him he ought to follow exactly the same course in examining the different organs, although occasionally he may find it advantageous first of all to examine thoroughly that organ which the history of the case or the prominent symptoms, whether objective or subjective, point out as the probable seat of disease, provided he have not, from general indications, come to the conclusion that the disease is one of those having no local site, which have formed the subject of the preceding pages. His next care, in either case, should always be to examine in a definite order the various organs, with their local phenomena, and to note in his case-book the negative as well as positive results which he obtains.

As a mere matter of detail, I would suggest that he should never enter in his notes such vague expressions as "chest healthy," but state explicitly the extent of his examination and

its results, which need not, however, occupy much more space. Thus to take the case of the chest, he may state simply that there is "no complaint of pain, palpitation, cough, or shortness of breathing;" and this would imply that the chest had not been examined by percussion or auscultation. He may go further, and record that "nothing abnormal has been discovered by percussion or by auscultation," or he may limit himself to some particular portion, "breathing natural under the clavicles, at the back of the chest," &c.; in the one case, he is understood to have examined the whole, in the other, only a part. The chief use of all these suggestions is to establish habits of accuracy; but if he should ever wish to refer to these cases in after years, if it should be his lot to publish reports of them for the information of others, then the value of definite statements will more clearly appear.

In looking for indications of the state of the brain, we direct our attention to the mental phenomena of consciousness and coherence; we have to observe whether there be any degree of slowness of apprehension, or inability to understand and reply to questions; whether there be any wandering of thought, as expressed by talking, or muttering, or irrational acts; and the relations which these bear to each other. The appearance of the eyes is closely connected with the state of the brain, as shown in strabismus, and dilatation or contraction of the pupil. Deafness is another important indication, especially when associated with discharge from the ear; so is the manner of speech, slow, hesitating, or imperfect. These objective phenomena are not all equally valuable; strabismus and deafness may have nothing to do with the present state of the brain; incoherence may be simulated by hysteria; want of consciousness by obstinacy; the manner of speech may be a congenital defect; but they are each suggestive of further inquiry. In hysteria, we often meet with imitations of these various states, talking nonsense, singing, pretended sleep, cataleptic trance, &c.; and if suspicion be aroused by the incongruity of these with the general state of the patient, or if the history indicate any previous symptoms of an hysterical character, careful watching may

trace consciousness when there is pretended stupor, or a method and artifice in the delirium, which disease never presents.

Subjective phenomena consist of statements of headache and giddiness, double or distorted or indistinct vision, tinnitus aurium, perversions of smell or taste, insomnia, loss of memory, &c.

The condition of the nervous system generally is indicated either by the condition of muscles, in paralysis, convulsion, or spasm; or by sensations more purely nervous, pain, numbness, tingling, or anæsthesia.

Disease in the chest is shown by lividity of face, hurry, labour, or difficulty in breathing; by a history of cough or sensations of pain and dyspnœa. These more probably point to the heart, if palpitation be complained of, with irregularity of pulse, and the dyspnœa be felt in mounting a hill or going up-stairs: they rather point to disease in the lungs, if cough be the more prominent symptom, accompanied by expectoration.

Diseases of the digestive organs will have for their general signs, loss of appetite, or a sensation of craving; pain after food or occasional vomiting; constipation; diarrhœa; disordered states of the tongue without corresponding indications of fever; pains in the epigastrium and in the abdomen; fulness, tympanitic distension, hardness, tenderness, or fluctuation.

For the kidneys we have always the ready means of inspecting the urine, and, in cases of doubt, examining it chemically and microscopically. Pains in the loins, in the groin, testicle, or urethra: excessive, scanty, frequent, or painful micturition ought always to lead to further inquiries.

In females, it is generally desirable to ascertain the condition of the menstrual flux; regular or irregular, scanty or excessive, the intervals being too long or too short, and its appearance being accompanied by pain

or uneasiness. We ought also to learn whether there be any other vaginal discharge.

Eruptions on the skin, or distortions of bones and joints, do not readily escape observation; but, whenever pain on the surface is complained of, an inspection of the part is advisable, as it frequently solves a doubt or a difficulty which all the description in the world fails to unriddle.

By such general questionings we determine whether further examination of any particular organ may be necessary, not only in the way of instituting a more minute inquiry into symptoms, but also of making, when possible, a physical examination. Those connected with states of innervation have a high importance in the phenomena of disease; but here the physical aid is wanting, and too often we cannot get beyond a simple induction based upon the symptoms both general and special; and to them we now proceed.

CHAPTER XIII.

SEMEIOLOGY OF DISEASE OF THE BRAIN.

Causes of Obscurity—History imperfect.

Div. I.—*Symptoms derived from Mental Functions*—§ 1, *Coma, or Insensibility*—§ 2, *Stupor, or Unconsciousness*—§ 3, *Insomnia*—§ 4, *Delirium—of Fever—of Delirium Tremens—of Inflammatory Fever—of Inflammation of Brain—of Insanity.*

Div. II.—*Symptoms from Nervous Sensibility*—§ 1, *From General Alterations of Sensibility*—§ 2, *From the Sense of Sight*—§ 3, *From the Sense of Hearing*—§ 4, *From Special Sensations.*

Div. III.—*Alterations in Muscular Movement*—§ 1, *Spasmodic Action*—§ 2, *Paralysis.*

In no department of medicine is diagnosis more obscure than in that upon which we now enter. Enclosed within its bony case, alterations in brain structure corresponding to phenomena during life can never be discovered till after death, when it is much more difficult to trace their connexion; and numerous and diversified as are the functions of the organ as a whole, physiologists have yet failed to determine, with any degree of accuracy, the particular regions in which its various powers are developed, or the special uses of many of its parts. The theories of Gall and Spurzheim, had they been based on any sufficient groundwork of fact, might have rendered essential service in discriminating the site of diseased action; but experience has shown that perversions of the mental functions which form the basis of their system do not depend upon, or even correspond with, lesions of the brain in those regions to which the names of organs have been assigned; and it yet

remains to be proved that special portions of matter are at all necessarily connected with particular actions of mind.

In addition to these difficulties we find one set of head symptoms, so transitory in their character, that we cannot suppose them to depend on change of structure; while others, though more persistent, leave no trace for the observation of the anatomist: both of these must as yet be considered simply as disturbances of function, though they sometimes approach so nearly to the symptoms of structural disease, that it is very difficult to distinguish them. On the other hand, the evidences of structural disease of very different kinds are so exactly analogous that the physician is at a loss in endeavouring to assign to each its exact cause: no less perplexing is the circumstance that the obscurity of the mental faculties in many of these conditions of disease deprives us of the aid which a true account of the patient's sensations might afford, as they are blunted, or perverted, or the power of analysing and describing them is lost.

For the same reason, it is not unfrequently impossible to obtain a history of the case at all available for the purposes of diagnosis; and yet no part of the inquiry is more important. Impracticable as the exact discrimination of symptoms may be at the time of observation, each case is generally marked by successive features in its history which, if they have been properly noted and carefully studied, will throw most important light on its character and causes.

The pathology of the brain is much less understood than it ought to be in the present day, in great measure, I believe, because the importance of the antecedent phenomena has been underrated, and the symptoms have been read apart from the history. Abercrombie is deservedly one of the great authorities on diseases of the brain; but the principles of diagnosis cannot be learned from his work on this subject, because, in most instances, the previous

history of his cases is so meager. Let it be remembered, too, that in the present state of our knowledge this record of the symptoms during life is, in many instances, all that is really known of the disease, all that is really valuable in treatment: and thus, in this case, diagnosis becomes, as it ought to be, the handmaid of practice.

Mental alienation forms another element in the consideration of diseases of the brain, which is, as yet, very much beyond the reach of pathological research. Without speaking dogmatically, it may be affirmed that scarcely any lesion has been found in cases of insanity which has not also been present in instances in which the mind has been perfectly clear. We must be content to acknowledge our ignorance in this matter; and if we can trace out general resemblances, and classify cases according to some well-known types, —more especially if we can discriminate the cases in which structural change exists from those in which it is not necessarily present,—we shall have done all that we are justified in attempting.

It will probably simplify the study of the diseases of the brain if, before entering on their special diagnosis, this chapter be devoted to an exposition of the symptoms which are more directly derived from the powers of innervation, as they refer to the mental faculties, and the centripetal and centrifugal nervous actions—the sensations and the muscular movements of the patient.

Division I.—The Condition of the Mental Faculties.

The indications derived from this source may be referred to two principal heads—consciousness and coherence—perception and reflection. These correspond to two very clearly defined features of disease expressed by the terms coma and delirium. Between the two extremes we find an almost endless variety of

examples, in which they are, more or less, blended together, where it is scarcely possible to tell whether the perceptive or the reflective powers be most in abeyance: in such instances there is partial loss of consciousness, with a certain amount of insensibility to ordinary stimulus, and confusion of thought, without active delirium: they may be only the transition stage from one state to the other, but are often distinct from either. Coma is related to sleep, of which it presents the greatest possible exaggeration; while delirium is associated with insomnia, which is its invariable attendant, and often appears as its precursor.

§ 1. *Coma*, or *Insensibility*.—Consciousness is entirely suspended; the mind is a perfect blank; the patient is alike deprived of the power of thought and expression, and of the knowledge of external things; voluntary action has altogether ceased; he makes no reply to any question; he may be pinched or pulled about, and he gives no evidence of pain or annoyance; the muscular movements are only those of organic life, or such as may be excited by a sort of reflex action, or unconscious resistance. In such cases it is important to discover whether the absence of voluntary action depends merely on the state of coma, or whether there be distinct paralysis of some of the muscles: a limb placed in a constrained position is moved in the one case by the counterpoise of flexion and extension, in the other it remains as a lifeless object in a condition of rest. When paralysis is present, the extent of the lesion is measured in some degree by the number and variety of the parts implicated.

If any history can be obtained, we have to inquire how the patient passed into his present state, whether he was attacked suddenly or the coma had come on gradually with increasing stupor and somnolence; and in the former case, whether any convulsive movement had been noticed. When no one was present to

observe these circumstances, we may still learn much from the position in which the patient was found: as it points to the seizure having occurred when he was at rest, or when he had warning of its approach, or to its having overtaken him in the midst of action or exertion, or to its being the possible result of accidental injury.

Coma is associated with several different conditions.

a. It may be the consequence of a fall or a blow. The coma of concussion, which is the first result of the accident, is not so deep as that which follows when extravasation of blood has taken place in consequence of fracture of the skull; and paralysis is not produced by concussion — hemiplegia especially points to extravasation. In their further progress these cases may each pass into inflammation and serious disorganization of the brain.

b. It is constantly dependent on an apoplectic seizure, in which the patient has suddenly fallen down insensible, without convulsion, or with convulsive movements very slightly marked. When hemiplegia co-exists with coma, thus suddenly coming on, without any trace of injury, the diagnosis is certain. But apoplectic coma may exist without paralysis, and then its presence can only be determined negatively, by the exclusion of other possible causes.

c. A comatose state may be caused by intoxication, or opium. In neither of these does it come on so rapidly; intoxication betrays itself by the odour of the breath; and in poisoning by opium the person may generally be recalled to some degree of consciousness, until near the last stage. In these cases the previous circumstances, and the position in which the patient is found, may be of great service in guiding our opinion.

d. Coma may also be the result of extensive effusion of serum into the ventricles of the brain. It is difficult to conceive how this can happen suddenly, and yet it is quite certain that patients are seized while walking along the street, or engaged in their usual avocations, with a fit, generally more or less convulsive in character, followed by coma, and not unfrequently attended with either paralysis or continued spasmodic action of one side of the body. The diagnosis rests chiefly on two points, the existence of convulsions in the primary seizure, and the extent of the coma, which is scarcely so complete as in apoplexy; in the latter, spasmodic movements are seldom met with. A history of previous bad health, with debility, would lead to the suspicion of effusion; a florid face and a full habit point more generally to sanguineous apoplexy.

e. Coma supervenes gradually in the course of a variety of diseases, indicating either a morbid condition of blood circulating in the brain, or progressive disorganization of the brain itself: cases of the last description are more readily recognised.

§ 2. *Stupor*, *Unconsciousness*, or *Partial Coma.*—A certain degree of unconsciousness always accompanies delirium: this circumstance will be subsequently referred to. We have now to consider the cases in which stupor is the prominent symptom.

When coma is incomplete, but attended by hemiplegia, or convulsive movements, the same rules of diagnosis are applicable as to complete coma. The phenomena of partial unconsciousness with paralysis are sometimes very remarkable. The attention of the patient is attracted by objects about him, which he follows in their movements with his eye; when spoken to, he turns towards the speaker, and seems to make an effort to reply, and it may be conceived that paralysis alone prevents his utterance; on closer investigation, however, it will be found that, though the attention be roused, the mind receives no impression, and the patient, though not insensible, is yet unconscious.

When paralysis is not present, the patient seems to be asleep, breathing regularly and tranquilly, but he is found to be in a very deep sleep; he is roused with great difficulty, and, without appearing to awake, he resists any attempt to move him in bed; he struggles when he is undressed; he pulls up the clothes about him when he is uncovered; and even when thoroughly aroused, his mind is quite confused. Though unable to answer questions, or do as he is directed, he will make very distinct combined movements in changing his position in bed, and placing himself comfortably, as if he wished again to go to sleep. Here delirium, or rather incoherence of mind, is evidently associated with partial unconsciousness.

Among the more prominent conditions in which stupor is observed we find (*a.*) That it very often follows upon a regular

epileptic seizure; indeed, the sleep in which an epileptic fit almost always terminates may be said to be of this nature; and, though generally very transient, it is occasionally prolonged even for days. (*b.*) It is also met with as the result of what has been termed transient apoplexy, or of concussion: the position the patient was found in sometimes aids in determining whether the fall was the cause of the confusion of thought, or whether it happened in consequence of loss of consciousness. Any appearance of blood about the mouth, showing the tongue to have been bitten, would lead us to believe the attack had been one of epilepsy; but in diagnosis, the distinction between epileptiform and apoplectic semi-coma is unimportant, and only demands consideration from the probability of recurrence in the one and the smaller chance of it in the other. (*c.*) Semicoma from intoxication, or poisoning with opium, is not accompanied by the same degree of loss of consciousness. When the patient is thoroughly roused, he will indicate less vacuity of mind. (*d.*) A comatose state sometimes commences very insidiously, without any complaint of particular ailment: there is a tendency to sleep; the patient is awaked with difficulty, and when roused and speaking rationally, he breathes deeply and slowly, and seems to fall asleep even with his eyes open, during a pause in the conversation; at first there is little confusion of thought, except momentarily, on awaking, but the coma gradually deepens, and is not unfrequently attended by convulsions. General ill health may have preceded it, but no particular derangement of any organ is traced in the history. Such a condition points very certainly to albuminous urine, and poisoning of the blood by the presence of urea; the probability would be stronger if anasarca had previously existed, but the point may generally be determined by examination of the urine.

§ 3. *Insomnia* is a common attendant on most of those conditions with which delirium is associated. The report made of want of sleep by the patient himself is never to be depended upon, as to its amount, though he can generally say whether he have been asleep at all during the night or not, unless the mental faculties be completely obscured. Starting, or waking up suddenly or in a fright, are phenomena less frequently relating to the brain than to the heart or stomach. In affections of the brain the question of most importance is whether sleeplessness preceded delirium when that is present, or has been otherwise associated with it.

§ 4. *Delirium.*—The term delirium, although generally applied to that wandering of mind which accompanies certain diseased states of the body, is equally applicable to the confusion of thought which supervenes on fixed delusion, and constitutes a paroxysm of acute mania. It is not our intention here to inquire into all the perversions of judgment, eccentricities of behaviour, or alterations in the affections and moral feelings, which are met with in persons whose general health is not otherwise affected, and which give rise to the fearful apprehension that the mind is becoming unhinged; but it is necessary to allude to the phenomena attending an attack of acute mania, in order to contrast them with those dependent on acute disease within the cranium.

The presence of delirium is shown by incoherence of expression, traceable to hallucinations and illusions which have generally a very fleeting character. Sometimes, however, they assume a continuous form, almost resembling fixed delusion.

Incoherence is always combined with some degree of unconsciousness; and it is worthy of consideration how far this proceeds from obtuseness of perception and is related to coma, how far from preoccupation of mind and confusion of thought. When coma is complete, there can be no expression of delirium; but when roused from a state of stupor, the patient may either be able to put out his tongue when desired to do so, and to give tolerably rational and consistent answers, or he may only reply by a vacant stare or an incoherent expression, showing that delirium is present as well as stupor. In delirium there may be the same impossibility of obtaining a rational answer, simply from preoccupation and incoherence: the question fails to give rise to any corresponding idea in the mind of the patient. This character of unconsciousness is very different from that depending on stupor; it is often only partial, as indicated by his not recognising individuals around him, and passing his fæces and urine

in bed, while an impression stronger than usual produces a rational act. During the time that he is talking or muttering to himself, or addressing fanciful persons whom he imagines to be near him, he may be recalled by firmness of manner to such a state of consciousness as to give a coherent answer, or to do as he is directed.

One feature common to all forms of delirium is that restlessness which prompts the patient to attempt to get out of bed, and this even when the strength is so exhausted, that the act might be supposed to be impossible. There is almost always distinct exacerbation at night, and this is most marked in the slightest cases. Delirium at night is often observed when there is no indication of wandering of thought by day; a patient who only mutters and talks by day will be noisy and unmanageable at night; and it is perhaps only when mental excitement is at its highest pitch during the day that it does not appear to be increased as evening approaches.

Under the term incoherence of expression we include all the inconsistent acts as well as words of delirium. These are as varied as the illusions under which the unhappy patient labours; but I think it may generally be observed that they are more uproarious as the character of the delusion is more definite. Thus we find one patient noisy and violent, with difficulty kept in bed or restrained from doing a mischief to himself or others, but always governed by some prominent idea; another, who only mutters and rambles on in the most inconsistent manner; while a third is still and listless, either giving no answer at all or one wholly incongruous. All are liable to pass their fæces and urine in bed, sometimes from unconsciousness of the act, at others, from ignorance of its impropriety.

It is most important to remember that delirium is not evidence of inflammation, and that in by far the majority of cases it is not accompanied by any inflammatory action at all within the cranium. The history

of the case and the correlative symptoms must be carefully studied, because it is so constantly a concomitant of other diseases.

a. It occurs in most severe attacks of fever.

b. It is constant in delirium tremens.

c. It is often associated with inflammation of some other organ, causing alteration in the blood, of which pneumonia is perhaps the most common.

d. It may supervene in the course of acute rheumatism, or erysipelas.

e. When the disease is confined to the brain, it may be linked with the tubercular diathesis;

f. Or it may depend on simple inflammation.

g. It may be an evidence of maniacal affection.

During the existence of delirium all the organs will require closer investigation to elicit evidence of disease, than when the symptoms are unassociated with mental phenomena, because they are so much obscured by the unconsciousness of the patient to sensations of pain or distress: thus, an individual suffering from acute rheumatism will make movements in his delirium, which would have been exquisitely painful to him if his perception had not been blunted; or one labouring under severe pneumonia or phthisis will cease to cough or suffer any inconvenience from the accumulation of secretion in the lungs. These points ought never to be overlooked.

The terms *active* and *passive* are occasionally employed with reference to delirium. They must not be regarded as having any relation to the cause of the condition. They merely serve to point out that the patient is more or less noisy and unmanageable, or quiet and, perhaps, listless. I conceive that such compendious modes of expression are generally objectionable unless their meaning is very definite and distinct.

a. In fever the delirium is very often of a quiet character, with considerable prostration, inattention to surrounding objects, and unconnected muttering and rambling; sometimes, however, the patient is very noisy and excited, and can scarcely be kept in bed, and this especially happens when the functions of the liver are disordered. It follows upon the insomnia of the early stages, coming on at first only at night, and continuing through-

out to have nocturnal exacerbations: there is great insensibility to external impressions, and frequently marked deafness. In addition to these characters of the delirium there are the special indications of fever, as distinct from those of inflammation; the eyes are dull and suffused, not brilliant and ferrety, the movements are feeble and tremulous, and the pulse is essentially weak and soft: these characters have been already detailed.

b. In delirium tremens it is accompanied by peculiar, hurried movements and muscular tremor; but there is also something in the character of the delirium quite distinctive; the mind generally runs upon one subject which is attended with anxiety or distress, either upon some business engagement which cannot be fulfilled, or on the presence of some disagreeable or disgusting object—some creature crawling about the bed, some horrible death's head staring at the patient. It is a busy and active, but not a violent, delirium: the patient is generally ready enough to do as he is told, will for the moment, perhaps, abandon his imaginary pursuit to answer questions apparently in a rational manner, and put out his tongue when desired; but quite as often he still keeps hold of the bed-clothes under the idea that they are some other object, and while answering the questions addressed to him, continues to issue orders to some of his imaginary subordinates. There is always great restlessness; getting out of bed, pulling about the bed clothes, constant talking, generally in a loud tone of voice, the same definite object always predominating in the mind, to the entire exclusion of surrounding realities. Sleeplessness is an invariable precursor of this form of delirium, preceding by some days its full development, but the nocturnal exacerbations are rarely so marked as in fever.

The moist, creamy tongue, the soft pulse, and perspiring skin are most important indications, because they not only materially aid the diagnosis, but form the basis of rational treatment.

c. The delirium of pneumonia very closely resembles that of fever; but when it occurs in persons of dissipated habits, may more nearly approach to delirium tremens; just as happens when such persons meet with severe injuries, or suffer from erysipelas or rheumatism. Hence the delirium itself does not aid our diagnosis, inasmuch as its causes, and consequently its manifestations, are so analogous; when resembling that of fever, the pneumonia has an adynamic type like the continued fevers of the present day, and to the accompanying condition of the blood the delirium is due; while, when it approaches in character to delirium tremens, the impression made on the nervous system by habits of dissipation acts as the predisposing cause, and the pneumonia merely takes the place of any other depressing influence in exciting the delirium.

The important point in diagnosis is, that the pneumonia should

not be overlooked; and a correct opinion will in all cases very much depend on systematic investigation, when delirium is present along with internal inflammation. The history must be carefully inquired into, the general symptoms weighed, and the condition of all the organs closely examined. In the absence of more decided symptoms, quick breathing, a dusky flush on the face, and especially rusty sputa, are unlike fever; dryness of the tongue and smallness of the pulse, unlike genuine delirium tremens.

Inflammation of the heart is another important condition which must be sought for in obscure cases of delirium. It is probable that in cases where this has been found as the sole evidence of disease, the true explanation is rather to be sought in the association which has next to be studied.

d. Delirium supervening in the course of acute rheumatism and erysipelas. These forms of delirium may be taken together, because there is alleged to be in each an occasional metastasis to the brain: in the latter the preceding state cannot be mistaken, but in the former the occurrence of inflammation of the heart may be accompanied by a retrocession of the affection of the joints, or may even be almost the only organ which rheumatism attacks; in the present state of our knowledge we must look upon idiopathic inflammation of that organ as being at least extremely rare.

It is quite certain that delirium of a very active character may occur in both these disorders without any inflammation of the brain. In acute rheumatism it generally commences as a slight wandering at night, or is at first only marked by some peculiarity of manner; it then passes rapidly into delirium of a noisy kind, which is often accompanied by great obstinacy and refusal to answer questions or to take food and medicine; and sometimes by local or general spasm: after a partial or complete remission, the delirium is apt to recur, and it then passes, in fatal cases, into coma and death. In erysipelas it has a less active character generally; it has much analogy to that observed in fever; beginning with the same wandering at night, it passes into the low muttering and rambling form, and rarely assumes a noisy character; in fatal cases this also terminates in coma. In persons of dissipated habits and dilapidated constitutions, the delirium attendant on both of these diseases more commonly simulates delirium tremens; and this is an important point in diagnosis, because it decides the question at once of whether there be inflammation of the brain or not. It is certain, under such circumstances, that the delirium is not due to metastasis.

Metastasis, in the true sense of the word, must be exceedingly rare in erysipelas: it may be conceived, but is not known as

part of its clinical history; I mean the disappearance of the swelling and redness of the part coincidently with the incursion of head-symptoms. On the other hand, considering the nature of the disease, that it is not associated with exudation of lymph but of serum, it is quite possible that serous effusion may be due to extension of erysipelatous inflammation to the membranes of the brain; but it is quite as probable that the delirium is merely the evidence of altered conditions of blood, of the circulation, and of the nervous energy, as in the other forms already noticed; and this is the more likely, because it exists without as well as with effusion. In diagnosis we have only to remember that the delirium of erysipelas is not associated with inflammation of the structure of the brain, or with such inflammation of its membranes as leads to effusion of lymph or of pus; because this is the all-important point in treatment.

In rheumatism, again, something very like metastasis to the heart occurs, and, therefore, there may be something like metastasis to the brain; the disease is essentially erratic. But in by far the larger number of cases we are sure that the delirium does not depend on metastasis, because rheumatic inflammation of the joints, of the heart, and of the pleura, is accompanied by exudation of lymph, and rheumatic inflammation of the membranes of the brain should be similarly evidenced by the presence of lymph. Post-mortem examinations prove that this is very rare indeed; and we are therefore justified in assuming that, unless the evidence of inflammation within the cranium derived from other sources be very decided, delirium, following upon or accompanying acute rheumatism, is to be classed along with that of fever, of pneumonia, of erysipelas, and to be taken merely as evidence of blood-poisoning; and this so much the more certainly if there be no retrocession of the affection of the joints, or if it have been preceded by inflammation of the heart.

In one of the less acute forms of rheumatism, the synovial membrane is distended with serum, not with lymph, and several cases are on record in which the sudden disappearance of the effusion in the joint has been followed by an equally sudden occurrence of effusion in the brain. In these cases the symptoms were rather of coma or stupor than delirium: they, perhaps, are the only real instances of metastasis met with in practice, and are not improbably associated with diseased kidneys.

e. Delirium, when not symptomatic of disease in the blood, or in other organs acting through the blood, must be taken as indicative of changes going on within the cranium. It will be best first to consider that condition which is linked with the tubercular diathesis,

in order that, by a process of exclusion, we may arrive at those which are uncomplicated. The association between tubercles and inflammation of the brain was first clearly recognised in what is called the acute hydrocephalus of childhood: it is not necessary that actual deposit of scrofulous matter within the cranium should take place, although it is frequently found there after death. Delirium is by no means a constant accompaniment of hydrocephalus: in fact, in early childhood, before the reasoning powers are developed, it is not only difficult to take cognizance of such a state, but experience teaches that the disturbance is more likely to be manifested by convulsions than by mental phenomena.

The association, however, is not limited to childhood, in youth, or even in adult age, the same condition of inflammation accompanies the tubercular diathesis, and must be presumed to spring from it. Here, delirium is one of the earliest symptoms of the disease: its character sometimes resembles that of fever, and then the diagnosis is extremely difficult, because all the general symptoms of fever are present; the pulse is quick, the skin hot, the tongue coated, and the bowels relaxed; like fever, the tubercular diathesis is apt to be associated with diarrhœa, ending in ulceration; as in fever, too, the pulse is essentially weak, and tends to be rapid; it is only distinguished by its great variableness. Pain in the head is more constant, there is often much heat externally, and the delirium is more pronounced and more constant; in its commencement it is not so distinctly a nocturnal state with total remission by day as in fever, and it is generally developed earlier in the disease. Such circumstances must at least lead to inquiry whether there be any evidence of tubercle.

The delirium sometimes assumes quite a different form: it is such as has been called passive delirium; there is scarcely any talking or restlessness; the patient lies in a partially unconscious state, taking

little note of surrounding objects; confused in his ideas, answering either not at all, or in a very unintelligible manner, any question put to him, and unable correctly to describe his condition or his sensations; he passes his urine and fæces involuntarily, and is with great difficulty induced to put out his tongue and to take his food or his medicine; the tongue is less generally coated, sometimes tolerably clean, occasionally unnaturally raw and glazed.

In the further progress of the disease, symptoms of pressure on the brain develop themselves in either case; there is dilatation of the pupil, and the supervention of coma, not from sheer exhaustion, but as the effect of active effusion.

The history of the case generally records ill health of some standing: the more acute attack has been insidious; the febrile symptoms have not set in suddenly with rigor and general depression; there has been marked pain of the head and delirium, as a very early symptom. It is to be remembered that we are not now speaking of the diagnosis of scrofulous inflammation, but of the delirium occasionally accompanying it, which is especially seen in youth and adult age: in such cases this mode of incursion is the usual one, though the disease may also set in, as it does more frequently in childhood, by severe vomiting and constipation, or by convulsions. As it is in the lungs that we can most surely trace the development of tubercle, it is to these organs that we must especially look for aid in our diagnosis; the condition of the abdominal viscera must also be inquired into: and we note the occurrence of hæmoptysis, or the liability to diarrhœa, as important features in the narrative of the case.

f. Although delirium can by no means be taken as evidence of inflammation in the brain, it is a very constant symptom when the superficial structure and membranes are the seat of acute inflammatory action. The diagnosis, however, rests less on the presence of

delirium than on other points to be noticed hereafter: it is generally of a more violent kind than any yet referred to, and more resembles acute mania; the patient is noisy and unmanageable, attempts to get out of bed, tosses the bed clothes about in confusion, and would often injure himself or others if not restrained: it is less characterised by fixed delusion than by wild shouting and screaming; it is usually impossible to obtain an answer to any question, or to fix the attention on anything that is said.

When such a condition exists, we seek for evidence of inflammation in quickness of pulse, flushing of face, throbbing of temporal arteries, intolerance of light or of sound, indications of spasm, convulsions, or paralysis, history of pain, vomiting, and constipation.

g. The Delirium of Insanity.—Cerebral pathology is yet so entirely at fault in the correct association of certain mental states with special change of nervous structure, that no attempt will be made to classify the various features of mania; the question of diagnosis need not be further pursued than to point out the distinctions between the delirium, which is a symptom of recognised conditions of disease, and that which is more properly, in the present state of our knowledge, considered as merely mental. Neither does it come within the scope of a manual of diagnosis to discuss whether or not alienation or perversion can be predicated of mind, independently of disease of the organ of mind; but there seems to be no greater difficulty in acknowledging this possibility than in confessing to the truth which Revelation teaches, of the fallen and imperfect condition of the mind of man, as a moral and responsible creature. And as it is possible, by purely psychical processes, to correct perversions of the moral faculties, and by similar means to restore the mental faculties in what is called the moral treatment of the insane, a curious analogy is thus established between them. It is enough for us

that the terms mental alienation, insanity, or unsoundness of mind are used to designate conditions different from those which we are acquainted with, as diseases of the brain.

As these terms imply, the prominent character of the state we are now discussing is an aberration of the reasoning faculties, the patient is unable to form a correct judgment on ordinary premises; and this may be limited to some particular subjects, or may apply, more or less, to all. But, besides the inability to reason correctly, there is generally a coexistent perversion of some particular faculty, moral or intellectual, or of some one of the affections, giving in each case its peculiar stamp to the form of insanity, and perhaps the only real cause why the judgment is erroneous. From this perversion springs the fixed delusion so often present in the insane—a false idea permanently engrafted in the mind, which, in its turn, leads to the production of hallucinations and illusions: these are independent of delirium, which we are now considering as a symptom of acute mania. When this condition is present, all the ideas are thrown into confusion, the fixed delusion itself may for a time be lost, or be in abeyance, or may acquire greatly increased force; some other prominent idea may take possession of the mind; or there may be perfect incoherence. The delirium of insanity exactly corresponds, in these respects, to the delirium of disease, and is only more distinct and more exalted. It comes nearest to that of acute inflammation, with which it is often exactly identical; and the diagnosis must be based on the mode of incursion and the indications derived from other symptoms.

When the attack has been ushered in by perversion of the affections, alteration in temper or spirits, or by peculiarity of manner in acting or speaking, especially when these can be traced to some cause of anxiety, bad news, or sudden fright, it is probably mania. Now and then, if the reports of friends may be trusted, cases

of delirium tremens commence in a similar manner; and we must guard against such a mistake by ascertaining whether there have been dissipation or excess prior to its occurrence. If due regard be had to those symptoms referrible to the "general state" of the patient, the skin, the pulse, and the tongue, faulty diagnosis, which cannot always be avoided in diseases of the brain, will not lead to errors in treatment; rational as opposed to empirical remedies, can alone give satisfactory results.

So likewise, in discriminating the delirium of acute inflammation from that of acute mania, besides that light which is thrown on the case by the ascertained absence of peculiarity or perversion of ideas prior to its appearance, still more information may be gained by a strict examination of all the symptoms yet to be detailed, which point to inflammation of the brain as their cause.

As we shall not have another opportunity for discussing the subject of insanity, a few remarks on its more general features may not be inappropriate in this place. Its forms are very varied: the patient may be morose, taciturn, or reserved; or he may be loquacious, noisy, or unmanageable; any one or more of the faculties and affections may be more especially affected by the disease; his delusions may be fixed and invariable, or may comprehend a constantly changing series of fancies; and these, again, are usually accompanied by the presence of hallucinations and illusions—mental impressions which seem to the patient to be produced by objects affecting his senses, when in truth they originate in the mind itself. These imaginings of the insane are very different from what may be more properly termed alterations in sensibility: in the latter the force of true impressions on the nerves is exaggerated or diminished in intensity, or their character is confused and indistinct; in the former, the mental conception is referred to the organs of sense, where impressions are felt exactly analogous to those which would be received if the corresponding object had a real existence: in the one the sensations are vague and ill-defined, in the other they seem distinct and clear.

In the strict application of terms, the word hallucination implies that no object is present to stimulate that organ to which the idea formed in the mind is referred; while in illusions,

existing objects, which in the first instance produce the stimulus, are clothed by the mind in characters more or less foreign to their true nature, and these are so inextricably blended with the sensation originally produced, as to give rise to the belief that the resulting idea is wholly derived from the external impression.

Morbid fancies are not limited to insanity; but when the judgment is perverted or lost, they are not corrected by the force of true impressions opposed to them, and hence their permanence and domination in insanity and delirium.

In mental affections the patient is usually out of health, but there are no general symptoms invariably present: the tongue is often foul, the bowels confined, and during the paroxysm of acute mania the pulse may be somewhat accelerated, but we seek in vain for evidence of inflammation, for convulsion, or paralysis, except when imbecility succeeds epilepsy, or paralysis accompanies fatuity: the symptoms referrible to the nervous system neither betray increased sensibility, nor loss of power, but consist of deceptions of the nerves of sense, delusions regarding external objects, and false impressions of the condition of the whole body, or of some particular organ. The main distinction between the false impressions of the insane, and those of the hypochondriac or dyspeptic, is that the belief in their reality in the one case implies an absurdity which the patient's knowledge of the laws of nature would be sufficient to detect and expose, were he of sound mind; in the other the conception is not irrational according to his amount of information on the subject. The most prominent exception to this rule of diagnosis as to the state of the general health is the condition of puerperal mania, which seems to hold a place somewhat intermediate between mental alienation and the delirium of disease, being allied to the former in the perversion of the affections and the reason, and the absence of distinct signs of disease, while it is assimilated to the latter in its coincidence with the peculiar state of health belonging to pregnancy and parturition. Its diagnosis cannot be based upon any peculiarity in the manifestation of the mental phenomena, but simply on the fact of its occurring during the puerperal state, and occasionally after prolonged lactation, when perhaps it is rather to be regarded as mania occurring in a condition of anæmia, than mania associated with pregnancy. In its commencement there is almost always delirium; after its subsidence the patient remains in a condition of temporary unsoundness of mind: undoubtedly faulty nutrition is one of the antecedent circumstances, but there is something more—hereditary tendency, insanity in other members of the family, or individual predisposition, as indicated by repeated attacks in successive pregnancies; at all events, it is alike

different from the blood-poisoning of fevers, inflammations, &c., and from delirium depending on change of structure in the brain.

Division II.—Alterations of Sensibility.

Sensation may be morbidly keen, or it may be obtuse and even entirely lost, or it may be perverted; each of these conditions extends, more or less, to the whole nervous system, or is limited to particular organs. With reference to all alterations of sensibility, a distinction must be made between pain and tenderness: the one denotes the existence of some unusual stimulus, the other indicates increased susceptibility to any impression; they are often present together in various conditions of disease (*e.g.*, local inflammations) and we are apt to consider them as only different expressions of the same nervous phenomena. When they are taken as symptoms of cerebral disease, and when no local cause exists in the part in which the phenomenon is present, it is still more important to remember the exact idea which each conveys: the one is to be regarded as perverted sensation; the other as morbid sensibility.

§ 1. *General Alterations of Sensibility.*—General tenderness of surface is not a symptom of much consequence when standing alone; it is then commonly the result of hysteria, or mere nervous excitability: if associated with causeless anxiety, depression, or dread, or with irascibility of temper or great elevation of spirits, it points to insanity.

Sensibility generally diminished is probably never seen except as the result of mental alienation, or as combined with general paralysis; but it must be remembered that it is not by any means a necessary concomitant of paralysis.

Perverted sensations affecting the whole system are similarly best seen in cases of mental delusion. Analogous phenomena are observed in the sensation of

heat complained of by patients in Asiatic cholera, while the whole body is sensibly cold; in the sensation of chilliness in fever, when the skin is morbidly hot to the touch; and in the extreme cold and shivering of ague, or of severe rigor. The tingling and formication of jaundice, and similar sensations produced by the action of certain substances in peculiar idiosyncrasies, are scarcely to be regarded in the same light. The only one which really bears on our present subject is that general sensation of pain and malaise which cannot be localized by the patient, and is not to be accounted for by the condition of the blood, as in fever: this symptom is not to be lightly disregarded, and is often the precursor of more serious lesions of the nervous system.

§ 2. *Alterations in the Sense of Sight.*—Of local conditions, none deserve more consideration than those presented by the organs of vision, where the pupil so readily exhibits the increased or diminished sensibility of the retina, independent of the patient's volition. They consist of—

a. Difference of size of the pupils on either side, which may generally be regarded as evidence of severe lesion of one-half of the brain: it usually results from partial or complete insensibility of one retina, and very rarely from increased susceptibility or irritability: in the majority of instances it is a dilatation of one pupil, and not a contraction of the other.

b. Morbid contraction of both pupils; associated either with (1) intolerance of light, pointing to inflammatory action; or (2) with insensibility more or less marked, especially seen in coma and narcotism; or (3) simply with increased irritability, the pupils dilating pretty freely when light is withdrawn, but contracting unduly on its admission.

c. Morbid dilatation of both pupils: (1) with insensibility complete, indicating pressure equally affecting both hemispheres, and hence most commonly seen

in effusion of fluid in the ventricles; (2) with oscillating movements when light is withdrawn, and again suddenly admitted—a condition most commonly found in the transition stage from inflammation to exudation in the hydrocephalic forms of disease; (3) with sluggish movements, which only show an obtuseness in the perception of light, and the excitement of reflex action, the pupil dilating largely, and contracting feebly, when light is withdrawn and again admitted —a common condition in fever; (4) a similar state of the pupil is also produced by belladonna, hyoscyamus, &c.

Dilatation of the pupil, with insensibility of the retina, exists as a local disease of the optic nerve, sometimes caused by pressure when one eye only is affected; it is invariably present in amaurosis, and the distinction between blindness resulting from disease of the nerve, and that which is consequent on disease of the brain, is to be sought in other symptoms of disordered innervation.

The point to be studied is the effect of the sudden admission of light after its exclusion. When no change at all occurs, sight is lost, whether in contraction or dilatation; but the movement may be so slight as to escape observation. In contraction, intolerance of light, or a sense of pain on its admission, is to be carefully noted; in dilatation we have to watch for evidence of the existence of vision when the patient is unable to express his own sensations.

Increased irritability, seen in rapid contraction and full dilatation on the admission or exclusion of light, stands exactly opposed to sluggish action: the one indicates exalted, the other, depressed nervous energy. It is very remarkable how the presence of some object producing an unusual degree of attention in a patient who is listless and depressed, such, for instance, as the entrance of a friend or near relative, may immediately restore the pupils for a time to their normal excitability. In examining the condition of the pupil it is of the greatest importance that light should be excluded from both eyes at the same time in order to judge correctly of the effect of the stimulus upon either when it is again admitted.

d. Perversions of the sense of vision have less definite relations to conditions of brain. The most important are—(1) double vision, especially when not associated with strabismus, which comes more pro-

perly under the head of muscular movements; (2) dimness and haziness of vision, partial loss of sight when a portion of an object is lost, and seems to be cut off, muscæ volitantes, and ocular spectra; (3) hallucinations and illusions, in which unreal objects are seen, or natural objects are clothed in unreal shapes, the constant accompaniments of delirium. The first division is that which demands the most attention, as being probably indicative of cerebral disease: the whole of those classed in the second division are more commonly observed in sympathetic or functional disturbance: the third are the results of delirium or mental alienation: ocular spectra are distinguished from them by their accompanying states of perfect consciousness and reason, when the evidence of the other senses proves to the individual the non-existence of the object.

§ 3. *Indications derived from the Sense of Hearing*, —These are much less numerous, but though often dependent on mere local causes, some of them are not without value.

a. Deafness supervening in the course of a febrile attack, as indicating diminished sensibility of the brain, is almost certainly an evidence that the disease is fever and not inflammation. Extreme degrees of deafness are sometimes produced by pressure.

b. Deafness of long standing in a person suddenly attacked by febrile disorder, should always lead to inquiries into the state of the ear. Disease located there is very apt to excite inflammation within the cranium: it is commonly accompanied by pain and purulent or fœtid discharge. For the same reason, when pain is present, we ought to inquire into the existence of deafness, or any other evidence of disease; and thus a history of scarlatina, as antecedent to the deafness, is very instructive.

c. Intolerance of sound or noise is a valuable symptom of great nervous irritability.

d. Less importance is to be attached to the existence

of tinnitus aurium, of unnatural sounds and noises, or voices. The former may exist along with disease of the brain; the latter are more commonly referrible to a mental state; but both are not unfrequently the result of mere local affection.

§ 4. *Special Alterations of Sensibility.*—Perversion and loss of the senses of taste and smell are comparatively unimportant with reference to disease of the brain; they are generally dependent on some morbid condition of the nerve or the mucous membrane. Alterations of common sensation in other organs derive their chief significance from our being able to determine whether the affection be limited to the filamentous extremities of the nerves, or be produced by some cause acting upon their main trunks, or be connected with disease of the nervous centres. We have to consider the condition of the parts to which the nerve is distributed, and the relation of the affection to its ramifications. When the sensation is referred to the terminations of one nerve, we have to observe whether any perceptible change of texture in the organ to which it is distributed can account for its existence; and if not, whether the sensation be limited to the branches of that nerve only, or extend to others having a similar origin. Those which have special reference to central structures, are such as affect the entire half of the body, or extend equally to either side: those limited to the nerves will occupy our attention at a later period; but it may be here remarked, that local fixed pain often accompanies the early stages of chronic disease of the brain, especially in organs not otherwise the subjects of common sensation, such, for example, as hyperæsthesia of the organs of the abdomen. It may be quite impossible to show the cause of this connexion, and the fact cannot, therefore, be made available for the purposes of diagnosis; but it is well that it should be borne in mind, with reference to other symptoms of disease.

Pain of the head and giddiness are among the local alterations of sensibility which frequently accompany disease of the brain, and yet they are the least to be relied on: not only do they continually fail in giving notice of mischief going on within the cranium, but they are associated with so many other disorders, that in by far the greater number of instances they do not point to any serious lesion. Thus they are to be met with in dyspepsia and constipation, and in almost all the disorders of the digestive and assimilative processes; they constantly coexist with disorder of the circulation, disease of the heart, anæmia, and plethora, whether the head be too freely or too scantily supplied with blood: they are frequently associated with altered conditions of the blood itself, in fever, inflammation, chronic blood ailments, &c.

These belong to what we call functional disturbance of the brain: if rightly considered, they ought not to give rise to any important misconception; for in every instance the organ in which concomitant symptoms of disorder exist, ought to be carefully examined. For example, we know that vomiting and constipation are very often secondary to inflammation of the brain; and if for a moment this circumstance be forgotten, and the attention be directed only to the local derangement, we find nothing there sufficient to account for the inflammatory fever which is going on; the tenderness of abdominal inflammation is entirely wanting: on the other hand, in dyspeptic headache, however intense the pain, there can be no evidence of inflammation, but the liability to disorder of the stomach is a fact easily made out. Useful information may be obtained in cases in which there is a possible connexion between the head symptoms and disordered circulation or disease of blood, by inquiring whether the pain be relieved or aggravated by assuming the horizontal posture. If the general symptoms be only those of fever we shall have more difficulty in determining whether the altered sensibility be caused by the fever, or whether it point to some more serious lesion of which the fever itself is only symptomatic.

It must not be forgotton that the pain is sometimes external to the skull; rheumatic, with tenderness of the skin and rhematism in other parts; inflammation of the scalp, in commencing erysipelas or disease of bone, inflamed pericranium, &c.

In all the functional disorders of the nervous system we must be careful neither too hastily to conclude that they are limited

to the nerves to which the sensations are referred, nor too ready to ascribe them to disease of the central organs; there are no cases of this kind occurring in practice which are not occasionally associated with either condition.

Division III.—Alterations in Muscular Movement.

Indications derived from the muscular system divide themselves into irregular or involuntary movements, and loss of power; spasms, convulsions, and palsy. They belong to objective phenomena, and are symptoms which can hardly escape observation.

§ 1. *Spasmodic Action.*—The slightest, but not the least important form of this affection is seen in the muscular twitchings of fever, as subsultus: it is at first only indicated by a tremulous movement in performing any voluntary act, caused by the irregular action of the muscles combined in its performance and differing in some measure from the tremor of mere weakness by this irregularity: in a further stage of the fever it is more constant, and such movements of the muscles of the arm are almost always seen: at an advanced period it is combined with delirium, assuming the character of "floccitatio," a picking at the bed-clothes, performed in the same tremulous and irregular manner. It does not prove that there is any peculiarity in the fever poison, but only that the brain and nerves are especially acted upon by it. Tremor also characterises the muscular movement in delirium tremens: in this condition there is less irregularity of action, and every motion is performed in a hurried manner, with marked energy and activity, while in fever they are all essentially slow and apathetic.

When the muscular twitchings are more spasmodic or convulsive in character, and there is delirium or loss of consciousness, we have reason to suspect more serious mischief; they are in such circumstances often confined to one side of the body, or more marked on

one than on the other; not unfrequently paralysis of one side is seen associated with spasmodic twitchings of the other. In such affections imperfect co-ordination of muscular movement is associated with some irritation of nerve-fibre which stimulates the muscles to action.

Loss of voluntary control is also a phenomenon of chorea, in the form of irregular jactitation of the whole body, of the various limbs, or only of one of them: the movements are more spasmodic than convulsive; the muscles act, not simultaneously, but severally, in opposition to, or uncontrolled by volition.

The absence of delirium or stupor in this instance, proves that no serious lesion of the brain exists, and leaves it undecided in what part of the nervous tracts the irritation is seated.

General convulsion is a more fearful form of spasm; the muscles of the whole body are thrown into violent and irresistible contraction, which produces contortions of the features and movements of the limbs; volition is lost, consciousness is suspended, contraction of one set of muscles is immediately followed by that of their antagonists, in consequence of which the body may be thrown by an almost superhuman strength from one side to another; the fæces, the urine, and the semen are often involuntarily evacuated. General convulsions occur in various forms of brain disease, but attain their greatest severity in the distressing attacks of the regular epileptic: the great distinction between epilepsy and convulsion will be found in the context of symptoms: at its first incursion the patient attacked with epilepsy seems to be in perfect health before his seizure; when it has passed, there is nothing beyond a feeling of languor for a day or two, or muscular soreness from violent action, to show that he has passed through the struggle; he once more appears to be free from disease; in its later stages the history of recurring attacks leaves no room for doubt. When dependent on other diseases con-

vulsions do not stand alone, but are found in connexion with a febrile state, with delirium, or with stupor.

Children are particularly liable to convulsions: irritation of the nervous system is with them very apt to produce the affection, and teething, disordered digestion, or intestinal worms are its common causes; but we must remember that it is not unfrequently the first symptom by which the attention of parents or nurses is drawn to the existence of insidious inflammation. In adults there is generally some previous history when convulsion is a symptom of disease of the brain; still it does occasionally occur as the first manifestation of fatal effusion of serum in the ventricles, in consequence of the very same sort of inflammation as the hydrocephalus of childhood. Convulsion is also a very usual symptom of blood-poisoning in cases of albuminuria.

Spasm is the prominent feature of tetanus; muscular rigidity more frequently occurs in connexion with disease of the brain: it sometimes supervenes on paralysis, causing permanent contraction, or it remains as a consequence of convulsion, especially in childhood; in other instances it arises slowly and spontaneously in long-protracted disease, and in such circumstances it must be regarded as a serious symptom.

Strabismus occasionally exists as a condition of muscular spasm, but is more commonly due to paralysis. It is one of the incidents in general convulsion, and is transient except when followed by paralysis of the antagonistic muscle. In inflammation within the cranium it is frequently produced by irritation of the origin of the motor nerves, and is then a very common cause of double vision.

§ 2. *Paralysis*, as a symptom of disease of the brain, must be studied especially with relation to its extent and duration, and also the mode of its incursion. It is one of those disorders which, in a truly scientific

classification, could find no place except as a symptom of disease; but we are met by the impossibility of ascertaining the exact condition of the nervous structures during life, and we also know that, while it is dependent on a great variety of causes, its features present characters which are constant and invariable; thus in some cases we cannot get beyond the fact of paralysis being present, while in others the primary cause having been removed the function of the muscles remains in abeyance until they are aroused by the repeated application of some local stimulus. It has, therefore, seemed necessary to assign to it a separate place in classification, and the question of its causes and extent will be subsequently examined. We may here remark that paralysis of cranial nerves must be more important than that of solitary nerves in any other part of the body, because the lesion is so much the more likely to be within the skull, and similarly, either hemiplegia or paraplegia, extending to the nerves originating in the brain itself, is more serious than when either disease is limited to the lower limbs. Again hemiplegia is more important than paraplegia, because the two hemispheres of the brain are more distinct than the two halves of the spinal cord, and affections of one side of the body, are therefore more likely to have a cranial than a spinal origin.

The fact of paralysis being complete or incomplete, does not so much affect the situation of the lesion as its character, and is chiefly of importance because the one is a reality about which there can be no question, while the other may either be overlooked by the observer or may be simulated by diseased imagination or perverted will. We are only dealing now with one symptom, and if we are to attain to correct diagnosis we must compare it with any other evidence there may be of cerebral disease; the apparent paralysis affords no sufficient ground for assuming its existence, even though it might be fully explained by such an hypothesis.

Ptosis is a symptom not readily to be passed over: difficulty in articulation, thickness of speech, stammering and stuttering or hesitation, in persons who have had no affection of the kind before, are also of much importance in relation to disease of the brain, indicating as they all do, some affection of cranial nerves. Their anatomical relations may help us to trace the point at which diseased action is going on; and where two or more nerves issuing by different foramina are simultaneously affected, we have at least strong presumptive evidence that the cause of the paralysis lies within the cranium.

Strabismus again comes under consideration, as it often is due to paralysis. We have to inquire whether it be recent or of old standing: in its chronic state there is generally retraction of one muscle with elongation of its antagonist, which is of no moment as a symptom of disease now going on, as it is either the remnant of some convulsive attack in childhood, or the consequence of some defect of vision; in its recent state it is very frequently the evidence of irritation and muscular spasm, but is also occasionally seen along with paralysis of other cranial nerves, as the effect of pressure, *e. g.*, along with dilatation of the corresponding pupil.

CHAPTER XIV.

DISEASES OF THE BRAIN AND ITS MEMBRANES.

History—Acute and Chronic — Antecedent States— § 1, *Scrofulous or Tubercular Inflammation—In Infancy—its Early Stage—its Advanced Stage—In Adults—its Association with Phthisis—Tubercles in the Brain—* § 2, *Simple Inflammation—its Causes and Characters — its Locality—in Membrane—in Brain Substance—* § 3, *Apoplexy—Characters of the Fit—History—Partial Coma—Serous Apoplexy—Associations — Congestive and Sanguineous Apoplexy—* § 4, *Sunstroke—* § 5, *Chronic Hydrocephalus —* § 6, *Chronic Disease—its History—its Symptoms —* § 7, *Diseases of Cerebral Arteries—Degenerative Embolism — Thrombosis — White Softening—* § 8, *Functional Disturbance—its Character—Associations —Relation to Insanity.*

In the preceding chapter a general outline has been given of the very large class of symptoms which must be investigated in inquiring into conditions of disease in the brain, and at first sight their number and variety seem to present almost insurmountable difficulties ; but in reality it is not so : in any given case, we are rather left in the dark by the absence of trustworthy evidence of the state of the brain, than bewildered by the number of objective and subjective phenomena : thus, when the mental functions are deranged, we lose all aid to be derived from the sensations of the patient : in some cases one symptom (*e. g.* paralysis) stands alone, in others there is scarcely anything to indicate the existence of disease beyond the presence of pain, which we know may be exagge-

rated, or may depend simply on disturbance of other organs.

We cannot too often recur to these important principles—(1) to inquire in every possible way into the history of the case; (2) to examine most carefully the condition of other organs, and search for the existence of other diseases: if these two points be neglected, correct diagnosis is almost impossible; if properly attended to, they not only lead us in the right direction when we fail to get at the exact truth, but they also enable us to avoid many errors. The next step is to consider the various important lesions of the brain, and ascertain whether the case under investigation can adapt itself to any one of these, not overlooking the possibility of insanity and simple functional disturbance, which with all their complex associations, belong distinctly to diseases of the brain.

The primary division is into those with and those without a febrile state. Acute diseases of the encephalon in adults seldom arise spontaneously, or without previous derangement of health; hence the importance of the history of the case. We may thus be enabled to exclude "head symptoms" occurring in the course of some other acute disease; it is only necessary to guard against being misled by a vague assertion of the existence of fever, when this was but the first step in the progress of inflammation. The history also conveys very important information with reference to the recurrence of headache, to pain or discharge from the ear, to previous loss of power, or attacks of convulsions in genuine cases of disease of the brain, or to cough and emaciation as preceding tubercular meningitis; in either case inflammatory action, when present, is, as it were, engrafted on old standing disease, and this is its most common course; on the other hand, it is sometimes developed suddenly in a person who had previously enjoyed perfect health, with great febrile disturbance, severe pain in the head, vomiting, and constipation; or it is announced in a

more unmistakeable manner by the coexistence of convulsion. Here we shall learn that symptoms of affection of the brain were among the earliest phenomena of disease, and we are thus assured that this organ has not become secondarily affected in the course of some other febrile disorder.

The importance of the information obtained from this preliminary inquiry can hardly be overrated, in so far as it serves to point out the association of the tubercular diathesis, either by the previous condition of the patient himself, or his hereditary tendency to scrofula or consumption. It may also greatly assist us in forming a judgment as to the exact seat of the disease, whether in the membranes or in the substance of the brain, because we learn from experience that meningitis is apt to be produced by disease of bone in the internal ear and the sinuses of the nares; or by caries or fracture of some other portion of the skull; by syphilitic nodes of the pericranium, or by injury of the scalp, especially when terminating in suppuration; on the other hand, inflammation of the substance of the brain, when not dependent on overstimulation of the organ, or upon scrofulous deposit, is more commonly excited by the pressure of an old apoplectic clot, or by the progress of chronic disease, traces of which are to be found very often in the past history of the individual.

The symptoms in the acute diseases of the encephalon are not generally such as point with any distinctness to the exact site of the action, because, though doubtless commencing in different structures, and occasionally limited to them, inflammation involves so much the general functions of the brain, as the centre of innervation and the organ of mind, that we can scarcely assign to each part a distinct share in their production; it rather concerns us to find out any really available mode of discriminating the two great practical divisions,—the scrofulous and the simple inflammation. For the purposes of classification, the

former is placed along with other specific diseases of the same class; but with reference to diagnosis it is necessary that the two should be studied together.

§ 1. *Scrofulous or Tubercular Inflammation.*—This form of inflammation is so much more common in infancy than at more advanced periods, that until recently it was hardly recognised as occurring after the age of puberty; and the name by which it was first known, "acute hydrocephalus," was limited to childhood: the records of St. George's Hospital prove that it is not uncommon up to the age of twenty-five or thirty. Its symptoms and progress have been much more studied in the earlier periods; and the description of these, in consequence of the modifications due to vital phenomena during the progress of development, will not always be found applicable to the disease as occurring in the adult. Pathological research seems to prove that the disease is the same, at whatever age it occurs: it is essentially connected with the strumous diathesis, which exerts some mysterious agency in its development, and hence it is numerically far more common than simple inflammation: indeed, up to the age of twenty-five, the one is the rule, the other the exception; so much so that, excluding infancy altogether, the number of cases occurring in connection with the scrofulous diathesis, from eight or ten years of age onwards, is probably double that of cases of simple inflammation at all periods of life collectively: this fact is very important in diagnosis.

The tendency of the inflammatory action is to the effusion of serum rather than of lymph or of pus; but both conditions occasionally coexist, as well as varying degrees of softening of the cerebral structures. These different lesions probably correspond to different degrees of arterial action during life, as indicated by heat and pain of head, in opposition to dulness, heaviness, and delirium; at present no certain rule can be

laid down by which they may be discriminated: coma and unconsciousness are pretty certain evidences of effusion, but in prolonged cases the brain seems partly to recover its power and become tolerant of the pressure. The susceptibility of the brain in the earlier periods of life is so much greater than in later years, that inflammation of the brain is then often the first indication of the tubercular diathesis, while afterwards tubercular deposit will have always been first formed in other organs.

Much as has been written on the diagnosis of the early stage of this disease in infancy, it is practice alone that can give any readiness in its discrimination. A child belonging to a scrofulous family is attacked by slight febrile disorder, with irregularity of the bowels, especially tending to constipation, accompanied by vomiting and occasional fretfulness: in such a case it is necessary to observe very carefully all indications referring to the brain; the mode of standing, walking, sitting, lying; any aversion to light, or dislike to the erect posture, as shown by nestling its head on the mother's bosom, and turning peevishly from any attempt to amuse or occupy its attention. These circumstances, again, must be compared with the amount of general disturbance: a child suffering from infantile fever shows much more weakness and prostration in comparison with the signs of cerebral affection: in hydrocephalus the heat of skin is most marked over the head, but is not in proportion to the quickness of the pulse; the tongue is coated but not dry; the stools are costive and often deficient in bile; thirst is not urgent; the vomiting has no necessary connexion with the period of taking food: in infantile fever, the heat of skin is more general, there is dryness of tongue, thirst, and very often a tendency to diarrhœa; listlessness and indifference mark the expression of the features rather than the anxiety and knitting of the eyebrows so often seen in hydrocephalus.

In simple gastric disorder, on the other hand, there

is little or no quickness of pulse, no heat of skin or of head; the tongue is much more coated; the vomiting and constipation are less obstinate, yielding more readily to treatment; the countenance may be dull and inexpressive, but it is not anxious.

In some few cases, and these are the most difficult of diagnosis, the tubercular disease has begun so decidedly in the abdominal viscera, that diarrhœa persists till the head affection has become unquestionable from the presence of coma or convulsion: in other instances an attack of convulsion is the first circumstance that awakens the attention of the mother or nurse to anything being wrong.

The hopelessness of the disorder deprives diagnosis of much of its interest; yet it is well to be able to warn parents of approaching danger, and it is now and then a source of gratification when we can remove apprehension regarding a case which has been looked upon with distrust, and can feel confidence in a prospect of amelioration.

In the advanced stages, extreme listlessness and unwillingness to be moved, frequent moaning, great aversion to light and noise, with marked inequality of pulse, followed by stupor, convulsions, paralysis, strabismus, or insensibility of the retinæ, and total blindness, sooner or later make the nature of the disease only too evident: their sequence is not always the same, and the more decided symptoms may be postponed till within a day or two of the patient's death. When the disease has been making slow and insidious progress for days before the child is first seen, and the bowels continue relaxed, while the history of the case is either imperfect or incorrect, it is apt to be regarded as an advanced stage of fever: this is the disease with which in all circumstances it is most liable to be confounded, and therefore a few hints may be given for their discrimination. In doubtful cases it is always a favorable sign when the child is seen to watch the attendant as a stranger in the room, when, though listless and unwilling to be disturbed, he is not distressed at being moved; it is also favorable when there is thirst, and no refusal of fluid nourishment; and, I may add, what seems paradoxical, when delirium and muttering are observed at night. This is explicable enough from the consideration that, if delirium depended on serious lesion of the brain, the other

symptoms would be such as to render the case perfectly clear; it is only when doubt exists that delirium can be thus viewed. Deafness may be to a certain extent regarded among the favorable signs, as it is a common circumstance in fever; but if it amount to total loss of hearing, it is most unquestionably of evil omen. Blindness is a constant effect of effusion, but it is sometimes difficult to make out whether the child be blind or simply indifferent to surrounding objects: mothers never admit the fact, and the mobility of the pupil can alone be taken as a certain guide.

Heat of head, refusal of fluids, moaning, anxiety of expression, are all unfavorable: variableness of pulse is also a very hopeless circumstance; its acceleration in acute hydrocephalus is constant, but not always great, often less than in fever, sometimes much greater: its occasional increase from slight causes, as well as its unevenness under the finger, are of more value than its absolute frequency: during the period of effusion it is sometimes slow.

Hydrocephalus must be carefully discriminated from the functional derangement following on exhaustion, which often so closely simulates it as to have received the name of the *hydrencephaloid* disease: the proper place for its consideration is among functional disorders; the most useful diagnostic mark, in cases where it remains unclosed, is the condition of the fontanelle, which is full and tense in inflammation, hollow and flaccid in exhaustion.

In adults the cases of tubercular inflammation of the brain may be divided into two classes; the one accompanying the early stages of tubercular deposit, when miliary tubercles are evenly distributed through the lungs; the other attending the advanced stages of phthisis, with vomicæ in the lungs. In their general features there is considerable analogy, but in the early cases the symptoms are more acute, and correspond more closely to those seen in the same disease in childhood: in the advanced cases the inflammation is of lower type: the presence of disease in the follicular glands of the intestine renders constipation very rare; vomiting, on the other hand, is of common occurrence. The pulse, so often quick in phthisis, is always so in this affection of the brain; the head is hot and painful; night-sweats, if they have previously occurred, have ceased, and, contrary to what is found in child-

hood, delirium is an early symptom. This subject has been already fully discussed under the head of delirium, to which the student is referred; its presence cannot fail to draw attention to the condition of the brain: it may be accompanied by strabismus, unequal action of the pupils, or aversion to light and noise, but such signs are more often wanting among adults. Alterations of sensibility and mobility are rarely observed in the early stages.

In advanced phthisis, emaciation naturally leads us to inquire into the previous history, especially with regard to chest symptoms, if none such have been detailed: emaciation unquestionably also attends chronic disease of the brain, but it ought to be enough that a suspicion of disease of the lungs is suggested; auscultation cannot fail to reveal its existence when a vomica is already formed.

In early phthisis, with equal dissemination of tubercle through the lungs, the result of stethoscopic examination being less satisfactory, diagnosis is sometimes at fault. The disease to which it bears the closest resemblance is continued fever with pulmonary congestion. The differences in the auscultatory signs will afterwards be noticed in describing diseases of the chest, but sometimes they cannot wholly be relied on; and even when they are well defined, the mind is so apt to be satisfied with the explanation which "fever" affords, that careful examination is foreborne in the depressed and delirious condition of the patient. In such circumstances, a correct history serves as our best guide: the points which it indicates are the existence of cough before the commencement of the present attack, the occurrence of both headache and delirium at an early period, with relation to the fever, and the wandering of the mind by day as well as by night. In conjunction with these we observe the more definite symptoms of heat of head, and vomiting, with a tongue not very much coated, and a pulse not remarkably quick in the first instance, but often variable and unequal.

As with the corresponding disease in infancy, the result of diagnosis is very unsatisfactory, revealing only the hopeless nature of the malady. Our apprehensions, grave at any time when the brain is seriously implicated, assume a more gloomy aspect when we have been able to determine that tubercular disease is present in other organs; nevertheless, we obtain by its means not only a safer guide to treatment, but information most useful in the varying phases of the disease, and

most important in venturing to give a prognosis to the friends of the patient.

It has been stated that tubercular inflammation does not necessarily imply the presence of tubercles in the brain itself; and it is here only necessary to add, that their existence is not generally betrayed by any symptoms, even when found of considerable size after death, till inflammation occurs; and the course of the disease is very much the same whether there be tubercular matter in the brain or not. Even when we have evidence of previous disease of the brain, and we may feel justified in believing that it is caused by tubercular deposit, because we can trace tubercle more or less clearly in other organs, still its absolute diagnosis is quite beyond human art. Its symptoms do not differ from those caused by the presence of any other morbid growth.

It occasionally happens that, after an acute attack, the disease lapses into a chronic form, consciousness is nearly perfect, but paralysis of one or more cranial nerves remains, with less distinct evidence of general cerebral disturbance. In such cases the circumstance of previous febrile action, along with local lesion, points pretty definitely to the coincidence of inflammation and tumour; and the probability is very great, in the case of children, that it is scrofulous inflammation and scrofulous tubercle.

§ 2. *Simple Inflammation.*—Acute simple inflammation of the brain is exceedingly rare as an idiopathic disease; more frequently it is set up by injury or disease of bone, and now and then acute symptoms supervene in a case where there has been long-standing disease; in all of these the general characters of the malady are the same, and the history can alone determine its cause and origin. The important antecedents may therefore be divided into two classes: (1) those which have reference to injury or disease of bone, such, for example, as a blow or fall, tumours or abscesses on the scalp, discharges from the ears and nose, or deafness from disease of the ear; and (2) those which bear more especially on the condition of the brain itself—viz, the occurrence of fits, whether apoplectic or epileptic, the existence of any form of paralysis, impairment of vision, or deafness without disease of the ear. These circumstances also tend to show which portion of the encephalon is the precise seat of inflam-

mation; but the determination of this is not of much practical importance in regard to treatment; it is usually enough for our purpose if we can determine that acute inflammation is going on within the cranium.

When pronounced, the characters of the disease are quite unmistakeable. There is pain of the head and restlessness, followed by quick, hard pulse, hot and dry skin, white tongue, heat of head, and flushing of face; the eyes are red and ferrety, and the pupils contracted; there is intolerance of light, and perhaps of noise; there are rigors, nausea, vomiting, and constipation, followed by convulsions, delirium, coma. Delirium, strange to say, is often absent, or only slight and transient, until a semicomatose state follows on convulsion; at other times it is furious and maniacal.

Pain is a very constant symptom, and is generally referred to the forehead, but it may prove a very fallacious guide; intense headaches find their solution very often in simple gastric disorder; the pain of inflammation is sharp and darting, rather than aching, and when associated with intolerance of light and noise, we may be sure that it is something more than mere headache. Heat of head, flushing of face, pulsation in the branches of the external carotid, showing increased action there, lead to the belief that there is corresponding increased action of the internal carotid, caused by inflammation within the cranium.

The nausea and vomiting are sometimes very striking; the smallest portion of food or drink being rejected, and sickness continuing even when nothing is taken into the stomach. That this is not caused by gastric inflammation is proved by the absence of pain and tenderness at the epigastrium: when accompanied, as it often is, by constipation, we have to bear in mind that this condition may of itself cause sickness and great cerebral disturbance in cases in which there is no inflammation present. The diagnostic value of such symptoms must therefore, in the first instance, depend on their being associated with others more distinctly referrible to the brain itself; their persistence after the action of a brisk purgative, or obstinate slowness of the bowels, in persons not habitually costive, are not to be lightly passed over.

Rigor rarely accompanies the onset of the disease; it afterwards occurs frequently in its progress, and may assume such a

character of periodicity as to resemble intermittent fever, and lull the medical attendant into fatal security.

Convulsions appear at very various periods: in young persons they sometimes usher in the attack, while in adults they are more generally delayed till the closing scene; whensoever they exist they are an important, and, at the same time, an alarming sign. The distinction between these and the true epileptic seizure, will be afterwards pointed out. The symptoms of disease do not remit, after the convulsive seizure has passed, in true inflammation of the brain, as they do in epilepsy.

Various alterations in sensibility and motility succeed to the exaltation which first accompanies inflammatory action; and the progress of the case may be marked by spasm or loss of power; these indicate changes in cerebral structure, or pressure from effusion of lymph, serum, or pus, but have no direct bearing on the question of inflammation. Strabismus and double vision are generally the first in order in this sequence.

The presence or absence of delirium seems in great measure to depend on the portion of the encephalon attacked by inflammation. It can scarcely fail to be present if the grey matter of the hemispheres be involved, but does not necessarily imply this particular lesion. In character it very much resembles an attack of acute mania, and the distinction is sometimes not easily made out. Regard must be especially had to the relation the delirium bears to the signs of increased action, and the order of their occurrence: maniacal excitement necessarily produces flushing of the face and acceleration of the pulse, but to a much less degree than inflammation. Evidence may also perhaps be obtained of previous perversion of intellect when the disorder is linked with insanity. Constipation is common to both states, and there will be little chance of confounding the nausea and vomiting of inflammation with the refusal of food, so often manifested by the maniac. The alleged cause of the attack, whether physical or mental, may sometimes help our diagnosis, although it be quite true that a purely mental one may excite increased action and actual inflammation, as well as mania. The occurrence of convulsions along with the delirium renders the diagnosis more certain.

In the 'Nomenclature of Diseases' several varieties of inflammation are enumerated which are discriminated with sufficient readiness on *post-mortem* examination, but are by no means so readily recognised during life. They consist of (*a*) inflammation of the *dura mater;* (*b*) inflammation of the *pia mater* and *arachnoid*, to both of these the generic term *meningitis*

is applied; (*c*) inflammation of *brain substance;* and as accessories to this its occasional terminations, (*d*) *red softening*, (*e*) *yellow softening*, (*f*) *abscess.* All cases in which no complete diagnosis can be given are called *encephalitis.*

The number and variety of symptoms present necessarily differ very much in individual cases. Without attempting to go too minutely into the diagnosis of the particular portion of the encephalon which is the seat of disease, it may be observed that pain, and the recurrence of rigor, seem rather referrible to inflammation of the membranes of the brain generally, while convulsions point to that more immediately investing the cerebral mass—the pia mater and the lining membrane of the ventricles; delirium chiefly accompanies inflammation of the grey matter, and alterations in sensibility and power of movement have especial reference to lesion of the central conducting fibres uniting the brain to the spinal system.

Again, in regard to the origin of the inflammation, we find that the inflammation of the dura mater is most commonly excited by causes acting on the bones of the skull, fractured caries, pericranial inflammation, &c. Inflammation of the pia mater and arachnoid, on the other hand, is the form which the disease is likely to assume when it is of an idiopathic origin. The brain substance is seldom deeply implicated, except when the inflammation is produced by injury, or by some foreign deposit, such for example as an old apoplectic clot, of which yellow softening is a common consequence. A certain amount of superficial inflammation of the grey matter almost invariably attends simple meningitis. Indeed, whether it be that the exciting cause acts simultaneously on more than one structure from the first, or that inflammation in one part is readily transmissible to the adjoining textures, certain it is that we seldom find local and circumscribed inflammatory action limited to any one tissue, and the symptoms are therefore necessarily

more or less ambiguous; nay more, it is even true that those belonging more especially to one form of structure may be developed by the simple proximity of inflammation in another. Nausea and vomiting are common to all the forms of inflammation; they are to be more carefully noted in consequence of their occasional occurrence as premonitory symptoms, which must be viewed with great anxiety in persons who have been known to suffer from discharge from the ear, or to have had any other of the antecedents of cerebral disease; they are sufficient to cause us to be on the alert for the appearance of any other symptom of inflammation. Idiopathic inflammation of the membranes and particularly of the arachnoid and pia mater, is much more frequent in children and young persons than in adults; in them the first symptom is commonly an attack of convulsion; inflammation of the substance of the brain again, is the more usual form in mature age, generally combined, however, with meningitis. From this combination, no doubt, it happens that the course of the symptoms is seldom the same in any two individuals: thus, sudden alteration in manner may be observed passing at once into violent delirium, and followed by vomiting, while convulsion occurs only at a later period; or vomiting and pain of the head may be the first in the order of sequence, and delirium only follow towards the close of the scene, without any appearance of convulsion at all; or again, convulsions may be the earliest symptom, but I believe this to be the rarest mode of attack, when the substance of the brain is the seat of the inflammation.

In all of these cases it will be seen how little we can rely upon any one pathognomonic sign, and that if we would avoid dangerous or even fatal errors in diagnosis, regard must be had to all that can be learned of altered function or action in disease.

§ 3. *Apoplexy.*—No condition of disease is probably

more marked or more easily recognised than a pure case of apoplectic seizure. Suddenly, while to appearance in perfect health, the patient loses recollection, and falls to the ground in a state of unconsciousness; his face is turgid; his temples throb; his eyeballs turn upwards; his features are drawn to one side; slight convulsive tremor agitates his frame, usually on one side; and he lies dead to all around him. When examined, probably one side of his body, or even the whole of his limbs, have become flaccid and useless, remain in any posture in which they are placed, and drop as lifeless things when lifted from the couch; his breathing is slow and laboured; his pulse oppressed, small, and yet resisting; if one side only be paralysed, he makes meaningless, purposeless efforts, and struggles with the limbs of the other, when any attempt to move him is made; in course of time his breathing becomes stertorous; his urine is retained in the bladder, or dribbles away in the bed; his fæces are passed involuntarily. Without another conscious movement, without any knowledge of what has transpired, the coma deepens, the breathing becomes a succession of interrupted sighs, and he passes away without a struggle.

Clear and unmistakeable as such a case is, we find in practice that all the symptoms may be so shaded off by imperceptible differences, that at length scarcely any portion of the original picture remains, by which to give an exact definition of an attack of apoplexy; and in common parlance, a "fit," followed by loss of consciousness, is called apoplexy. This is not the place to discuss whether anything be rightly called apoplexy which is not distinctly traceable to turgidity of vessels, with or without their rupture, and the consequent extravasation of blood; but, as a matter of diagnosis, it is essential to distinguish sanguineous apoplexy from all other sorts of "fit," whether these be followed by loss of consciousness or not.

When a history can be obtained in a case of apo-

plexy, it is not unusual to find that there have been for some days or weeks, occasional warnings, which are spoken of as "tendency of blood to the head," consisting of headache, giddiness on sudden change of posture, throbbing of the temples, &c.; and the occasion of the fit itself has been some strain or prolonged muscular effort, or some mental excitement. The fit may not be really the first step in the progress of the malady, but may be preceded for some hours by an accession of violent pain, or by some form of paralysis of the cerebral or even of the spinal nerves. The occurrence of apoplexy is generally, to a certain extent, limited by age: a full habit of body, luxurious living, turgescence of the face, and the cessation of habitual discharges, may each be found among the precursors, or, as they are called, the predisposing causes of apoplexy.

It has been already remarked, in speaking of semicoma, that it may be equally associated with apoplexy and with epilepsy: and in the broad outline of the former, just given, a drawing of the face to one side, and convulsive movements of the whole or part of the frame, have been mentioned as noticeable in an unquestionable case of apoplexy: and therefore it is evident that the "fit," and the semicoma following, may be symptomatic of either disease: in fact, it resolves itself into a question of degree, the amount of convulsion, the depth of coma. Apoplectic convulsion is rather a faint tremor than convulsion, and is most marked when paralysis of one side of the face leads to more distinct deviation on the other. In epileptic convulsion, however slight, there is definite movement, forcible and almost irresistible, distinctly dragging the limb or the head into unnatural contortions, and these are rarely limited to one side. The physician has no chance in general of seeing the movement and judging for himself, but any intelligent bystander can comprehend the difference and say what he saw. Then, again, the coma differs in degree,

and in the opposite direction: if the convulsion of apoplexy be slighter, the coma is deeper. The difference can scarcely be made intelligible by words, but the loss of consciousness and usual sleep of epilepsy are quite distinct from the stupor of apoplexy: the one consists rather in confusion, the other, in suspension of the mental faculties.

But there is another condition, which has been called serous apoplexy. Here, too, there is a fit; there is loss of consciousness and paralysis, and yet there has been no turgidity, no rupture of vessels—mere effusion of serum. This fact has been already referred to, and it is almost incredible that it should take place instantaneously. I think we must believe that a morbid process has been going on for some time; that at a certain point the brain becomes intolerant of pressure, this point being determined by momentary repletion of either arteries or veins, or of the capillary vessels, and that then the event occurs in a moment. This is not true apoplexy, and careful inquiry will always show that it is more nearly allied to epilepsy; that it is, in fact, analogous to the convulsive seizure which ushers in hydrocephalus occasionally, even in the adult; but the paralysis has proved the stumbling-block, and has been thought distinctive of apoplexy. The diagnosis is difficult, but I can affirm, from personal experience, that it is not impossible, though perhaps nothing can teach it except watching such cases, with the knowledge that events of this nature do occur, and that they do manifest themselves by special features.

The condition of the pupils deserves consideration, although no very definite rules can be laid down. Contraction indicates irritation; dilatation, paralysis of the optic nerve. A want of correspondence between the two proves the existence of more severe lesion on one side than the other; and would, therefore, at once exclude the idea of epilepsy.

Be it remembered, that there is no one symptom by

itself distinctive of sanguineous apoplexy, and it is often only after several examinations that a diagnosis can with confidence be pronounced. There are two points which, in the subsequent condition of the patient, serve very greatly to discriminate the cases ; these are, the recurrence of the "fits," and the relative consciousness on succeeding days. (1) When they recur at short intervals, and no paralysis follows, the case is certainly not sanguineous apoplexy ; even if the convulsive movements be only slightly marked, they are probably epileptic, and after their cessation, convalescence from the condition of coma may be confidently looked for. When recurring at longer intervals sometimes of days, more often of weeks, with paralysis enduring throughout, it is probably an instance of serous effusion ; true sanguineous apoplexy only recurs at very much longer intervals. (2) Alike in epilepsy and in serous effusion, consciousness is not so entirely suspended as in sanguineous apoplexy ; at least, it is so for a much shorter time ; when semi-coma follows upon epilepsy, the subsequent state is one of prolonged sopor, from which when the patient is roused, he manifests a certain degree of consciousness by placing himself comfortably in bed, drawing up the clothes, &c. ; but no regard is paid to surrounding objects. In serous effusion the sopor is less prolonged, and it is followed by a kind of vague, dreamy consciousness, which is attracted by surrounding objects, without recognising or understanding them, so that the impression made on the senses is not followed by any corresponding rational act. In apoplexy the patient wakes as from profound sleep, and the recollection is confused, the thoughts are collected with difficulty, and the reason used imperfectly ; but there is distinct consciousness in the waking movements.

The character of the pulse in cases of apoplexy demands careful study on the part of the practitioner, because of its bearing on the all-important question of venesection : it has also its uses in diagnosis, inasmuch as a hard, wiry pulse, or a

condition of vascular congestion about the head and throbbing of the temporal arteries, are so many indications of sanguineous apoplexy; but the converse does not by any means exclude the possibility of rupture of a blood-vessel.

In all of these sudden invasions of the intellect, the heart and kidneys must be closely examined. Few cases of fatal sanguineous apoplexy occur in which both organs do not present evidence of disease, and probably in all cases one or other is at fault. Serous apoplexy is perhaps more frequently associated with the strumous diathesis; one form of convulsive seizure is directly connected with blood-poisoning in disease of the kidney, and it is perhaps conjoined with effusion of serum.

Two varieties of apoplexy are enumerated to which the names *congestive* and *sanguineous* are respectively applied; the latter being also sometimes called *cerebral hæmorrhage*. In practice it is not difficult to distinguish these varieties by their subsequent results. When paralysis of however trifling a character remains, there can be no doubt that blood has escaped from the vessels, and hæmorrhage has taken place. And it is just as certain that after such an accident the brain cannot return to a perfectly natural state in the course of a few days. These results, however, cannot be measured by the severity of the seizure, and it is only after a certain time has elapsed that the diagnosis can be given. The patient may have been unconscious of the attack, he may have been quietly sleeping in his chair after a meal, no appearance of change in his condition may have been noted; and yet he may awake with numbness of one arm, presently it ceases to obey the will, he drags his leg, his speech is interfered with, and months must pass before the effused blood can be reabsorbed, and the brain accommodate itself to the altered relations of parts. On the other hand, a patient may pass into a state of profound coma, so that it may be impossible to determine whether there be any accompanying paralysis or not, and yet in a few days he awakes not only to complete consciousness, but to perfect use of all his limbs. No doubt the part of the brain affected has much to do

with the different aspect of the two cases, and it may be regarded as an accident whether the brain is pressed on by a congested state of vessels or by an actual effusion of blood. The merest speck of effused blood in the medulla oblongata may kill by paralysing the respiratory muscles, but a considerable quantity of blood must be poured out on the surface of the brain to produce anything like the stupor of congestive apoplexy. In their after consequences it is of no small moment to the patient whether blood has escaped from the vessel or not.

§ 4. *Sun-stroke.*—The pathology of sun-stroke is not very clearly made out. In fact it seems certain that the consequences of exposure are not alike in all. In some the condition is chiefly one of extreme exhaustion, and any unconsciousness that may be observed partakes of the character of syncope rather than of congestion. In others the symptoms are almost exactly analogous to congestive apoplexy, while in a third set of cases an inflammatory element comes into play, and effusion of serum takes place. Ultimately these varieties will probably be classed under their proper sections with a mere note of the exposure to extreme heat as their cause, but considering the obscurity of such cases, and the very remarkable fact of their common origin, it is perhaps unavoidable that, for the present, they should form a separate group of cerebral disease.

§ 5. *Chronic Hydrocephalus.*—Little need here be said of a condition so self-evident that it needs no rule of diagnosis to discriminate it. It is only worthy of remark that it has nothing to do with acute hydrocephalus or strumous meningitis. There is no such thing as a patient passing from the acute into the chronic state, as the diseases are wholly dissimilar in every respect except in the fact that the ventricles are full of serum. The meningitis may pass into a chronic state though it rarely does so, but it never can become chronic hydrocephalus. It is simply a local dropsy which very often produces enormous enlargement of the head, and is usually a congenital disorder, associated with something like malformation of the brain. It is only while the bones are in process of formation that such a state of things can be developed. After a time the affection is sometimes arrested, and the skull grows firm, but of a huge unwieldy size.

§ 6. *Chronic Disease.*—If the diagnosis of acute

diseases of the encephalon be beset with difficulties, those encountered in investigating states of chronic disease are still greater, and in the majority of cases it must be confessed that we can scarcely form any certain opinion as to the actual lesion: there we had to guard against being led by symptoms referrible to the brain, to overlook acute diseases in other parts to which they were only secondary; here we are very apt to mistake mere functional disturbance for chronic disease. In a practical point of view, and this is the most important one, the only question of real interest is, whether we can distinguish such as are dependent on states of chronic inflammation, and therefore remediable in a majority of cases, from those which depend upon other causes, when we must be content with treating symptoms; because, in the absence of inflammation, the same broad and rational principles of treatment will be most efficacious, whether they depend upon functional disturbance or on serious disease.

The first inquiry is necessarily the history of their origin and progress: the next must be into the condition of all the other organs of the body, because there are none, it may be said, which do not occasionally react upon the brain; some, it is true, more constantly than others; indeed very distinct classes of symptoms seem to be pretty constantly associated with particular forms of disease, while the coincidence in other cases is rather accidental.

If we fail to detect disease elsewhere, we must again revert to the brain itself, investigating more closely the relation of each phenomenon, and evidence of disease of bone must be sought for. The presence of inflammatory action is most clearly indicated when the commencement of the attack can be traced back to a fixed and not very distant period, and when the symptoms follow a definite course: uncertainty with reference to their development and their irregularity or incongruity are to be taken rather as indications of insidious disease, or of nervous, hysterical, or hypo-

chondriacal disorders. As in the acute forms, careful inquiry must be made regarding previous injuries or accidents, and the presence of syphilitic nodes or tumours of the scalp; caries and suppuration rather excite acute than chronic inflammation, and, when associated with nervous symptoms of long standing, are more commonly found to have acted through the medium of the nerve-sheaths, than through the brain or its investing membranes.

After careful investigation of the history of the case, the other attendant circumstances are to be considered. A cachectic state which is not dependent on discoverable disease in other organs is, to a certain extent, presumptive proof of organic disease; its absence is, on the contrary, an argument in favour of chronic inflammation where disease of the brain is believed to exist. To this many exceptions are found; and encysted tumours, for example, frequently proceed to a fatal termination without any symptom of cachexia.

Headache more or less accompanies all chronic diseases of the brain: much has been written on this subject, but little is known with certainty beyond the fact that cases resembling each other in their essence may differ very greatly in this respect, while those producing similar sensations of pain, weight, aching, or dizziness, may reveal after death lesions very unlike one another. It is most difficult to discriminate cases in which this symptom stands alone as evidence of disease of the brain, from those in which it is merely secondary on deranged digestion. When dyspepsia, vomiting, or constipation coexists with headache, the determination must rather rest on the absence or presence of concomitant signs than on its intensity or duration: perhaps, when dependent on disease of the brain, the pain recurs more frequently, and without chylopoietic derangement; the intermissions are less frequent, the paroxysms of longer duration; it is aggravated by noise, motion, light, company, and is never dispelled, like a dyspeptic headache, by exercise or excitement. Very often, too, the recumbent posture aggravates the disorder but its significance is greatest when it is accompanied by any disturbance of the mental faculties, or disorder, however slight, in the performance of muscular movements.

The objective phenomena are much more trustworthy than the subjective. Alterations in manner, in character, or in memory —partial paralysis, whether limited to one or more of the crania nerves, or extending in a modified manner to all the spinal nerves or to those on one side of the body, as well as muscular irritability

or spasm similarly distributed, are symptoms which can be more readily brought to the test of experiment than mere complaints of pain or uneasiness. Mental phenomena, in chronic cases, must be assumed to be dependent upon some cause of pretty general action, because we know that, in the absence of delirium, the intellectual faculties are frequently undisturbed by lesions of very considerable extent, especially when they are limited to one hemisphere; we have also reason to believe that the grey matter of the convolutions is particularly involved in the production of such phenomena, and therefore we may be justified in regarding them as evidence of chronic meningitis. When the cause of the affection is central, and acting secondarily on the grey matter, we shall probably find as its accompaniments stupor or paralysis, which are more closely connected with disease of the fibrous element.

Local paralysis, when slight, may be but the commencement of more general paralysis; when complete, it rather points to the pressure of a tumour, or to some other form of disease of local character. More extended paralysis, if caused by pressure, is generally accompanied by more or less stupor and confusion of thought; when standing alone, it is probably dependent on disorganization of the central structures and tubular nerve substance. In cases in which it is less pronounced, it would seem sometimes to be caused by chronic inflammation of the membranes especially about the base of the brain.

Paralysis, coma, and convulsion, with reference to all forms of chronic disease of the brain, are symptoms of very unfavorable omen; spasm, or imperfect control of movement, hold out more hope of possible amelioration, as they rather show some inflammatory action or irritation of nerve matter. Convulsion is not often seen in chronic disease till towards its termination; it generally indicates some degree of inflammation extending to the ventricles or the base of the brain.

Not unfrequently cases of long-standing disease put on, at some period of their history, the aspect of active inflammation. The acute symptoms in such circumstances may be somewhat modified by the previous disease, but their diagnosis is much facilitated by a knowledge of the foregoing state. Unfortunately, the prognosis is almost hopeless, the chances of modifying the course of the inflammatory action being so much the smaller in proportion to the severity of the organic lesion out of which they have sprung.

It is unnecessary to specify the various forms of disease grouped under this head; they are rather subjects of anatomical research than of clinical diagnosis. Symptoms of chronic disease may, however, be sometimes traced to diseases of the arteries which form an important section of intracranial disease.

§ 7. *Diseases of the Cerebral Arteries.*—As life advances, *degeneration* of the coats of the arteries throughout the body is liable to occur, and in no organ are the consequences of degeneration more important than in the brain. Unfortunately the condition can rarely be recognised during life. The presence of other evidences of fatty degeneration, especially if associated with a bruit over the aortic valves, which is clearly due to some other cause than blood change or inflammatory action, may afford a hint of the probability, but in practice such guesses are more often wrong than right. It may not be impossible to diagnose atheroma of the aorta, near to its cardiac origin, though the further inference of disease of the cranial vessels may be entirely without foundation.

Still more impossible would it seem to be to distinguish the presence of intra-cranial *aneurism.* But it is alleged that in such a case the whizz of the blood-current has been remarked by the patient, and a bruit has been audible to the observer through the bony walls of the skull. Such a possibility must be borne in mind in cases of chronic disease of the brain.

Occlusion of vessels, whether partial or complete, due as it is in some cases to a coagulum formed at the site of disease, and in others to one carried thither from some other part of the circulation, can only be traced by its effects on brain structure. The blood supply is more or less cut off, and the event is either a sudden one in *embolism*, or gradually brought about in *thrombosis*:—the condition of partial occlusion is, I believe, only traceable in the latter instance. When a patient is suddenly seized with paralysis, without any symptom of apoplexy attending the seizure; when, in addition to this, the age, the aspect, and the condition of the patient, all tend to negative the idea of sanguineous congestion or effusion; and when, on examination, a cardiac bruit is heard, or has been known to exist, the conclusion seems unavoidable that some portion of the roughened edge of the valve has

been washed away, and has been arrested in its attempted passage through the brain. The absence of convulsive movements, and the perfect consciousness maintained throughout serve to distinguish such cases from serous effusion. Their discrimination from certain forms of apoplexy in which there is no loss of consciousness is not so easy, and the cardiac bruit is just as likely to be present in the one as in the other.

In the further progress of such cases, as well as in those in which the occlusion of the artery is more gradual and less complete, ultimately the failure of nutrition certainly leads to *white softening* of the brain. No disease is more commonly misunderstood, no term is more constantly misapplied than that of softening of the brain. Whenever loss of power, either mental or physical, is gradually developed, the cause is at once assumed to be softening of the brain; and thus the impotent paralytic and the hopelessly imbecile are constantly classed with those suffering from paralysis of the insane under the same general name. And yet pathology teaches most unmistakeably that such are not the symptoms of softening; and that if partial hemiplegia may be pretty constantly traced as one of the later evidences of the disease, it is rare to find any interference with the mental functions, beyond the existence of a certain amount of obtuseness and languid action. Indeed, I know of no indications which can afford any certain information of what is going on. The evidence of chronic disease must be taken in conjunction with any circumstance which points to the chance of occlusion, or even to the existence of atheroma, which must be regarded as a possible cause, though a less constant one, of atrophic softening. The same condition may be traced in the softening of the fornix and septum lucidum when the ventricles are largely distended with serum, but there are no symptoms specially connected with it; nor can we expect to trace them when the

change is local and partial in whatever region of the brain it occurs.

§ 8. *Functional Disturbance.*—Vague as this term may be, it needs no argument to show the necessity for such a distinction in a classification of nervous diseases. Not only do our present means of investigation fail in pointing out that there is any disease in nerve-structure accompanying the delirium of fever, or puerperal mania, but there are numerous slighter and more transient alterations in the relations of the brain as the recipient of sensation, the originator of motion, and the medium of intellectual operations, the nature of which, were our means of investigation never so perfect, we cannot by any possibility have the opportunity of ascertaining through the bony wall of the cranium ; and to these last we especially wish to limit the term functional, although it might very well include all those conditions which, so far as our knowledge extends, are unconnected with actual disease of nerve-structure.

They divide themselves naturally into three main groups ; (*a*) those connected with disturbances of the circulation, whether in excess or deficiency ; (*b*) those connected with disorder in the process of digestion and assimilation ; and (*c*) those which are more properly called nervous. Of the two former it is to be remarked, that while coincident, and bearing some relation to each other as cause and effect, the functional disturbance of the brain is not to be regarded simply as a symptom of disorder of the circulation, or of the digestion ; for it is not a necessary or a constant effect. The same amount of disorder is not uniformly followed by similar disturbance in any two individuals, or in the same individual at different times ; while the identical symptoms may be noticed in the same person under very different states. Hence, the term nervous might be justly applied to all ; but it is important to bear in mind that the connection exists, and that the

disorder of the circulation or of the stomach being removed, the functional disturbance of the brain for the time ceases.

Insanity might, with some show of reason, be included in this section, as its relation to disease of the brain is so entirely unknown. We have already endeavoured to point out, in speaking of delirium, the means of its diagnosis, to which it is unnecessary again to allude.

The symptoms of functional disturbance cannot be classified according to the disorders of other organs with which they are associated; we shall, therefore, take them in the same order adopted in the previous chapter, considering them in their relations to intellectual faculties, to sensations, and to power of motion.

Here we meet with neither coma nor delirium; their counterparts, however, may be traced; for we have the semi-stupor seen in what is called the hydrencephaloid disease of childhood, the mock hydrocephalus following on exhaustion, either from diarrhœa, from excessive depletion, or from want of nourishment. In carefully following up the rational principles of diagnosis, which it is the object of these pages to elucidate, the error which this very name implies will be easily avoided, because on the one hand the history will teach us that the child has been exposed to depressing causes, while on the other its actual condition will be defective in some of those characters which are necessarily associated with inflammation of the brain; as we find, for example, a cool scalp or a depressed fontanelle: when mistakes have been made they have arisen from limited inquiry, and from reasoning upon partial information. Another counterpart to the condition of coma in severe disease, is seen in the fainting-fit in the adult, which is sometimes simulated by hysteria, but is, in truth, merely an expression of want of blood in the brain. Then again, corresponding to hallucinations and illusions, we find

ocular spectra and deceptive noises, as well as all the morbid fancies of the hysterical and hypochondriac. More common forms of disturbance are met with in the complaint of loss of power to carry out an ordinary train of thought, or transient loss of memory.

Among sensations may be reckoned as the most common, headache and giddiness; then partial blindness, tingling, ringing in the ears; to these, again, must be added the exaggeration of pain which is produced by constantly thinking of and directing the attention to it.

Muscular spasm and paralysis are not often seen as a consequence of functional disturbance; for, although we do not know that chorea is associated with any organic change in the condition of the brain and nerves, it has too much the characters of a distinct and definite disease to be classed along with those we are at present considering: both choreic movements and paralysis are simulated in hysteria. Convulsions, on the other hand, occur in infancy quite as often in consequence of functional disturbance as of organic disease: among adults we can scarcely include in this class those which are seen in cases of blood poisoning, —uræmia, and puerperal convulsions,—although they be not directly connected with organic change in the brain.

In the investigation of "head-symptoms" generally, the same rules must be followed as in the more severe diseases of the brain. We have to make out the history of the case and the order of sequence of the various phenomena, remembering that, as the attention of the patient is fixed on what he considers the most important symptom, he generally dates the commencement of his illness from the period of its first appearance, and it is only by close inquiry that he can be got to admit any previous derangement of health; indeed, it may have been so insidious as to escape his observation. Then diligent search must be made for other indications referring to the brain or nerves,

besides that of which the patient complains, lest, perchance, it should be discovered that it is but one link in a chain of symptoms which proves the existence of some severe disease of the encephalon.

In the order of examination we shall next be able to exclude febrile and inflammatory states; and then the appearance of the patient in regard to conditions of anæmia or plethora naturally occupies our attention: not indeed in the more marked forms of blood change, where hæmorrhage, purpura, or chlorosis constitute distinct classes of disease, but in such minor deviations from health as perhaps are only testified by the circumstance that the symptoms are either relieved or aggravated by the recumbent posture. Along with this we naturally take the condition of the organs of circulation, when a slight cardiac murmur, unaccompanied by other evidence of disease, may be enough to explain uneasy sensations in the head, which are far more tormenting to the patient than the dyspnœa or palpitation which we might expect to find, and the very existence of which he utterly ignores.

The lungs, too, must be carefully examined, but this rather for their negative than their positive results; for we are not now dealing with symptoms relating to severe disease, but with the little torments which invalids frequently suffer; and, for their successful treatment we are rather indebted to experience than to pathology.

A step further brings us to the organs of digestion, which are more often the apparent exciting cause of functional disturbance than any other. But it is in their minor derangements only, that we can be justified in regarding the cerebral symptoms as functional. A bilious headache is a thing of every-day occurrence; but we must carefully analyse what is meant when a person says he is bilious: we may employ such a phrase as a compendious expression of a certain state, but we must be careful how we listen to it from the mouth of a patient. Frequent vomiting, obstinate

constipation, or severe diarrhœa must make us look further into the case; slight nausea, loss of appetite, discomfort during digestion, and irregularity in the action of the bowels may justify the conclusion that the uneasy sensations in the head are only functional. In addition to this, it will be found in practice that a patient seldom applies for relief at their first occurrence, when connected with derangement of the digestive organs. Dyspeptic symptoms arise by such slow degrees that few have reached the middle period of life without suffering from them; and it is only when they are more than ordinarily severe that advice is sought; to some people they become the ordinary state of health, and immunity from them the exception; they have had their headaches over and over again, and begin to look upon them as necessary evils, till some strange sensation arouses suspicion of unknown mischief. The frequent recurrence of such head-symptoms, — their habitual association with attacks of more severe indigestion or more than usual irregularity in the bowels,—their transitory character, and the circumstance that excitement and motion succeed in dispelling them after a little starvation, or a little purgation,—all this affords valuable assistance in discriminating these transient disturbances from the more severe forms of cerebral disease.

The state of the urine, after all that has been said of the connexion of diseases of the brain with those of the kidney, will not fail to be investigated.

The state of the sexual organs is chiefly related to that form of disorder which we have denominated the nervous. We have seen something of this mysterious connexion in hysteria—a condition which tends greatly to heighten and augment the symptoms derived from this source, though they may have their existence quite independent of it; but all the disorders of these organs, and especially their undue excitement, must be borne in mind in relation to "nervous" disorders. Painful as the inquiry must be to every right-feeling man, we

must not neglect the suggestions of the wan aspect and the shrinking eye of a young man in a state of nervousness bordering on insanity, who has brought upon himself, as the fruit of his vices, the penalty of a constant spermatorrhœa; duty commands us to endeavour to save him from himself, no less than from the clutches of the disgusting charlatan who only keeps up while he preys upon the disorder. But we tread upon delicate ground, and I must earnestly warn my younger readers against the scarcely less obnoxious and obscene familiarities of the legitimate specialist.

This class of cases borders much more closely on the organic diseases which have been already discussed than either of the preceding; sometimes it is hard to be discriminated from mental alienation. The overworked brain of the professional man who is labouring after eminence or wealth, and still more, the overexcited brain of the stock-jobber or speculator, after a time becomes exhausted and unfit for the longer performance of duties beyond its strength; and apoplexy, paralysis, meningitis, or dementia, put a sudden stop to his foolish schemes. It is vain to attempt any more correct classification of these symptoms; but, with reference to diagnosis, it is well to remember that they may be but the precursors of more serious mischief. On the other hand, it is always a state of depressed vitality which gives prominence to symptoms generally called "nervous." Over-anxiety and care, whether accompained by straitened circumstances, which deprive the individual of many of the comforts, perhaps of the necessaries of life—or leading to irregular hours, when the system is alternately exhausted by long fasting, and taxed by subsequent repletion—not less than a life marked by habits of gaiety, dissipation, and excess, must in course of time undermine the strongest constitutions, and expose them to these attacks. By repairing the waste, and giving tone to the system and relaxation to the brain, more serious mischief is sometimes prevented.

CHAPTER XV.

DISEASES OF THE SPINAL CORD.

Inflammation rare as an Idiopathic Disease—its History and Symptoms—Connection with Caries—Spinal Irritation—Chronic Disease.

Inflammation of the spinal cord, except as a consequence of accident or injury, is confessedly so rare, that it demands but little notice in a work, the avowed object of which is to conduct the student to right principles of diagnosis. In its general character it ranks among acute diseases, and it is often accompanied by symptoms of cerebral inflammation: these may arise either from the actual spread of the inflammatory action to the membranes of the brain, or they may be produced merely by the sympathy necessarily existing between parts whose functions are so closely connected: such symptoms have been found, both with and without sensible change within the cranium.

The history of the case perhaps reveals the previous occurrence of some accident or strain, or casual exposure to cold, which may be reckoned among its more usual causes. In every instance it gives an account of a sudden seizure as the starting-point from which to date the sequence of the phenomena, while the greater or less rapidity with which they succeed each other, enables us to judge of the relative severity of the attack.

The early stages of the disease are liable to be confounded with rheumatism and neuralgia; but on closer investigation it will be found that there is more of general disturbance than the local and limited nature of the attack would warrant us in expecting,

were the pain due to either of these diseases. It is always characterised by pain somewhere in the region of the spine, and generally pretty high up; of a fixed character, and notably increased by any quick change of posture. In well-marked cases this pain is accompanied by spasm having somewhat of a tetanic character, especially in the muscles of the neck and upper part of the back; paralysis sometimes comes on early. These are exactly the signs which, *à priori*, we should expect to meet with in inflammation of the cord, as they are due either to the irritation or the subsequent disorganization of the large bundles of nerve-fibres. In many cases we are perplexed by the paucity and comparatively slight character of the symptoms directly traceable to the spine, and their very constant association, when they have attained a certain degree of severity, with others which are more distinctly cerebral. Paralysis, or loss of sensation, indicates a further advance: the inflammation is no longer limited to the membranes, but, as in the chronic forms of the disease, some change has actually passed upon the nerve-fibre.

The condition of the bones should next occupy our attention, in so far as their regularity of position, capability of movement, and tenderness on pressure are concerned; and it may be laid down as a rule in diagnosis, that when the cord is inflamed, and especially when spinal meningitis is present, any sudden twist or jarring movement gives more evidence of pain than mere pressure. Permanent displacement, as a result of caries, may have proceeded to a very great degree without any distinct evidence of its impeding nervous action; and when paralysis at length occurs, it is often due to inflammatory action set up by the contiguity of diseased structure. Probably this cause operates even more frequently than the pressure dependent on increasing distortion: in such circumstances the characters of an acute attack are generally wanting.

As connected with this subject a few words must be said upon the somewhat fashionable ailment denominated spinal irritation. It is a great misfortune when a name is given to any affection which conveys an erroneous impression of its nature: irritation of a nerve produces either momentary spasm or transient sensation, as the course of the nervous influence is centrifugal or centripetal: and a continuance or repetition of the irritation will produce the same phenomena in a more or less continued succession: in this view all pain and all spasm may be classed generally under nervous irritation, and so the true spinal irritation which characterises the first stage of inflammation of the cord produces fixed local pain, and distinct local spasm. On the other hand, excessive tenderness or sensibility—hyperæsthesia, as it is called,—such as occurs in inflamed states of organs, whether with or without actual pain, as well as the excessive mobility seen in chorea or delirium tremens, may be said to be due to irritability, when the ordinary stimulus excites unusual action, but there is no proof of irritation. Again, loss of sensation and loss of motion are not evidence of either irritability or irritation, but of interruption to the transmission of nervous influence, or loss of power in the brain to take cognizance of the one or originate the other.

In what is called spinal irritation all these phenomena may be met with, and are mixed up together in the most incongruous manner. Some inquirers have deceived themselves into the belief that the symptoms were capable of classification, and have even detailed examples of cases in which there was some pretension to scientific order and natural sequence; but in these instances they have, no doubt, been misled by their having put leading questions to persons in whom the prominent condition was a disordered fancy, and by their having readily obtained answers in the affirmative. Take the patient's own account of symptoms, or put the leading questions in such a form as to develop their incongruity, and no doubt need remain of the truth of what is here stated. There is often complaint of pain in the back, but its character, in place of being fixed, and local, and deep-seated, is diffused, superficial, and variable. Movement, at one time alleged to be impossible, is effected with perfect ease at another, when the attention is turned to something else: the slightest touch, when the question is put, will be said to give pain, and yet firm pressure or a considerable jar at another moment is unheeded. This character alone is sufficient to distinguish such complaints of pain from those that are of real importance; the same remarks apply to the spasms and the paralysis which, each in turn, may form the principal feature of the disorder: they may, by a little dexterity on the part of the observer, be proved to have their existence only in the exuberant

fancy of the patient. If the distinctions in the use of terms just pointed out had been clearly kept in view, we should probably never have had any doubts or confusion on this subject.

Chronic disease of the cord is a subject on which little can be said in a diagnostic point of view. The great evidence of its existence is to be derived from the paralysis which, sooner or later, always accompanies it; but this symptom alone can give little information regarding the causes of its occurrence; because, as will be shown in the sequel, one which really acts only on a small fragment of the medulla, produces symptoms such as we should imagine indicative of disease of a much more extensive form.

The chief guide in determining the nature of the lesion is the order of sequence among the phenomena; thus, in a very general way, it may be stated that pressure on the cord gives rise to feelings of formication, tingling, heat and cold, &c., simultaneously with pain in the back; whereas in inflammatory action, even of a chronic kind, the pain is more usually associated in the first instance with spasm, and the sensation of numbness comes on at a later period. Both of these are again distinguished from the common cases of paraplegia dependent on atrophy of the cord by the absence of pain in the latter condition altogether. Another circumstance which may serve for our guidance in this, as it does in other organs, is the knowledge which pathology gives of the relative position and extent of diseased action; atrophy is confined to the lower end of the cord; inflammation is apt to diffuse itself widely; tumours are most commonly found towards its upper extremity; and each of these positions must of necessity be characterised by phenomena of different kinds.

I have said nothing of the means of distinguishing spinal meningitis from inflammation of the substance of the cord, nor, again, of the difference in symptoms

between inflammatory softening and hardening: they are far too uncertain to be laid down for the guidance of the student, who may rest quite satisfied if he can distinguish inflammation either of acute or chronic form, from other lesions.

CHAPTER XVI.

PARALYSIS.

Loss of Sensation—of Power of Motion—Incomplete Paralysis.—§ 1, *Hemiplegia—Its Mode of Incursion—Its Central Origin—Causes and Complications*—§ 2, *Paraplegia—Its Causes and Varieties—General Paralysis—Paralysis Agitans*—§ 3, *Progressive Paralysis—Paralysis of the Insane—Locomotor Ataxy—Progressive Muscular Atrophy*—§ 4, *Local Paralysis—Its Meaning — Nervous — Muscular.*

By paralysis is meant the inability to transmit nervous influence, whether in a central or in a peripheral direction ; but the term is more usually applied to that manifestation of it which consists in loss of muscular power: loss of sensation has been called *anæsthesia*, and a corresponding term for muscular paralysis has recently been invented—*acinesis:* loss of power of motion without diminished sensibility is much more frequently met with than the converse, and when the two are coincident the diminution of mobility is generally much greater than that of sensibility. Taking into consideration the compound nature of most of the nervous tracts, it will rather appear surprising that the two conditions should ever be apart, than that they should frequently be found associated in the same individual: and in those exceptional cases in which the nerve-fibres are wholly sensory, or wholly motor, we find that the very same circumstances which in the one lead to anæsthesia, in the other produce muscular palsy. In prosecuting the diagnosis of nervous diseases there would therefore seem to be no

advantage in separating them in a pathological view; and in semeiology, as has been already observed, objective phenomena are generally more certain and conclusive than subjective.

The history of the incursion of paralysis and the symptoms which have preceded its development, give us the first clue to discover the cause on which it depends; but they are also of use in enabling us to determine whether the complaint made by the patient of loss of power or numbness be based on a real alteration of the condition of the parts, or be entirely or partly imaginary; a point which is often very difficult to decide when the paralysis of the nerve is not complete. In real paralysis we shall either find that at one time it has been more perfect than it now is, and that it commenced with a comparatively sudden seizure, or that it has come on gradually and has been slowly increasing: its amount, too, is the same at different times of observation.

This may be best measured by power of resistance; but it is necessary to bear in mind that spasm is sometimes associated with paralysis, and while there is little or no voluntary power, the muscle under the influence of spasm may offer great resistance to movement of the limb by another person. Such an occurrence can only mislead when the observation is very superficial; either one set of muscles only is affected by the spasm —and that for but a short period, the limb under all other circumstances remaining in a powerless condition—or the spasm, if more general, is also more constant. In the one case, the muscular contraction is only noticed when the limb is handled, and seems due to some sort of reflex action; in the other, it is quite as marked a feature as the loss of power, and points to the existence of irritation of nerve-fibre along with the interruption of the ordinary power of transmission.

The duration of the affection sometimes helps us in tracing it back to its cause, as we either note loss of power coming on in

the course of some long illness, or more acute symptoms of any sort supervening on old standing paralysis, or as is more frequently the case we find all the symptoms of disease dating from one common origin. Similarly its mode of incursion, when correctly ascertained, will aid the diagnosis as we find it occurring suddenly in apoplexy, or more slowly in chronic disease; ushered in by a fit or loss of consciousness, or gradually spreading from muscle to muscle; attaining its maximum in a few hours, or advancing from week to week. Occasionally some slight paralysis of long standing is only first observed when febrile disturbance is present; such, for instance, as slight strabismus, of which the patient was quite unconscious. The possibility of error is best avoided by ascertaining whether there be any recent change in function; double vision necessarily attends recent strabismus unless the sight of one eye be lost.

In all forms of incomplete paralysis, whether the patient complain of inability to walk, of imperfect power of the hand and arm, or of mere feelings of numbness, while yet there is no muscle which cannot be brought to act when he is at rest and no resistance offered, we are beset with difficulties, because, on the one hand, the cause of such an affection must be exceedingly obscure, and on the other, its main features may be simulated by hysteria or hypochrondriasis. It is not only during life that this obscurity prevails, but even after death it may be wholly impossible to point out the lesion on which it depended. Were other instances wanting, this fact is clearly proved in what is called the paralysis of the insane.

In such cases we have to seek for other evidence of disease of the brain or nerves, if any such can be traced, in actions which do not come under the power of volition; to study the character of the patient, as it may evince nervousness, hysteria, exalted imagination, unnatural excitement or depression, and to compare one day with another the increase or diminution of symptoms. In hysteria especially, variation is the ordinary rule; consistency, the exception. A patient will fail to show any power of resistance, or will bear pretty severe pinching at one observation, and at the next the symptoms will have undergone a complete change. But it is to be remembered that the different result may be due to the manner in which the investigation has been made. It has happened in my own experience, that one physician pronounced anæsthesia to be complete, while another obtained distinct evidence of sensation; because, by the one, only a transient impression was made, which was not transmitted to the sensorium, while the other maintained the irritation for some time, and at length consciousness of pain became apparent.

Where we have reason to suspect simulation or imaginary ailment, various devices must be had recourse to in abstracting

the attention, in avoiding leading questions, or perhaps putting them in a wrong direction, so as to bring out a want of harmony and consistency in the tale; we must watch the action of those muscles which are less under the control of the will, employed in winking, in speech, and in deglutition: but, besides this, we may learn much from the gait and movements of the patient, as the real paralytic makes vain efforts, which end in partial or complete failure: the "*malade imaginaire*" evidently does not attempt to bring the muscles into play at all; the will is paralysed, and not the instruments which it employs. The test of resistance, which when judiciously applied, generally serves to detect any exaggeration or imposture, is also of great value in discriminating cases in which the practitioner is liable to be misled by a phrase employed by the patient that he has "lost the use of" a limb, when it is only motionless from stiffness or pain of the joint; just as, on the other hand, it may detect the existence of paralysis when the patient speaks of it as rheumatism.

We have no such test to apply in regard to the degree of sensibility, which must rest wholly on the report of the individual; but it is well to remember that it seldom exists without loss of power at the same time. Loss of sensation, when standing alone, except in the case of one or two special nerves, is most probably exaggerated; but, as a sense of numbness or partial insensibility, it may be the first indication of coming paralysis which excites the patient's notice, loss of power being regarded as mere weakness.

The next point is to determine the form and distribution of the affection, because a knowledge of the number of muscles paralysed, and their relations to the nervous system, is the principal element in forming a correct hypothesis regarding the seat and nature of the cause. The value of paralysis as a symptom of disease depends entirely on our acquaintance with the origin and course of the nerves, and on our being able to determine the point at which the interruption to volition occurs, whether by failure of the brain as the organ of mind to receive the power of the will or of the nerve-tubes to transmit that will; and whether the interruption, when affecting its transmission only, can be referred to the tract of a single nerve, or must be traced back to the common exit or origin of several. We recognise in practice three main divisions of paralysis—hemiplegia, affecting one side of the body;

paraplegia, implicating both sides equally, or nearly to the same degree, up to a certain height; and local paralysis, which may be either limited to a group of muscles supplied by one nerve, or one set of nerves, or to single muscles by themselves—in the former the disease is probably seated in the course of the nervous trunk; in the latter, in the muscular structure.

§ 1. *Hemiplegia.*—This form of paralysis is distinguished by its limitation to the muscles on one side of the body: a line corresponding to the axis of the spinal column separates those which can no longer be called into exercise by volition, from those which retain their healthy action. In its most extended sense the one-half of the tongue, the face, the chest, and the abdomen, as well as the arm and leg of the affected side, are all implicated; but such a condition rarely exists. Some of the muscles are more easily affected, some more quickly regain the power of motion; and we seldom see a case in which hemiplegia is complete. It may, therefore, become a question, when certain muscles of one side of the body are paralysed, whether the case should be considered as one of partial hemiplegia or of local paralysis. And this is not a mere question of names; the correctness of the term employed implies a correct judgment regarding the causes of the phenomena observed; because, if we regard it as hemiplegia, we attribute the palsy to a cause acting upon the nervous centres, and thus affecting the nerves derived from them on one side; whereas local paralysis points to a cause affecting only the nerve itself, and having no necessary connexion with the central structures at all; ultimately it may implicate them, primarily it is independent. The answer to the question is, in fact, the diagnosis of the case.

The history divides cases of hemiplegia very naturally into those ushered in by a "fit," and those in which there has been no loss of consciousness. In the former class there is no doubt whatever about the

character of the paralysis: its cause is manifestly central; and so far as observations have hitherto gone, its extent throws no light whatever on the particular portion of the brain involved. Sometimes the progress of the case and the duration of the paralysis are of some assistance in determining the nature of the changes which in the first instance caused the fit.

In the latter class the symptoms may have come on gradually or suddenly; depending, in the one case, on disorganization of the brain, softening, or abscess; in the other, on extravasation of blood, and occasionally on embolism. I am not aware that, in any case, serous effusion has produced paralysis without preceding evidence of inflammation or the occurrence of a fit either distinctly convulsive in character or more nearly resembling apoplexy. When slowly developed, we seek for evidence of previous disease of the brain in headache, earache, dimness of sight in one eye, double vision, ptosis, deafness, or impairment of intellectual power, loss of memory, &c. Occasionally, while such circumstances point to some form of chronic disease of the brain, the paralysis itself comes on rapidly; in other instances this is the only symptom; it begins with partial failure of the power of volition over certain muscles, and gradually increases both in extent and in intensity. When dependent on extravasation of blood the patient has probably been in his usual state of health up to the period of seizure, suddenly he becomes conscious of numbness or loss of power in one of his limbs, and the paralysis soon involves the greater part of that side of the body. Occasionally the occurrence of headache leads to a strong presumption in favour of extravasation; but this is not the rule in such cases.

The diagnosis between hemiplegia and local paralysis—between loss of power depending on changes occurring within the cranium and those affecting the nerve or the muscle—in all cases in which the history fails to point out symptoms directly connected with

the encephalon, must rest entirely upon the distribution of the affection in its relation to the anatomy of the nervous system. If we find that the palsy includes muscles supplied by nerves which have different origins, and have no direct communication with each other at their exit, we may be certain that the disorder is central.

Hemiplegia is very rarely indeed associated with disease of the spinal cord: the space in the canal is so limited, that pressure on one half is sure to affect the other, although, perhaps, in slighter degree; and the two halves are so intimately united, that inflammation of the one never fails also to attack the other; paralysis of one side of the body is therefore always found with a minor degree of the same affection on the other, when the disease is situated in the cord, and the case must be considered as one of paraplegia.

In some instances, hemiplegia may be traced to a tumour within the cranium: its presence may be first shown by the occurrence of local paralysis of one of the cranial nerves, produced simply by pressure on its tract; hence it was said that the cause of local paralysis had no *necessary* connection with the nerve-centres. In such a case the effect of the tumour within the cranium is just the same as it would have been had it pressed on the nerve after it had emerged from the skull. When it has attained some size, it may destroy a portion of the brain in which several nerves take their origin, causing paralysis of each, and then we have a case of partial hemiplegia—no longer one of local paralysis; or it may paralyse several nerves by mere pressure, and though in that case it would in reality be an instance of compound local paralysis, yet we should not be wrong in assigning to it an intra-cranial cause, which is all that diagnosis can assert with any degree of confidence. It does not appear that such tumours can by their mere size produce more general hemiplegia: when this occurs, it almost certainly depends on the coincidence of inflammation, which has led to softening of the brain or effusion of serum. The only possible exception is when the pressure is exerted on a portion of the medulla oblongata, and then paraplegia is the usual if not the invariable result.

By far the most common cause of hemiplegia is extravasation of blood in the hemisphere of the brain opposite to the side of the body affected; but why this event causes in one case both apoplexy and paralysis, in another apoplexy alone, and in a third only hemiplegia, we are not always able to determine. It is to be remembered that while, on the one hand, hemiplegia does not necessarily follow on apoplexy, so, on the other, its continuance

after consciousness is restored must not be taken as proving that the fit has been of the nature of sanguineous apoplexy; because it is sometimes dependent on effusion of serum, when one lateral ventricle is more distended than the other. Extravasation of blood in the brain is so often found associated with disease of the heart and arteries, that, apart from any consideration of causation, the discovery of valvular lesion, or hypertrophy, affords strong presumptive evidence, in cases of hemiplegia, that they belong to this class rather than to serous effusion or chronic disease. In connection with this subject we must again refer to the plugging up of an artery by a mass of fibrine detached from a diseased valve. In most cases the paralysis is produced by disorganisation of brain resulting from imperfect nutrition; but it also appears to be sometimes the immediate effect of the stoppage of the supply of blood, when the symptoms are necessarily more quickly developed than in the other instance; but neither present the character of sudden seizure belonging to extravasation, and in neither is there anything like apoplexy.

§ 2. *Paraplegia.*—Rarely sudden in its incursion except after injury of the spine, it is but seldom dependent on cerebral disease; in both respects it stands in complete contrast to hemiplegia. Just as in hemiplegia, the power of movement is generally more affected than sensibility, but loss of the one seldom exists without partial failure of the other. Its characteristic is that it affects both sides of the body symmetrically, although not necessarily in the same degree. Its history points out its more or less gradual development, the occurrence of some accident or injury to the back, or it may in rare instances afford evidence of disease of the brain. It ought always to be ascertained whether there be any deviation from the normal condition of the bones of the spine, or any point at which a sudden jar or blow causes more pain than elsewhere; we have then to consider how high the condition of paralysis extends.

a. In its most common form, the disease has come on by slow degrees, observed first, perhaps, in one leg, and soon after in the other, and still exhibited to a greater degree in the limb in which it was first

felt, but extending no higher than the loins; it has been preceded by no accident, is accompanied by no distortion, and is entirely without pain. The patient at first only feels some weakness in the knees, and very frequently in walking experiences a sensation as if he were treading on soft wool; the muscular sense is soon lost, and he needs to look at his feet to know where he steps; gradually the paralysis increases, and in the worst case he is at length reduced to such a state that he has no power even to move his limbs in bed except with the assistance of his hands, and yet the upper half of the body is unaffected. This is dependent on a condition of simple atrophy of the lower part of the cord; there is no evidence of inflammation, acute or chronic, during life, no appearance of it after death: nor do the remedies which generally influence the progress of inflammation show any power over this disease.

b. The form occurring next in frequency is that dependent on injury or disease of the spine—fracture or caries of the bone, and ulceration of the intervertebral cartilage. Displacement following on these causes may of itself give rise to paralysis: but in chronic cases it is seldom found unaccompanied by evidence of inflammatory action: we may, therefore, for all practical purposes, include in the same class the paralysis consequent on concussion, which may result at once from the accident, and be perpetuated by inflammation, or may only supervene some time after the injury has been received. Here the diagnosis is generally facilitated by the history of an accident or by the evidence of displacement. But it sometimes happens that the ulceration of the intervertebral cartilage sets up inflammation in the membranes of the cord before displacement occurs; and while the pain on movement, and stiffness of the back, are only supposed to be rheumatic, symptoms more or less distinct of this inflammation are developed, and paralysis speedily follows. In such cases accurate diagnosis

depends upon the correct appreciation of these symptoms, especially with reference to the seat of previous pain and stiffness; but it must be confessed that the knowledge often comes too late to be of much service in practice.

c. Idiopathic inflammation of the cord, of itself, as we have seen, a comparatively rare disease, may give rise to symptoms of paralysis under three distinct conditions: they may be only the evidence of further disintegration, and the immediate approach of death; they may remain for a lengthened period in consequence of chronic thickening after the acute symptoms have passed by; or they may arise without any previous acute symptoms—the inflammation from the first presenting only the characters of a subacute or chronic affection. An exposure to cold, the occurrence of pain in the back, and the comparative suddenness of the attack, point to a condition different from what has been recognised as the consequence of atrophy. The resulting paralysis is paraplegia, but there is very generally a considerable difference in the degree to which the limbs on each side are palsied.

d. The pressure of a tumour on some portion of the cord may also give rise to paraplegia: when occurring in the lower region of the back, with no external evidence of its presence, it is not to be distinguished from cases of atrophy; but when the paralysis has come on gradually, when no history of injury is obtained, and no evidence of distortion exists, when the patient is free from pain, and the upper extremities are partially involved as well as the lower, good ground exists for suspecting the existence of this form of disease; when the breathing is also interfered with, its seat is probably at the base of the brain, and it may be expected soon to prove fatal.

e. Spinal apoplexy is one of the rarest forms of disease of the cord. The symptoms are said to be very much what might have been anticipated from our knowledge of cerebral apoplexy: violent pain in the

region of the effusion, general convulsions, sudden paralysis, which, in place of affecting one side of the body, occupies its lower half to an extent determined by the distance of the effusion from the top of the canal: it is generally unaccompanied by coma, and proves speedily fatal.

In former editions of this work *General Paralysis* as affecting both sides alike, was classed under paraplegia. To this there is the evident objection that brain symptoms are present, and separate it from the class of paralysis dependent on disease of the cord. It has been placed in the next section for the purpose of comparing it with two other affections which present some analogies to it. In *paralysis agitans* there is no loss of volition or sensation, but a spasmodic movement goes on which is more or less beyond the control of the will. It is consequently now classed with functional disorders of the nervous system.

§ 3. *Progressive Paralysis.*—We may conveniently consider together under this general heading the three disorders known as *Paralysis of the Insane*, *Locomotor Ataxy*, and *Progressive Muscular Atrophy*.

General paralysis is the only form of the disease affecting both sides of the body which has its seat in the brain: seldom complete until towards its close, it is marked by a general loss of muscular power, an occasional difficulty in articulation, a tripping over or stuttering and slurring certain words, as in the early stages of intoxication. It is seen in its most typical form in the *paralysis of the insane*, where, along with the gradual abolition of the muscular power, there is a corresponding gradual loss of mental consciousness, ending in perfect fatuity; it is usually preceded by symptoms of alienation of mind having more or less the character of exaltation of ideas: the patient imagines that he has acquired an enormous fortune; or the quiet, steady man of business becomes suddenly

gay and extravagant; the delusions seem always to have the character of happiness and contentment.

Pathological anatomy is not yet sufficiently advanced to point out in all such cases what are the actual changes in structure on which the disease depends, the brain being found in very various states after death.

The same name may be given to cases in which paralysis exists with no accompaniment of insanity, and it is yet quite impossible to predict the actual lesion that will be discovered. The consistency of the affection, its extension to one or other or both of the upper, as well as the lower extremities, makes it probable that the seat of disease is above the spinal column; and, having satisfied ourselves that the vertebræ of the neck are free from disease or distortion, our next step is to analyse with care the condition of the cranial nerves; deafness, unequal action of the the pupils, strabismus, &c., are to be taken as evidence of disease in the cranium. It is worthy of remark, that, while these nerves are affected only on one side, and one arm is perhaps decidedly weaker than the other, the legs are usually equally paralysed. Spasmodic contraction is sometimes also present and affords strong confirmatory evidence of organic disease of brain.

In *locomotor ataxy*, the paralysis presents the same character of affecting all voluntary movements more or less; it is a form of general paralysis, but it is less characterised by actual loss of power than by inability to perform combined muscular acts. It is the power of co-ordination rather than the power of contraction that is influenced by the disease. It is not always easy to determine the true nature of such a case. The patient complains of difficulty in walking and some imperfection in the use of his arms. He is apt to drop small articles, and yet he can grasp pretty firmly; his gait is unsteady, but he plants his feet with a good deal of force. It will be observed that

he keeps his eyes fixed on his feet as he walks, and that he cannot avoid falling if he cease to do so. The same thing will be noticed in a paraplegic patient; but there is a difference to be traced if sought for. The one does so because he cannot complete a combined movement without the aid of his eyes, while in the other the eye is only used to supplement the deficient sensation and impaired muscular sense which make it impossible for him to know where he has placed his foot after the movement has been effected.

Progressive muscular atrophy leads to paralysis as certainly as loss of nervous influence. It would seem to be quite independent of nerve, and to be simply a degeneration of muscle. This is most important in diagnosis. The muscles may be affected in groups, but they are not necessarily those supplied by the same nerve or the same set of nerves. And while, on the one hand, it is clear that the disease is not dependent on change in any of the nerve-centres, the case is distinctly neither hemiplegia nor paraplegia; yet, on the other hand, it will be observed that far too many muscles are implicated for us to suspect that the paralysis is merely local and dependent on disease of nerve. It would be unreasonable to assume that so many different nerves were simultaneously affected, while the immunity of others negatives the idea of a central origin of the affection. In the early stage such cases are very apt to be mistaken for local paralysis.

Progressive paralysis is in its progress generally very slow, and the failure in muscular power may vary greatly in intensity in different parts of the body, being generally most complete where its existence was first recognised. In the paralysis of the insane, the defect in speech is generally that which is first observed; in other cases this is not so, but its existence is always very important in diagnosis. The absence of any other indication of disease besides loss

of power, in some instances, has led to their being mistaken for cases of hysteria or hypochondriasis.

§ 4. *Local Paralysis.*—It has been already explained, in speaking of hemiplegia, that this appellation is, in strictness, confined to cases of paralysis not having a central origin. When its cause is nervous, the affection of the nerve is located somewhere after it has emerged from the cerebro-spinal axis. Due regard to the extent and special distribution of the affection, and knowledge of the anatomy of the nervous system form the groundwork for the diagnosis of local paralysis; it is limited to the organs which some particular nerve supplies. The cranial nerves, issuing singly from the brain, afford the most frequent examples; thus we have amaurosis, ptosis of one eyelid, anæsthesia, or palsy of one side of the face, &c. In all such cases we have to assure ourselves well that no other cranial nerve is similarly affected, because, when more than one is implicated, there is good ground for believing not only that the lesion is within the cranium, but that it probably also involves the brain itself. In the case of the fifth and seventh pairs, where contiguity or admixture of fibres of different kinds exists, the relations of paralysis of sensation and motion are sometimes such, that we can define the exact portion of the nerve in which the disease is seated. Ambiguity is, to a certain extent, in many instances unavoidable; because while some very slight disease within the cranium may produce local paralysis and nothing more, it is yet equally true that this form of palsy may be the first manifestation of serious disorganization.

Pressure of a tumour on the brachial plexus, or upon the crural nerve, may give rise to symptoms of palsy and anæsthesia more or less complete in the limbs to which they are distributed: a not unfrequent instance of this condition is the numbness of the legs during pregnancy.

Some forms of local paralysis are more directly connected with the muscular structure than with the nerve by which it is supplied. This condition is met with—especially affecting the extensors of the forearm—in *lead palsy*, but also involving to a less degree the flexors. The colic which usually precedes the affection of the forearm, is probably caused by corresponding paralysis of the muscular coat of the intestines.

Drop-wrist is also occasionally met with in over-worked, half-starved tailors and needlewomen, and over-worked clerks, without colic, without blue-line, or any evidence of lead-poison, and would seem to be produced by the forced and long-continued action of ill-nourished muscles. It is sometimes called *scriveners' palsy*. Similarly, an over-strain of muscle, on perhaps only one occasion, is sometimes followed by loss of power. Paralysis of the bladder from distension affords a ready example.

The history of the case, as has been already remarked, serves to exclude instances in which local paralysis is the last remnant of a more general affection, or the only effect of an apoplectic attack; these evidently belong to hemiplegia. In other cases it points out, when the disease has come on suddenly, what has been the exciting cause; or it indicates, by the slow supervention of the affection, that it is due to some condition of long standing. Such, for example, is the history of colic.

Local paralysis is not generally a disease of grave import: it is much more so when the cranial nerves are the seat of the affection than when spinal nerves only are implicated; and among these considerable differences exist. *Facial paralysis*, coming on after exposure to cold, is one of the least important. Amaurosis is a very distressing disease to the patient; but ptosis is a symptom of much more serious consequence in the mind of the physician. Strabismus in childhood, after eclampsia, is common, and not of much

consequence, while in the adult its presence is of evil augury, when of recent occurrence. But, as before remarked, the coexistence of affection of two distinct nerves (*e. g.* facial palsy with strabismus) gives most cause for serious apprehension; or, the concurrence of any of them singly with symptoms, however obscure, which can be traced in any way to disease of the brain.

Loss of power is more definite in its indications than loss of sensation, inasmuch as the one is an objective, the other a subjective phenomenon; but yet even loss of power may, to a certain extent, be exaggerated, if not wholly simulated, in incomplete paralysis, by the imaginings of the patient; and such cases are always more difficult of diagnosis than when the power of motion is entirely lost. Patients often speak of numbness when they do not mean anæsthesia at all; there is no loss of feeling, but perhaps a sensation of tingling, or formication, to which the name is applied. Such cases are rather to be regarded as an indistinct form of neuralgia, than as local paralysis.

The bearing of diagnosis on treatment in all cases of local paralysis, may be summed up in the discovery of its cause, whether that be revealed by the history of the case, or can be gathered from a knowledge of the portion of the nerve which is the seat of lesion, and a consideration of the structures immediately surrounding it, in so far as they may interfere with the transmission of volition and sensation through the nerve fibre.

It is not the place here to refer to other specific forms of paralysis. None, perhaps, is more remarkable than diphtheritic paralysis, which has been already alluded to as one of the occasional results of the disorder to which it owes its name.

CHAPTER XVII.

FUNCTIONAL DISEASES OF THE NERVOUS SYSTEM.

Meaning of the Term—§ 1. *Tetanus and Hydrophobia—Varieties of Tetanus—Characters of Spasm*—§ 2. *Epilepsy and Convulsions — Convulsions of Childhood—Epileptic Vertigo—Cramps—Laryngismus Stridulus*—§ 3. *Chorea, Shaking Palsy, and Mercurial Tremor—Characters of Chorea—its Simulation—Progress of Shaking Palsy—Mercurial Tremor a Form of Chronic Poisoning*—§ 4. *Delirium Tremens—Causes and Characters*—§ 5. *Hysteria, Catalepsy, and Syncope — Fainting Fit—Trance—Hysterical Exaggeration and Simulation—Globus Hystericus—Fit*—§ 6. *Neuralgia—its Anatomical Distribution—Meaning of Pain—Causes of Local Pain—Sympathetic Pain—Facial Neuralgia—Hemicrania—Sciatica—Spinal Irritation*—§ 7. *Hypochondriasis—Distinguished from Insanity.*

The functional diseases of the nervous system include a great variety of affections which have no common origin or association, and are only placed together under this common heading, because in each, whatever lesion may occasionally or constantly be met with, it is still impossible to associate the phenomena of disease with any definite alteration of brain or nerve tissue. Even when the original cause of disturbance is known the link which associates it with the symptoms resulting from it, through the medium of the nervous system, is yet wanting. For the purpose of diagnosis I have thought it desirable to throw into groups such of them as present features somewhat analogous: and it will be observed

that in many of them the recognition of the disease rests almost on a single phenomenon. There will always be room for the exercise of skill and judgment in tracing out the indication in obscure cases, and still more in framing a conjecture as to the cause of the malady, and the relation in which they stand to each other. In ordinary cases one observation may be sufficient to pronounce unhesitatingly on the nature of the case. This is especially true of the convulsive and spasmodic affections which are essentially characterised by muscular movement, not only involuntary but uncontrollable. If we take tetanus and chorea as prominent examples of this class, we shall find that there is scarcely any other indication present, none other pointing to the nervous system. It may be associated with a variety of other symptoms, corresponding to different conditions of internal organs; but the muscular movement stands by itself as the sole indication by which the disease is recognised. Here diagnosis has but little to do. The element of the disease is quite unknown to us, and hence it is to the prominent symptoms alone that we have as yet to look for the discrimination of each; to this symptom the name of the disease is applied, and by this is it characterised.

The movements of chorea once seen can never be forgotten or mistaken; nor can the fearful spasms of tetanus be taken for anything else. It is true that in severe lesions of the brain, when the patient is in a state of stupor, or of delirium, convulsive movements may be seen in some cases, spasm of muscles in others; but no one who has seen the diseases can ever mistake them for chorea or tetanus.

§ 1. *Tetanus and Hydrophobia.*—Tetanus is usually preceded by some wound or injury, and especially by such as give rise to tearing of the nervous and fibrous tissues. The history of the case is, therefore, of great importance as indicating the origin of the spasm.

In some instances we fail to trace any traumatic origin, and then the very important question arises, whether there may be any chance of strychnia poisoning. The full answer to this question belongs to the province of Forensic Medicine. But it may be observed that in true tetanus the first sense of illness is a stiffness and contraction of the muscles of the jaw—*trismus*, or lock-jaw: gradually spasm also affects the muscles of the back and *opisthotanus* results, the hands and feet are less liable to spasmodic contraction than the trunk. In rare cases the action is somewhat irregular and *emprosthotanus* or *pleurosthotanus* may be seen. This rigidity of the muscles continues for some time before relaxation occurs, which is again followed by spasm after a short interval. Such alternations continue for some hours in the worst cases, and may go on for days in cases of recovery. In poisoning, on the other hand, the seizure is sudden, affecting the trunk and limbs simultaneously, every muscle being thrown into a state of rigidity for a few minutes, the hands contracted, the toes incurvated, and opisthotanus being produced simply by the greater power of the dorsal than the abdominal muscles. The paroxysm is of very short duration, but occurs again and again with the same or even greater violence, and speedily proves fatal. The nervous system is in such a state that the slightest jar will bring on the spasm when the patient is quiescent, a similar condition to that which is seen in minor degree when an excessive medicinal dose of strychnia has been taken, and the spasmodic action is only excited by some external agency, such for example as bringing the foot into contact with the ground in attempting to walk.

Hydrophobia is brought into relation with tetanus by the muscular spasm which attends its course and is due to a peculiar excitability or erethism of the nervous system seen only in this disease. Commencing in an involuntary contraction of the muscles

concerned in deglutition when an attempt is made to swallow fluids, this condition of excitability becomes so marked that the sight or sound of liquid at once provokes spasmodic action, and the body may be thrown into a sort of tetanic spasm by a draught of cold air passing across the surface. The disease can scarcely be misunderstood by any one who has seen it, and it is only in rare cases of mental derangement that anything approaching to it has ever been observed.

It seems scarcely necessary to point out the difference between the form of spasm by which the muscles are affected in these diseases, and that which attends convulsion or chorea. In each the muscular movement is the prominent expression of the condition of the nervous system, but in no two of them is the character of that movement alike—sustained and simultaneous in tetanus, moving from muscle to muscle more or less rapidly and irregularly in epilepsy, short, jerking, and incongruous in chorea. The terms clonic and tonic spasm have been invented to mark this distinction in broad outline. Their meaning is, however, apt to be misunderstood, and no advantage attends their employment. We must not forget in all spasmodic affections the possibility of their simulation by hysteria, but this is less likely to occur in tetanus or hydrophobia than in any others of the class.

§ 2. *Epilepsy and Convulsions.*—The term epilepsy is unfortunately somewhat indefinite in its application, because while on the one hand it is used to denominate a specific disease which has no analogue in, and receives no explanation from, any of the disorders of function to which the brain is liable, yet on the other hand it is applied more or less indefinitely to any sudden seizure which is marked by convulsions and loss of consciousness.

The grand distinction between epilepsy and convulsion consists, not in any peculiarity in the seizure, but in the context of symptoms. It resolves itself into the question, is there any disease present in any organ in the course of which convulsions may and do occur? On this question being answered in the nega-

tive depends the diagnosis of true epilepsy, imperfect as it must be confessed that such a distinction is. The point is quite unconnected with its curability: the prevailing theory at present is that the seizure consists in an excess of irritability and over-excitement of the nervous centres: in curable cases certain concomitant conditions are regarded as sources of irritation, and these being removed, and the tone of the nerve-fibre itself restored, the disease ceases. The question proposed is, not whether there be any such circumstance which determines the attack, but whether disease be present, which either by being seated in the brain itself, or by establishing a certain blood-crasis, tends directly to produce convulsions during its continuance. The most notable examples are inflammations of the cerebro-spinal axis, puerperal states, and albuminuria, or more properly, perhaps, uræmia. In true epilepsy we fail to detect any such conditions during life, and although we do find, in certain cases after death, something within the cranium which may have acted as a permanent cause of irritation, its mode of action is unknown, its symptoms are limited to the simple expression of irritability in the epileptic seizure.

The convulsions of childhood may be said to form a class by themselves: more nearly allied to epilepsy than to the secondary convulsions of adults, they seem to depend on a species of excitability which is probably owing to the disproportionate development of the brain of infancy; as in epilepsy, too, the sources of irritation are various: with the exception of those connected with inflammation, they do not lie within the cranium: but while one child never shows the slightest tendency to convulsion, another suffers repeated attacks from all the accidents of infancy; teething, worms, intestinal disorder, or mere exposure. Still they are not to be called epilepsy, except they return periodically, without the presence of the exciting cause; that in some children repeated con-

vulsions terminate in confirmed epilepsy is too true, but in by far the greater number, fortunately, no such lamentable occurrence results.

One great element in epilepsy is its periodicity, whether regular or irregular; but the first recurrence may be at so long an interval that the patient is lost sight of before a second fit occurs, and our diagnosis cannot wait for such an event for its confirmation. Its importance is such, however, that in all convulsive attacks it is desirable to ascertain from friends, or from the patient himself, as soon as consciousness is restored, whether he have ever been at all similarly afflicted.

The severity and duration of the attack vary very greatly, from a transient loss of consciousness with the slightest possible muscular spasm, to the most violent and horrible convulsions. In the former case the patient is arrested for a moment or two in his usual avocation, retains his position without falling, whether standing or sitting, and proceeds with his work as if nothing had happened. In the latter the mind remains confused when consciousness is restored, and the patient soon falls asleep to wake up generally in a short time, stiff, or sore, or bruised, and perhaps complaining of headache, but not otherwise feeling ill. This confusion of mind and tendency to sleep is in rare instances prolonged for some days, the patient remaining, as has been already pointed out, in a semicomatose state.

The diagnosis between true epilepsy and convulsions arising from other causes is not to be regarded as a matter of merely curious investigation, for upon its just appreciation depends the correct treatment of the case. I may cite an example in which the first epileptiform seizure was accompanied by some delirium which differed materially from the mere confusion of epilepsy; but the whole disorder seemed so transient, that its peculiarities were attributed to manifest bad management in the commencement of the attack; and with some misgiving it was regarded as epilepsy. The patient was dismissed as having recovered; but the next attack was distinctly one of serous apoplexy, at an interval, indeed, of nearly two years. After death there was

found immense dilatation of one of the lateral ventricles. I cannot doubt that in this case a condition of chronic inflammation had existed throughout, and that judicious treatment might possibly have prevented the fatal termination.

An epileptic seizure may be either feigned for the purposes of deception, or simulated by the hysterical paroxysm. One grand source of distinction in such cases is the circumstance of no corporeal injury being inflicted during the attack: not that this necessarily happens in true epilepsy; but while, on the one hand, a bitten and bleeding tongue or a bruised face may be taken as conclusive evidence of genuine convulsion, its avoidance in circumstances which might naturally have given rise to it, leads to the suspicion that consciousness has not been entirely lost. The determination of its nature, indeed, turns mainly on the existence of consciousness, and various methods must sometimes be had recourse to for the purpose of ascertaining it. There is generally, too, a certain method and regularity in those movements which are either partially or wholly voluntary; and in the case of hysterical females, other characteristics may be observed from which the existence of hysteria may be predicated, and the consequent probability that the seizure is only part of the same disorder. But this demands experience and attention rather than book-learning.

Certain points must not be omitted in the investigation of convulsive attacks which are not immediately connected with diagnosis. In a first seizure, it has been shown how necessary is the inquiry into the condition of other organs; but it is no less so even in cases where periodicity is clearly established. The possibility of success in the treatment of all such disorders depends upon the correctness of this information, and in proportion to its accuracy will their management be removed from the realm of empiricism, and come under the domain of legitimate medicine. Not only do the physical condition of the cranium and all the relations of the brain to sensation, motion, and the intellectual faculties, demand particular study; but respiration, circulation, digestion, and elimination, have each been proved to have their influence, if not as causes of the disease, yet as special sources of irritation, and therefore must each be individually inquired into; and if last, not least, the reproductive organs, in their changes from disease to health, from imperfection to maturity, exercise a most unquestionable influence over its amelioration and its cure.

The term *epileptic vertigo* is now substituted for that of "petit mal," by which the mildest and most transient of epileptic attacks used to be known.

Spasm of *muscle*, in its most common form of cramp,

is especially prone to attack the large muscles of the lower extremity. It seems to be in great measure due to imperfect circulation, and hence is a constant attendant on the collapse of cholera, when the circulation is almost at a stand-still. By some angina pectoris is supposed to be spasm of the heart's muscular walls. We are taught, too, to regard true asthma as spasm of the small muscles surrounding the bronchial tubes. In whooping cough and in *laryngismus stridulus* there is not less clearly spasm of the muscles closing the glottis. In all these cases the affection depends on the state of the nervous system, but it will be more convenient to consider them among local diseases of organs than under the head of nervous system.

§ 3. *Chorea, Shaking Palsy, and Mercurial Tremor.* —The main character of these three disorders is a shaking or jerking movement of the muscles due to imperfect innervation; but there are remarkable differences among them, both with reference to the manner in which the movement takes place and the causes which excite it. In chorea the disease usually commences in a fright or some other sudden shock to the nervous system, but is occasionally also due to gastric irritation, and is in some instances associated with the rheumatic diathesis. In the mildest forms of the affection nothing more is observed than a degree of ungainliness in the ordinary movements of the body unusual to the individual; when the disease has made further progress each voluntary movement is attended by an incontrollable jerking action of the muscles, which alters its character and sometimes renders the act impossible: in its most severe forms a constant jactitation of all the limbs which does not leave the patient a moment's rest by day, and is occasionally prolonged through the night, leaves no room for doubt as to the nature of the affection. In such cases the expression of the features is so distorted as to be almost maniacal, the patient becomes exhausted from

constant restlessness, insomnia, and inability to take food, and the case may terminate in delirium, coma, death. It is remarkable that while in the earlier stages of its progress voluntary motion is essential to the development of the spasmodic action, in its more developed form the jerking movements become continuous and unceasing, and require no such exciting cause. In the milder cases, again, it is usual to observe that certain limbs or muscles are much less under the control of the will than others.

The simulation of chorea is one of the very common expressions of a hysterical tendency. As might be supposed the imitation is a very imperfect one. The movement is usually restricted to one limb, where it is unceasing so long as the patient's attention is directed to it. Attempted movement plays no part in exciting the irregular jerks of the muscular system, and these are much more methodical and harmonious than is ever seen in the real disease.

The association of valvular disease of the heart, which is not unfrequently met with, may probably be traced to the relation which they each bear to rheumatism. It was at one time believed that the irregular action of muscle might prevent the closure of the mitral valve, and give rise to a murmur of regurgitation. Such a theory is quite untenable, nor less so as it appears to me is the belief that somehow or other functional murmur is produced by chorea. In my own experience all murmurs have been resolved into those due to valvular lesion, and those dependent on blood-change.

Shaking palsy differs in many respects from chorea, although here too there is involuntary movement of muscles subjected to the volition of the brain. The one is essentially a disease of childhood, and is rarely seen after puberty, the other belongs to adult life or rather to old age. In chorea the exercise of volition is that which, in the first instance at least, excites the involuntary movement, whereas in shaking palsy a voluntary effort which calls the affected muscles into play will arrest their abnormal action. It is in sustained muscular action, which is barely volitional and not in active movement, that the shaking is seen. The head and the arms are consequently the localities in

which the disease first shows itself, and in its milder forms a position of perfect rest will, by relieving muscular strain, put a stop to the action as completely as forced movement.

The disease sometimes begins early and lasts through life as a consequence of convulsions in infancy. Still there is no evidence of actual disease of brain, the intellectual faculties are not impaired, there is no paralysis properly so called, the cranial nerves are not implicated, and there is no anæsthesia. It is simply a disturbance of the relation between nervous influence and muscular movement.

In mercurial tumour, again, voluntary effort is essential to the development of the leading feature of the disease. When perfectly still there is no tremor. It differs from chorea, however, in this respect, that as soon as an attempt at movement is made the tremor becomes general and is not confined to the muscles actually called into play. In this respect there is a slight analogy to a very mild case of strychnia poisoning, but there should be no practical difficulty in distinguishing between the spasm of the one and the trembling of the other disease. It is a form of chronic poisoning produced apparently only in those exposed to the fumes of mercurial vapour, and not in cases in which the mercury has been introduced into the system by other channels. If not arrested the disease ends in delirium, convulsions and coma.

§ 4. *Delirium Tremens.*—A disease in which phenomena, not unlike those seen in the last section, are combined with symptoms more directly traceable to disturbance of brain. It is a *delirium cum tremore.* Its history shows that it is something more than mere disorder of the nervous centres. Dependent as it is on habits of dissipation its actual presence seems to be due to perverted nutrition of the brain consequent on the circulation through its mass of impure blood, unsuited to develope healthy functions. And while

the delirium points at once to the brain, the accompanying tremor must be regarded in diagnosis as its most essential characteristic, which every act of the patient betrays: the hand cannot be held still; but there is neither the jactitation of chorea, nor the regular shake of paralysis agitans; the tongue quivers when protruded; and these movements differ from the ordinary tremulousness of pure nervous debility, in the rapidity and excitement with which each act is performed. The patient sits down and gets up in a hurry, he raises himself in bed with a spring, he turns suddenly round to the person who addresses him, he thrusts forward his hand for the pulse to be felt, and he puts out his tongue with the same quick unsteady movement, when directed to do so.

All this may occur before any delirium has shown itself. From the patient himself, or his friends, it will be learned that he has either lately had a drinking bout, or that, being an habitual drunkard, he has been, under circumstances of privation, debarred from his accustomed stimulus; perhaps, that there has been some mental anxiety, and along with this, his last few nights have been sleepless. He will say that he has been long ailing, that his present state has been supervening for weeks or months, and will often be exceedingly shy of telling that there has been any recent aggravation of his symptoms, or that they have, as we may be well assured from other sources, all come on within a few days: this appears to arise from a consciousness of the real cause of the malady, which he vainly fancies he may conceal; but it is worthy of noting, because it might lead to a mistaken diagnosis.

The pulse is soft, often large, sometimes weak and quick. The tongue is evenly coated with a moist creamy fur. The skin is warm, frequently perspiring; but in the early stage it may be dry, and often exhaling somewhat of a rheumatic odour; it has never the heat and pungency of fever. In former days, when dilirium was regarded as evidence of inflammation, depletion was

no less had recourse to in this than in the delirium of typhus fever, or of mania: but in this practice essential symptoms were evidently overlooked—that of the soft pulse and the moist tongue; and just as in attempting to form a correct diagnosis, so for the purpose of adopting sound treatment, the totality of symptoms must be considered in place of the mind being fixed on one which is remarkably prominent.

§ 5. *Hysteria, Catalepsy, and Syncope.*—There can be no question that catalepsy, if not merely one form of hysteria, is closely related to it; and it would appear that the nervous excitability which gives rise to the more ordinary symptoms of hysteria, predisposes to syncope,—although, under circumstances of great excitement, a person of ordinary nerve may faint away. There is generally no difficulty whatever in recognising the still and unconscious figure, the white face and blanched lips of one who has fainted. There is no spasm, no power of resistance, no struggle, all the muscles are perfectly relaxed, till the blood once more begins to flow through the brain.

A few simple questions addressed to the bystanders will generally elicit a correct description of the "fit" when it has occurred in the absence of the medical attendant. The circumstance of its occurrence in some hot overcrowded public assembly, or after seeing some painful or disagreeable sight, or hearing some tale of horror, also serve to aid the diagnosis.

In catalepsy we rely for diagnosis on the state of prolonged unconsciousness, which has not been ushered in by distinct convulsions, is not accompanied by paralysis, does not depend upon disturbance of the circulation, but presents to our observation a very rare form of unconscious volition. I have applied the same term to the combined movements seen in concussion of the brain, when the patient covers himself up in the bed-clothes, and yet cannot exercise any of the mental faculties. Here the condition is different,

though analogous. A cataleptic will call one or more muscles into play together, not for the purpose of producing movement, but to maintain the position in which the body happens at the time to be placed.

It has been alleged that the limbs will always be maintained in the posture given to them, however fatiguing or difficult it might be to do so in any other state than that of trance. This is not absolutely true of the majority of cases. The great fact is that the muscles are not relaxed as they are in paralysis, coma, or syncope; the arm raised from the side does not drop like a lifeless thing, but either the elevation given to it will be maintained for a longer or shorter time or it gradually resumes its former posture, or some other position of comparative rest.

Hysteria is a much more important disease. The distinction which we have attempted to draw between objective and subjective phenomena derives its fullest illustration from this protean malady. Here the sensations of pain and uneasiness are out of all due proportion to the derangement of function and of nutrition; the feelings of the patient are the all-absorbing idea in her mind, and so completely do they take possession of her faculties, of her very nature, that vital functions over which she has really no voluntary control, are swayed by the force which these feelings exercise when they become concentrated on any particular organ. Although most fully developed in the female sex, and originally deriving its name from a supposed excitement of the female generative organs, an analogous disease is not unfrequently seen in men exhausted from any debilitating cause, or effeminate from over-care and nursing of themselves; extreme nervousness is the only term in common use to express such a state. There is no exact line of demarcation between this condition and one in which, the attention becoming fixed on some particular organ, sensations are supposed to arise there, of the non-existence of which we are satisfied by collateral evi-

dence of their absurdity or impossibility: to this the name of hypochondriasis has been applied; it merges into insanity.

The question of diagnosis then simply takes the form of an inquiry into the reality and importance of the complaints of the patient. When these stand alone, or are out of due proportion to other evidence of disease, we conclude that they are exaggerated if not unreal; and when their intensity, as described in language, is not borne out by the actual effect upon the individual, we conclude that they are unimportant. The following remarks will apply to either sex, although especial reference must be had to the female in discussing the subject of hysteria. There is usually such a constant simulation of other diseases, that it is impossible to draw any general picture of it which would apply to every case, the only feature which they have in common being the negative one of the absence of some important indication which is absolutely essential to the existence of the reality which is imitated by it: the function which ought to be deranged is unchanged; the sign or the symptom which ought to be found is wanting; or we may even obtain direct evidence that the organ which is supposed to be the seat of disease is in a perfectly natural and normal condition, except that it is the point on which those morbid sympathies are concentrated.

It has been already pointed out, how impossible it is to form any standard of comparison by which to measure expressions of pain. Other sensations admit of more analysis, and generally have a more definite range. Thus a sensation of numbness may be analysed into actual deficiency of sensitive power, or into mere tingling, which produces a relative feeling of insensibility; a sensation of weight, whether in the head or at the epigastrium, is an explicit statement of what we can understand, and what we can generally refer to some co-existing morbid state. Of pain generally it is most important to remember that it does not

imply inflammation: too frequently these words are regarded as almost synonymous, and complaint of severe pain calls forth all the energies of antiphlogistic treatment: it is in reality nothing more than an expression of irritation of some nerve, and the cause of that irritation is to be sought for. Practically we have to remember that the ultimate filaments of the nerves are distributed to various organs, and that every abnormal condition of the organ may give rise to sensations of pain. Thus, no doubt, in persons of weakly frame, muscular effort, which is painless in the robust, is a cause of more or less permanent aching; and errors in diagnosis can only be avoided by searching out the site as well as the cause of irritation.

The history often throws great light upon the nature of the case. Disorder of the uterine functions often, very often, acts upon the imagination of the patient, leading her to pay attention to and exaggerate slight uneasy sensations. Long ailment without material loss of flesh, proves that the sensations are not indicative of serious disease. The commencement of the present attack has not been ushered in by the usual accompaniments of an acute or febrile disorder; in place of rigor or flushing, there has perhaps been a fainting fit, or an hysterical paroxysm, and the whole relation of symptoms betrays more or less of inconsistency ineir th sequence and their supposed causes and effects.

At the time of examination the pulse may be either quiet or temporarily excited and quick, without heat or dryness of skin; it is not hard or wiry, it is not firm, nor is it often full, but generally weak, and varying with the least excitement. If the face be flushed, it is out of proportion to the condition of the rest ot the skin. The tongue may be evenly coated, with projecting red papillæ; but there is no red edge, no thick brown streak in the centre, nor any patchy abrasion of epithelium; it is not dry, nor is there

accompanying thirst. The urine is pale, limpid, and copious; the bowels not altered from their usual state. There is no marked emaciation; there is no pinching nor anxiety of features; sometimes a marked readiness to tears, or alternation from smiles to frowns.

There is often alleged loss of power, in one or both legs, or in one arm. The best evidence of the reality of this state is obtained by rather rough handling, which will always bring out resistance; but it must be remembered that real loss of power is sometimes associated with spasm or reflex action, and to complete the evidence the limb should be placed in a constrained position, while the attention of the patient is strongly directed to some other organ. If the mind be thoroughly pre-occupied, it will be supported for a moment or two by voluntary effort.

On examining the region to which pain is referred, we very generally find extreme tenderness. The slightest touch is represented as very painful, much more so than anything short of the most intense cutaneous inflammation could account for; it is diffused over a large surface, and is not local or limited; and if the attention can be abstracted, very firm pressure is borne without apparent increase of suffering. Very good evidence of this fact may be obtained by varying the tactile manipulation with one hand and directing the patient's attention to that, while firm pressure is made with the other, or by referring to the condition of the uterine or any other functions in which the patient feels especially interested. A distinction must be made between this morbid sensibility of hysteria and that which is felt in superficial rheumatism, or after muscular exertion. In such circumstances the tenderness which is really felt on a very slight touch is relieved by firm pressure; but to elicit this fact requires no abstraction of the patient's attention: whereas the hysterical tenderness here spoken of disappears and reappears without reference to the

mode of examination, simply as the attention happens to be directed to the spot.

In females the *globus hystericus*, or rising in the throat, or the occurrence of a regular hysterical paroxysm, often materially aids the diagnosis. But all the ordinary evidences of hysteria must not cause us to forget the possible coexistence of some severe ailment in such a constitution, and this so much the more that the very exaggeration of the symptoms may lead us to doubt the existence of actual disease in its early stage, because practical experience teaches us that it is not then necessarily associated with such symptoms. It is often a very nice point to determine what is due to imagination—perhaps associated with perverted volition,—what is simply due to exaggeration, and what there is of real disease in the condition of the patient; and this can only be done by carefully weighing the relation of disordered sensations, of perverted functions, and of abnormal or normal physical signs in each organ in succession.

As the more frequent forms of hysteria are mere simulations of severe disease, so a regular hysterical paroxysm is, after its fashion, a simulation of epilepsy. The limbs are tossed about with the same violence, but more of method may be detected in the hysterical, more of regularity in the epileptic convulsions. The patient in epilepsy bites his tongue severely, hurts or wounds himself in falling; the hysterical female never seriously injures herself, and is only bruised by the energy of her movements during the paroxysm. The expression of the features is often horribly distorted in epilepsy; is generally placid in hysteria, with a quivering tremulous movement of the closed eyelids. The epileptic fit ends in deep slumber, the hysterical paroxysm often in tears: in the one consciousness is suspended, in the other it is not so, except when fainting occurs; but of this it is sometimes extremely difficult to feel quite certain.

§ 6. *Neuralgia.*—This term is one which only serves to remind us of the limited range of our knowledge: had we attained to a perfect pathology, it would find no place in a systematic classification of disease, except as a symptom. In itself a mere sensation dependent on a variety of causes, we are yet forced very often to rest satisfied with the knowledge of its existence, without being able to trace it backward to its true source in the causality of disease; and at the same time its very vagueness too often serves as a cloak for ignorance, or furnishes a ground for deception. It is exposed to all the difficulties in investigation which are inseparable from merely subjective phenomena, and there are few indications by which we can correct an opinion we are driven to form merely upon the patient's own statement. Even when convinced that there is no exaggeration or deception, we are still so ignorant of the changes in nerve structure, that when able to prove by post-mortem evidence that there has been no traceable cause for the pain, we must rest on the fact that it has been felt, and in the expression of it as neuralgia.

One point is perhaps not sufficiently attended to in the employment of the term, that while in truth all pain is perceived by the nerves, and in that sense is seated in the nerve, yet all pain ought not to be called neuralgia. The true distinction between the two is that in the one instance the sensation is produced by some irritation acting locally on the terminal filaments of the nerves which are the normal recipients of pain, while in the other it is caused by something affecting the trunk of the nerve,—that bundle of fibres, large or small, lying within the neurilemma, which in a state of health does not receive but transmit the sensation: consequently, neuralgia properly so called affects all the sensitive branches uniting to form the trunk on which the irritation acts, and pain is felt sometimes distinctly to the terminal filaments, sometimes vaguely in the course of the ramifying fibres. As in paralysis,

a knowledge of the parts over which pain is distributed, and of the anatomical relations of the nerves, will best assist us in distinguishing between neuralgia and local pain. When two distinct parts of the body, having no nervous communication with each other, are both the seat of pain, the presumption is very strong that they are not simultaneously affected with neuralgia; when all the structures supplied by one nerve are painful, it is highly improbable that each should be influenced by a local cause; when one form of structure only is affected, we are led to suspect that there must be some change in that to account for the suffering, rather than an affection of the nerve: these rules are well exemplified in the diagnosis between rheumatism and neuralgia.

At the risk of repetition, I must again remark, that if there be a distinction between pain and neuralgia, it is still greater between all sorts of pain and inflammation. Pain is the expression of irritation of nerve matter, and nothing more: in different individuals it has a very different signification; some are intolerant of pain, and generally use big-sounding words to express it—it is terrible, dreadful, intense—when, in reality, there is little derangement; some are callous and indifferent, and will scarcely admit that they suffer pain, when such disorder is present as can scarcely exist without it. Perhaps the best criterion of the reality and amount of pain experienced by the patient, is when it produces an expression of anxiety and pinching of the features.

It may be stated generally that pain accompanying inflammatory action is less noticed by the patient than that attending nervous disorders, whether functional or neuralgic. The pain of inflammation is described as acute, darting, or stabbing, in opposition to dull, aching pain; and that of suppuration as a throbbing pain: but the whole vital functions are so deranged that the attention is less engrossed by it, and it less frequently forms the chief subject of complaint: perhaps, too, it is not so constant; and as it is aggravated by pressure, it is also in some measure dependent on movement, and is therefore less felt in perfect quietude. Inflammations of various organs differ very materially in the amount of pain they cause; the bones, joints, and ligaments, the skin, and the serous membranes, become the seat of much greater pain when inflamed than the mucous membranes and the viscera. For example, in peritonitis, acute

rheumatism, gout, carbuncle, the pain is generally a prominent symptom; in inflammations of the liver, the bowels, and the bladder, it is much less noticeable: again, a dyspeptic headache is much more complained of than the pain of the most intense meningitis: in acute pleurisy, the patient dare not cough or draw a deep breath; and yet, till his attention be drawn to it, the pain may be the last thing he speaks of. Corroding cancer affords an example of pain without inflammation, which is very severe and lancinating, and yet patients occasionally present themselves who suffer very little while labouring under that dreadful malady.

Allusion has already been made to the lessons taught by the *duration* of pain; it was stated that its importance in cases of long standing is to be measured by its effects, and that when of recent date, it is a symptom of but little consequence in persons who have been long ailing, while their general health is not seriously undermined. These considerations show the necessity of inquiring into the patient's previous history, and in doing so we shall often find that the precursory symptoms, or the circumstances which have seemed to give rise to it, throw great light on its causes. General pain, by which is meant pain or aching not limited to particular organs, but irregularly distributed over the body, is commonly an indication of general disorder; such as we have already studied in what are called blood-diseases, fevers, rheumatisms, even anæmia; it may be muscular, or confined to the joints, to the bones (*e. g.*, rheumatic periostitis), or to the nervous system, with headache and pain in the back. These varieties in its manifestation, comprising the individual elements of which the sum of general pain is composed, lead us by analysis to the various diseases and disorders in which we have already met with it as one of the symptoms. Another form of general pain is somewhat analogous in character to neuralgia; it is referred to the sensitive filaments of the nerve, but has its real seat in some portion of the cerebro-spinal axis, and is caused by disease of, or pressure upon some portion of the cen-

tral organs; it is often very irregular in its manifestation, and is of great importance when associated, as it is sooner or later, with spasm or paralysis: occasionally it is complained of in parts which have lost some degree of their ordinary sensibility. Apart from such corroborative symptoms, there is nothing in the pain itself to distinguish its cause: when more limited in its distribution, it is apt to be confounded with neuralgia; when diffuse and irregular, it resembles muscular rheumatism.

Local pain is either direct or sympathetic: when accompanied by a febrile state, it is always referrible to congestion or inflammation; without fever it is either dependent on chronic ailment of the part, some unfitness for the performance of its ordinary functions, or it must be regarded simply as neuralgia. The first inquiry, therefore, is whether there be any alteration in the function, normal condition, or nutrition of the part in which pain is complained of; next, whether any ailment exist elsewhere of which such pain is known to be sympathetic.

Examples of such affections are found in disorder of the liver being frequently associated with pain in the right shoulder; nephralgia, especially calculus of the kidney, causing pain in the thigh, groin, or testicle; irritation of the bladder being referred to the meatus urinarius; disease of the womb, leucorrhœal and other discharges, being accompanied by pain across the sacrum; disease of the hip-joint being often indicated by pain in the knee, &c. Some practitioners have recently attempted to substitute a theory of sympathetic or perhaps reflex pain, connected with the uterus and ovaries, for that of spinal irritation, as affording an explanation of some of the anomalous pains of hysterical females. This wants confirmation, and will in all probability be found as baseless as the spinal irritation theory.

We must not overlook the consideration that direct pain in local inflammation is aggravated by movement or pressure, and is indeed sometimes only spoken of as produced by such circumstances; bearing in mind, at the same time, the exaggeration of this fact exemplified in tenderness of hysteria.

Should careful inquiry reveal no definite cause for local pain, we must be content with the terms neu-

ralgia and irritation; not that they are in themselves satisfactory, but they serve to distinguish conditions beyond which we cannot at present penetrate. Patients generally are unacquainted with the situation and distribution of nerves, and therefore we may fairly assume that there is more of reality and less of imagination in pain described as following the known course of some nerve, than in that which is anomalous and irregular. But while remembering that it may be the effect of imagination, or may be simply imposture, and while all pain unaccompanied by local lesion is very liable to exaggeration, yet we know that irritation really does occur, and does give rise to pain, and therefore it must not be ignored only because we cannot find out its cause. Examples of local irritation are found in toothache, earache, muscular rheumatism, the effects of exercise or strain, as well as in painful digestion, painful menstruation, &c. An hysterical or chlorotic female has almost always pain in the left side; this is probably due to the liability to excited action of the heart present in such cases, associated, as it commonly is, with flatulent distension of the stomach. When local irritation has a persistent character we may conclude that there is some hidden cause for its presence.

Pain dependent on irritation is of more importance when accompanied by tenderness on pressure: so true is this, that even sympathetic pain, when severe, will produce tenderness in the part where the pain is felt, although we know certainly that the seat of the disease as well as the cause of the pain is located elsewhere. This observation must of course be taken with the limitation that it is not hysterical tenderness accompanying hysterical irritation.

It is sometimes quite impossible to determine the circumstances which give rise to this nervous irritation; its cause, for example, may be inseparably bound up with derangement of stomach or disorder of the intestinal canal, while its effects are really produced

at a very distant part. When the stomach has been emptied by vomiting, or the primæ viæ cleared out by a brisk purgative, the pain immediately ceases. In such circumstances, as well as in those more usually called sympathetic, there is probably something of a reflex action; and to them the name of neuralgia might with some propriety be applied; it seems better, however, to confine it to cases in which there is some actual impression on the nerve-trunk, producing sensations in the branches. Though not limited to any particular nerves, there are a few in which it is more commonly met with than in others, and to them distinct names have been applied.

a. Facial Neuralgia, or Tic Douloureux.—This disorder usually affects the branches of the fifth pair; it is described as a darting pain which thrills along the course of the nerve to its remotest branches. Sometimes limited to one, sometimes extending to all of the main divisions of the nerve, its momentary shock seizes the individual without warning under a variety of exciting causes. The pain is intense, though transient, leaving an aching for some few minutes after it has passed; it recurs again and again on the occasion of any fresh stimulus, whether speaking, eating, a draught of air, or a touch, or even without apparent cause. Its associations are so numerous as to defy classification: it is enough here to say that in many instances treatment directed to correcting general disordered states of system is successful in its removal; and we are therefore called upon to investigate all the correlative symptoms, not as an aid to diagnosis, which is generally only too unmistakable, but as a guide to rational treatment. The most intractable cases are those in which there is coexisting disease at the root of the nerve; they present to us the same problem as epilepsy, so difficult of solution, why an abiding cause of irritation should only manifest itself in paroxysms.

b. Hemicrania.—Much more diffuse than tic, its paroxysms are not nearly so intense, but they are of very much longer duration: like it, they very generally entirely subside for a time, to return at no long interval; but in this disease there is very frequently a marked regularity or periodicity in the recurrence; in such cases its popular name is brow ague. Its situation is not so much in the face and the course of the fifth nerve, as generally over one side of the head, referred especially to the forehead, and frequently affecting the eyeball. When associated, as it often is, with a debilitated or exhausted condition of the body, it is less distinctly periodic, and easily curable by means calculated to remedy the general health; in its purely intermittent form it is only a manifestation of malarious poison.

c. Sciatica.—It is very often difficult to make out whether a patient be suffering from chronic rheumatism or sciatica; but the distinction in such cases is of less importance, as this form of neuralgia is very frequently of rheumatic origin. In a well-marked case the pain is described as extending from the sciatic notch down the back of the thigh and leg; and the effect of counter-irritants in its treatment seems to prove that the pain is due to subacute inflammation of the neurilemma. But it is often much more diffuse; and then it is quite as likely that the ultimate filaments of the nerve are the seat of irritation, as its main trunk. This is especially the case when the pain is more sensibly felt in the proximity of the joints; it is probable, in such cases, that those are its real seat, although not spoken of by the patient, whose description is so vague that it can only be determined by the effect of movement: forced flexion of the joints is always painless in sciatica, voluntary motion gives pain alike in both diseases. In sciatica the pain is not increased, as it usually is in rheumatism, by the patient bearing his weight on the limb: local disease of the

joints can hardly lead to any perplexity, as pain is not an early, and rarely an urgent, symptom in such cases. The existence of previous pain in other joints or limbs would lead us to suspect that it was of rheumatic character, even when convinced from other circumstances that the case was clearly one of neuralgia.

A few words may be added here on the subject of pain in the back. We know it under the name of lumbago, as one of the most severe and common forms of muscular rheumatism; it has also been referred to as an indication of an attack of smallpox, and is not uncommon for fever generally; it is also an accompaniment of irritation of the kidney, and is sympathetic of uterine disorder. But we still meet with pain in the back which cannot be referred to any of those causes; in very many cases, it is merely one of the forms of hysteria, and as such, with its many anomalous characters, its irregular manifestations, and its power over the imagination of its victims, has given rise to many false theories, and to much pernicious practice; nothing can be more deplorable than the permanent mischief which has frequently ensued from confining such persons to a recumbent posture, till the best advice and the most judicious treatment will fail for years to set them again on their legs. The views of those who ascribe this affection to irritation within the spinal canal, appear to me most unphilosophical and most unsatisfactory. We must, indeed, refer it to what has been distinguished as irritation,—a condition of the sensitive extremities of the nerves, of which in reality we know nothing; but it is assuredly not an irritation of nerve centres or of nerve trunks.

This class of cases is deserving of careful study, in order that we may not be misled by them, as they form a large proportion of the nervous affections of the back: their diagnosis is based upon those general features which mark the hysteric tendency; long ailment, without serious impairment of health; inconsistency between subjective and objective phenomena; excessive, but unreal tenderness; and pain, evidently not limited to one nerve or one set of nerves, unreasonably excited by trivial causes, and not increased by others, except the patient be led to expect that it ought to be. But it often requires great care to discriminate these spurious affections from the pain caused by disease of the vertebræ, before alteration in form and direction proves the presence of caries. If any one character more than another can serve to distinguish them, it is that a sudden jar or shock to the spine will necessarily increase the pain attendant on disease of bone.

One of the most common causes of back-ache among delicate persons is the exhaustion of muscle in maintaining the erect posture. The cause of irritation can be most easily proved to be of this nature by its entire disappearance on the patient's assuming the recumbent posture: movement by throwing the strain on other muscles also affords temporary relief, and this serves to distinguish it from muscular rheumatism. The hysterical affection is very often engrafted upon this muscular pain.

When such cases are eliminated, only a very few remain to which the name of neuralgia, as already defined, can apply. They are very generally rheumatic in their origin, but do not exhibit in any great degree the character usually associated with rheumatism, of being aggravated by motion: we cannot get beyond the fact of local pain limited to parts supplied by a single set of nerves. It is important to observe whether there be any loss of ordinary sensibility or of muscular power, as such circumstances would indicate a more serious affection than simple neuralgia.

§ 7. *Hypochondriasis.*—This affection borders very closely on insanity: and it is somewhat difficult to point out in what respects it differs from it. As already pointed out in considering the subject of delirium, one great rule in diagnosis is that true insanity is not necessarily connected with bodily disorder, and does not spring out of disturbance of the general health like the delirium of disease. In hypochondriasis we find always some disturbance of health, but in place of delirium there is merely some exaggerated idea of the actual condition of disease, or some false conception regarding its origin. That this mistaken view of the case is not insanity can only be known by the circumstance that however absurd it may appear to an educated person or to one who knows the structures of the body, it is not really irrational on the part of the patient. It is, perhaps, not at first sight very apparent why a man should be called a lunatic who declares that his inside is made of glass, while one who fancies that a live animal is moving about in his body is only set down as a hypochondriac. When the test given above is applied the difficulty dis-

appears. A certain amount of education is required to know that the entozoa can alone live in the interior of the body, and that their movements are very limited in range; when this knowledge is wanting the misconception may easily arise. The idea that any part of the body is made of glass must be irrational.

CHAPTER XVIII.

EXAMINATION OF THE CHEST.

Importance of Correct Knowledge—its Sources—§ 1, *History and General Symptoms—Acute and Chronic Disease—Pain—Indications of Fever—of Emaciation—The Breathing—Cough—Expectoration*—§ 2, *Physical Signs*—(*a*) *External Appearances*—(*b*) *Percussion—its Teaching—Sources of Error*—(*c*) *Auscultation—its Application—False Nomenclature—How Deductions are to be drawn.*

In the ordinary course of inquiry, we have next to examine the condition of the organs contained in the chest; and in order to ensure habits of accuracy in diagnosis, the student should make a rule under no circumstances to omit it: in practice he may subsequently limit himself to a few general questions with regard to cough, dyspnœa, or palpitation, and the existence of pain or expectoration. If the answers to such queries be unsatisfactory, further inquiry is evidently called for; but even when they fail to elicit any statement indicating the presence of disease, the examination of the chest may be attended with the most important results: it is scarcely too much to say that diagnosis would be less frequently at fault, and treatment more uniformly beneficial, if it were our constant practice to ascertain the leading characters of the respiration and the heart's action in all classes of disease, just as we are accustomed to look at the tongue and feel the pulse. A cursory examination at least serves to assure us that there is or is not disease of much amount, while a more careful investigation may bring to light some fact which will in great

measure serve to explain circumstances previously unintelligible.

§ 1. *History and General Symptoms.*—The history of the case sometimes affords but little information, while in other instances it may almost alone serve as the basis for correct diagnosis. The duration of the attack at once separates cases of recent origin from those which by their continuance or repetition are shown to be more or less chronic: from the date of the first deviation from health and the order of sequence among the phenomena, we learn whether pain or febrile symptoms, coryza or expectoration, attended its commencement, or the cough came on gradually; and we are also enabled to place by themselves cases in which the very important fact can be elicited that blood has been occasionally mixed with the sputa. Any past illness, directly or indirectly bearing on disease of the chest, should be noted, because it would show either that the symptoms were secondary on disease in other organs; or that the present attack was one of a succession of similar character; or that it had sprung out of the organic changes wrought by the previous illness.

In the present condition of the patient we have to consider whether the general symptoms indicate inflammatory fever or hectic, or freedom from any febrile disturbance; the pulse must be especially noticed, as it is one of the more direct signs of disease of the heart. The appearance may be one of health and strength, or of weakness and emaciation: the aspect may betray signs of anxiety, as caused by pain or breathlessness; the colour of the face may have the dusky hue of ill-ventilated blood, or the brilliancy of hectic. We have to pay regard to the posture which disease may oblige the patient to assume for the relief of laboured respiration; and while listening to complaints of pain or discomfort, we watch the character of the breathing and cough, with regard to frequency and force, com-

paring the former especially with the quickness and power of the pulse; it is also important to ascertain the character of the expectoration.

These circumstances may point either to disease of the heart or of the lungs. The history of the former is generally obscure, the origin unknown to the patient himself, and the duration extremely uncertain; and it is perhaps only when the pain of pericarditis marks the commencement of that disease that any definite information is gained.

The duration of the different affections of the chest varies in a very remarkable degree: the only important points connected with this inquiry are the recent occurrence of an acute attack, the continuous illness of some weeks or months which especially characterise rapid phthisis, and the yearly return of cough in chronic bronchitis, emphysema, and the more tardy forms of tubercular disease. In organic changes of the heart's structure shortness of breath is sometimes spoken of as a symptom of many years' standing: at the same time it will constantly be experienced in practice that very serious disorganization must have been proceeding for years without any consciousness of its existence on the part of the sufferer.

Not unfrequently the date which is assigned as the commencement of the attack is altogether erroneous; the first symptoms have not been observed, or have been forgotten: some persons speak of having had cough as long as they can remember; others are unable to recall to mind the colds and coughs of last winter; and a false date is worse than none at all: but it is not without value, in a diagnostic point of view, that the patient is unable to assign a date, because it indicates the insidious approach of the malady; more commonly some period is named at which it is alleged that cold was caught. Beyond this, perhaps, all inquiry fails in getting any information; the points of greatest importance are the existence of pain and fever in an illness of recent date, and the occurrence of hæmoptysis in one of old standing.

In the history of antecedent illnesses we are sure to find, when the symptoms of chest affection are primary, and the attacks repeated, that the lungs are the organs chiefly implicated; while by the previous occurrence of rheumatism or dropsy we are led to expect disease of the heart, and the affection of the lungs is more likely to be subordinate and of minor importance. When confined to the respiratory organs we either meet with severe symptoms of occasional occurrence, or with habitual winter cough; the patient may be an old asthmatic, or may have been always delicate; or he may never have thoroughly recovered from the effects of a more acute attack; latterly he may have lost flesh and strength; and we endeavour to contrast his pre-

sent state with what we can gather from description to have been his usual condition of health prior to the illness under which he is now labouring.

From this we are led to inquire what is that actual state: the presence or absence of fever will be indicated by the skin, pulse, tongue, &c.; but here we often meet with the adynamic form called hectic, in which the rapidity of the pulse is not always accompanied by a furred tongue or a hot skin—at one time it is dry and burning, at another it is bedewed with moisture or dripping with perspiration: in such cases the tongue is often chapped, peeled, or glazed, and the bowels tend to diarrhœa. Real inflammation of the lungs (pleurisy or pneumonia), as well as pericarditis, can scarcely have place without the co-existence of inflammatory fever. Irregularity of pulse invariably indicates disease of the heart: its frequency in cases clearly tubercular marks the distinction between the acute and chronic type of phthisis: an habitually quick pulse in bronchitis would lead to the suspicion of tubercles, when there is no better proof of their presence; a quiet one may tend to disprove such a conclusion, when some probabilities are in its favour.

The absence of emaciation is often at once taken as decisive against the supposition of tubercular disease; but neither is this without exception, nor is the converse absolutely true that chronic chest ailment with emaciation indicates phthisis; an experienced eye may discriminate between the one and the other, especially if the discoloration of the face in chronic bronchitis, or the hectic flush in phthisis, be taken into account. The dusky flush of pneumonia is a very remarkable sign to one who watches the physiognomy of disease, as is also the peculiar dragging of the alæ of the nose, with hurried breathing, noticed in pleurisy or peritonitis. Not less distinct are the blue nose and lips of disease of the heart.

The patient by his attitude often unwittingly reveals to the observant practitioner sensations which he fails to express in words. A phthisical person rarely cares to have his shoulders raised in bed, while one with bronchitis often does: in disease of the heart the semi-erect posture, which has suggested the name of orthopnœa, is most commonly selected; and even when the lung symptoms are the most prominent, its presence pretty constantly proves that there must be something more: in some peculiar forms of disease a prone position is the only one in which ease is obtained. A patient with one pleura full of fluid very generally, even when raised in bed, inclines to the affected side, except when pain prevents his doing so; the rule and the exception are still more invariable when the position is horizontal.

Among the sensations of the patient, the consciousness of dyspnœa—shortness of breath, felt especially in ascending a height

or going up stairs, has more distinct reference to disease of the heart than complaint of cough, which, when associated with expectoration, more probably indicates affection of the lungs. Palpitation of the heart is more frequently complained of by nervous persons than by those suffering from cardiac disease, but its value must always be ascertained. The principal facts to be elicited in regard to pain are its locality, and the circumstances which attended its commencement. It may be across the upper part of the thorax or at either apex; and this is common in phthisis: sometimes its position at the lower part of the chest, and the freedom of the respiration, prove it to be connected with the stomach or some of the abdominal viscera. On the other hand, pain, distinctly referred only to one side, sharp and cutting, and situated just below the nipple, always much increased, perhaps only felt, in the act of coughing or breathing deeply, is very probably caused by inflammation. This point is to be considered with reference to the co-existence of fever, because rheumatic and neuralgic pains are similarly aggravated.

By experience and observation much is learned from the character of the breathing, of the cough, and of the expectoration; and, as aids to diagnosis, they must not be omitted; but the student must be very careful not to draw conclusions from any of these symptoms alone. The prolonged wheezing sound, in the act of expiration, by a person labouring under emphysema, is very characteristic in extreme cases; the cough is deficient in expiratory power; it seems a soft, forceless effort, with very little vocal sound, and the voice cannot be elevated without difficulty and fatigue; other conditions, however, give rise to characters very similar, such as pressure on the trachea or large bronchi, and even chronic dilatation of the smaller tubes, when obstructed by thick, purulent secretion.

The cough of hooping-cough is itself diagnostic, but must not be confounded with the crowing inspiration of childhood, nor with the harsh, raucous sound of croup or laryngitis: by parents it is sometimes alleged to exist when the child is merely suffering from the violent paroxysmal cough which sometimes attends extensive tubercular deposit, and is not unfrequently a precursor of hydrocephalus. The loss of voice in affections of the larynx, and the noisy breathing which is audible at a considerable distance, when the disease is accompanied by partial closure of the glottis, are almost unmistakeable.

The ringing cough of croup, once heard, can scarcely be forgotten; but false diagnosis has not unfrequently been made, from some sound which has merely simulated it being alone taken into consideration. The short hacking of early phthisis, and the stifled and suppressed cough of its more advanced

stages,—the rattling and straining, often ending in sickness, attending the emptying of a large cavity,—are all more or less significant.

The absolute quickness or slowness of respiration, and also its ratio to the rapidity of the pulse, are rather to be regarded as evidence of the severity of the affection than as specially pointing out its nature: such, for example, are the very hurried breathing of extensive tuberculosis, and the want of correspondence between its increased frequency and the acceleration of the pulse in severe pneumonia. A distinction is to be made between the evidence of quick breathing derived from observation and the sensation of the patient that it is short. The character of the sputa often helps to correct our diagnosis when there is anything like incongruity in the symptoms or physical signs of disease. The chief conditions which may be observed are these: simple mucus, of varying degrees of adhesiveness and amount, in pleurisy, catarrh, bronchial irritation, and bronchorrhœa: mucilaginous or rice-water sputa, seen in the early stages of phthisis; purulent mucus in chronic bronchitis; unmixed pus coming from a cavity; adhesive rust-coloured mucus, very distinctive of pneumonia; admixture of blood, from slender streaks to copious hæmorrhage; and offensive discharges. In many instances these varieties approximate very closely to each other; thus the muco-purulent expectoration of bronchitis may assume the appearance of unmixed pus. When bronchitis coexists, as it so often does, with phthisis, the sputa present every degree of consistency, and the imperfect admixture of the secretions due to each cause sometimes points out their combination. In the earliest stage of phthisis it is only that of bronchial irritation, and in pleurisy there is usually no expectoration beyond a little salivary-looking fluid; glairiness or adhesiveness, and especially a brown tinge, prove that the inflammation is not confined to the pleura. Puriform sputa may have most of the characters of a cavity when the pus comes not from a vomica, but from the cavity of the pleura: in such circumstances a gush of pus, instantaneously discharged, would indicate that the opening into the pleura was a consequence of empyema and not of phthisis. With reference to the rusty sputa of pneumonia, while the adhesiveness is generally in proportion to the severity of the inflammation, the student must be careful to ascertain correctly, in cases where the secretion is more abundant, that the colour is really produced by slight admixture of blood, and is not caused by the colouring matter of wine or medicine.

The blood expectorated in phthisis differs from that of pneumonia, not only in its brighter colour, but in its being less perfectly intermixed with the other secretion; its amount is exceedingly indeterminate. In a large proportion of consumptive

patients it may be ascertained that hæmorrhage from the smallest to the largest amount has at one time or other existed, and therefore the fact in any individual case is not without value; but it is true that certain phthisical patients escape altogether, that in some cases it is dependent on other causes, and that patients often sedulously endeavour to conceal or ignore it. On the other hand, the hæmorrhage may be due to disease of the heart or of the great vessels; and in some cases is no evidence of disease at all.

Sometimes the expectoration is offensive, and occasionally it is so to a very high degree. The cause of this is no doubt the admixture of disintegrated lung tissue; but while occasionally the process is rapid and gangrenous, with black and grumous sputa, more frequently it is merely fœtid pus, the result of rapid and unhealthy suppuration; both are generally confounded together as gangrene, but the condition of fœtid abscess ought to be distinguished from it.

In the observation of many of these points it is often necessary to wait until anything like flurry or nervous excitement have passed, or at least to correct the observations made on first seeing the patient by others at the end of the visit, and not unfrequently to abstract the patient's attention from the particular symptom which is for the moment the subject of observation.

§ 2. *Physical Signs.*—It is not necessary in the present day to study much in detail the general symptoms of disease of the chest just adverted to; but there was a time when, to the correct interpretion of such vague and uncertain signs, the attention of the physician was confined. In our own day diagnosis has made great advance in consequence of the light thrown upon it by the practice of auscultation and percussion, and the error to which we are liable is that of overlooking the general symptoms, and being satisfied with the physical signs; and the deductions from these two sources of information, if considered apart, may be wholly at variance with each other. The student should therefore make careful note of all that he can acquire of the history and the general indications before he proceeds to the minute examination of the organs of circulation and respiration, in order that he may correct the inferences he may be disposed to draw from this source by observations made before his

judgment had received any bias from the indications it affords.

The facts which we have to study consist of the relative movements of the different parts of the chest; the proportion and position of solids or fluids and air as determined by percussion; and the sounds produced, whether normally or abnormally, by the movement of air, or air and fluid together, in the lungs, and of blood and solid structures in the heart and great vessels; and in connexion with these, the condition of parts as sound-conducting, or sound-generating media. To describe these sounds in such a way as to be intelligible to one who has never heard them is impossible, and to describe them to one who has, is unnecessary. I would only remark that any student who will take the trouble of examining the chest of *every* patient, will learn to distinguish the sounds of health and disease in a very short time; while those who merely listen to such cases as are pointed out to them as instances of certain diseases, or of certain unusual sounds, will never have an adequate notion of the value of auscultation. It is absolutely necessary, in order to make any advance at all, that the natural respiratory sound, and the natural first and second sounds of the heart, be known and understood; and the student who is anxious to learn them will never come away satisfied with having heard nothing. It too often happens with the learner, that when some peculiar circumstance is pointed out to him in the wards, he is too hurried or too nervous to catch the sound described: in all such cases, my advice to him would be to remove his ear to some other part of the chest where he knows the natural sounds are most easily to be heard, and gradually and patiently to approach the point to which his attention was first called; a sound once heard becomes louder and more distinct, as it becomes more familiar to the ear by prolonged attention: if he then take the earliest opportunity of comparing what he has just heard with that which is to be found in the

same spot in a patient not labouring under disease of the chest, he will best know whether he have learned anything that may be of value to him afterwards.

a. External Appearances.—If we were to follow strictly the order in which the various organs are placed in the nomenclature of Diseases, we should commence with diseases of the heart and blood-vessels, which have been placed before those of the respiratory organs, because they have less of a local character; the circulatory apparatus being distributed, like the nerves, to every part of the body. With reference to diagnosis, there seems an advantage in pursuing a different course; because diseases of the heart are more readily understood when the phenomena connected with the lungs, which occupy so much more space in the thoracic cavity, have been previously explained.

In exploring the chest it is essential to contrast the signs observed in corresponding parts on each side, because there can be no absolute standard of comparison applicable to all cases: the differences must be noted as the examination proceeds, but no conclusions ought to be drawn from them till the examination is completed. Regard must first be had to the external symmetry, and then to the movement of its various parts in the act of breathing; and we may at the same time observe whether the vocal fremitus or thrill be equally perceived by the hand on either side when the patient speaks. Deviations of form serve either as indications of bygone disease, such as the rachitic distortion of the ribs in childhood, the scrofulous caries of the spine, or the lateral curvature of imperfect development; or as signs of still existing changes in the respiratory organs of some duration; for example, the rounded chest of emphysema, or the flattened one of phthisis, or the lateral distension of pleural effusion. Alterations in movement, again, if we exclude the effects of muscular paralysis, and anchylosis of ribs, have more direct bearing on the condition of the lungs with reference to their power

of expansion: and, contrary to what might have been expected in so mobile an organ, the actual position of the diseased portion is often very accurately pointed out by deficient movement of the ribs over that particular part of the lung.

These points are not of very great importance in diagnosis, because of necessity disease has proceeded to a considerable extent before it becomes distinctly manifested in the form and movements of the chest. But they serve, when present, to give certain impressions which aid the practitioner in forming a rapid diagnosis, and therefore demand the attention of the student; and they also serve sometimes to correct an error into which we might inadvertently fall if they were overlooked. Distortion, especially that produced by spinal curvature, is very liable to render the ordinary physical signs fallacious, and due allowance must be made for this circumstance in forming a judgment upon them. Among the more important points with which the student should make himself familiar, we may enumerate the following:— (1) The upper ribs sink away from the clavicle, become flattened and motionless in advancing phthisis, while in many cases the movement of the lower ones is not interfered with, and as a general rule the change is more evident on one side than the other. (2) In emphysema the opposite condition prevails; the chest is full and rounded, the ribs stand out, but have a very slight range of movement, and the inspiratory effort is marked by powerful traction of the muscles of the neck; the movement of the lower part of the chest is very often *inward* in place of *outward* during inspiration: the contrast between the opposite sides is seldom very great. (3) When one side only bulges, and the intercostal spaces are obliterated, the effect is usually produced by distension of the pleura with fluid or air. (4) Without any deviation in form, a remarkable stillness and want of movement may be observed in the early stage of inflammation of the pleura: and when the disease is very limited, this effect may be quite local. (5) A very striking change may be noticed in the contraction of one side, when there is no distortion of the spine, as a consequence of previously existing empyema. (6) The contrast between thoracic breathing, when the diaphragm is not moved, in peritonitis, and abdominal breathing when all the respiratory nerves, except the phrenic, are paralysed by injury of the upper part of the spinal cord, is well worthy of observation; its minor degrees ought also to be considered in diagnosis.

b. Percussion.—The operator elicits the sound by his own act, his object being to ascertain the relative

amount and position ot the solid or fluid and gaseous contents of the thorax. The stroke should be short and sharp, and not more forcible than is necessary to produce a distinct sound, except when the character of the resonance is doubtful, and then it may become needful to compare the sound produced by firmer percussion with that which results from a gentler tap. The finger used as a pleximeter to receive the stroke, should be level, and, when comparing different parts, should occupy as nearly as possible the same position with reference to the ribs, whether parallel or transverse,—upon the bone or in the interspace. The formation percussion conveys is derived from two sources: the resonance or clearness of the sound produced, and the sense of greater or less resistance to the finger; and it is to be remembered that these vary, not only with the condition of the lung itself, but also with that of the parietes, being remarkably modified by the elasticity of the ribs. In order to obtain trustworthy results, it is essential to compare the sound produced at corresponding parts on either side; and also to contrast the difference between the upper and lower regions on one side with that on the other.

Percussion indicates either that there is an excess of solid and fluid compared with gaseous contents or the contrary, as the sound is dull and dead and the resistance great, or the sound clear and resonant and the resistance slight; and these conditions may be either beyond what is consistent with perfect health under any circumstances, or merely different from that of the surrounding parts or the corresponding parts on the other side of the chest. It is quite true that various morbid states are associated with unusual sounds on percussion, which become sensible to an experienced ear; but, except in the extremes of tympanitic resonance and remarkable dulness, they are not such as can be well explained to the student, because there is no absolute standard from which their variations can be calculated.

Percussion is not equally applicable over all parts of the chest. (1) In front its variations are readily perceived, but it is only over the upper third that the indications are of much value with reference to the lungs. In the middle third the heart on the left side prevents a correct comparison with the

right; and lower down, while enlargement of the liver may be the cause of dulness on the right side, distension of the stomach with gas may give rise to unusual resonance on the left. Applied over the region of the heart, it teaches us whether a larger portion of lung-tissue than usual be displaced by disease of this organ, or, on the contrary, whether the lung have encroached on the ordinary space of præcordial dulness. (2) At either side the upward pressure of the abdominal viscera tends to invalidate any results of percussion below, and those only are trustworthy which are obtained from the region bordering on the axillæ; and even here stomach resonance in rare cases makes itself heard. (3) Over the back the thickness of the walls of the chest limits us in very great measure to the inner border and lower angle of the scapula, as it requires considerable tact to make the difference perceptible even in the supra-spinal region, where, notwithstanding it is much more readily applicable than upon or just below the spine of the scapula. In a downward and outward direction we are met by the same difficulties, which tend to invalidate the effects of percussion in front and on either side: for practical purposes, however, the information derived from the region on either side of the spine, when the scapulæ are drawn aside by the arms being crossed in front, is quite sufficient.

c. Auscultation.—In this term we include all the sounds produced by the movement of the air; whether in ordinary breathing, in forced inspiration, in the act of coughing, or in the resonance of the voice. We have to observe the sound caused by its simple motion backwards and forwards in the air-tubes and vesicles, to take note of the force with which the voice formed at the larynx is transmitted through the tissue of the lung, and to listen for anything unusual or abnormal, which we may call adventitious sounds.

The vesicular murmur, as it is called, heard loudest and often only during inspiration, is that which characterises healthy lung: it is distinguished from unhealthy breath-sounds of all kinds by its great softness, but in loudness and distinctness, perhaps, no two chests are exactly alike. The resonance of the voice also differs extremely in different persons, and even in different parts of the same lung in perfect health; in disease its chief value is derived from a want of corre-

spondence between those in which its intensity is usually equal. The characters of adventitious sounds will be discussed in a separate chapter. Knowledge on these points, while most essential to correct diagnosis, cannot be conveyed by any written description; it can only be acquired by repeated examinations of the chest in health as well as in disease. The student must in the first instance exercise much patience and attention, and especially not restrict himself to persons labouring under some form of pulmonary disease. If on first applying his ear to the stethoscope he should hear nothing, he may cause the patient to inspire deeply, to talk, or to cough, when some sound will be produced; and if that sound be peculiar, he ought to listen to it till it can be recollected and recognised again, and if possible he should get some more experienced auscultator to explain it. By this means, in a wonderfully short time, he will find himself quite competent to say what is healthy and what unhealthy breathing, what is natural and what adventitious sound.

In the detailed treatises on auscultation descriptions of all possible sounds are given, and names are too often employed which have tended rather to perplex than to instruct. The nomenclature has unfortunately been derived from the morbid condition with which the sounds have been supposed to be associated; and in well-marked examples, no doubt, the name and the association are correct; but as it necessarily happens that such morbid states are not separated from each other by any distinct line of demarcation, and that the actual character of the sound cannot be very clearly defined, it seems unwise to employ a name which suggests a theory of disease, while prosecuting an inquiry which is only ultimately to lead to its discovery. It is better, therefore, to confine ourselves as much as possible to terms which convey ideas of sound rather than ideas of disease.

Auscultation is best performed in front, by means of the stethoscope. Over the back the ear more readily takes cognizance of the condition of extensive tracts of lung-tissue, when applied directly, with only the intervention of a fold of linen: here the sounds have to pass through much thicker parietes, and therefore it is unwise still further to deaden them by the intervention of an

instrument; when it becomes important to localise a sound, the stethoscope may be used.

In conditions of disease we meet with modifications of the breath and voice-sounds, and with adventitious sounds. There can be no absolute standard of health to which the breath or voice-sound can be at all times referred; and hence, as in percussion, our judgment in regard to them must be in great measure formed by comparison of different parts of the same chest. The student must place no reliance on what he may consider deviations from the ideal standard, but confine himself to discovering a want of consistency between the two sides, and it will often require the exercise of his clearest judgment, and most correct reasoning, to deduce from this want of consistency the exact nature of the deviation. It is to be observed that difference in the intensity of the voice-sound is most liable to mislead, and is least to be relied on as indicating the condition of the lungs: difference in the loudness and quality of breath-sound affords more direct and more satisfactory evidence: difference in the resonance on percussion is unmistakeable proof of different degrees of density of the lung, if the parietes be free from disease; while adventitious sound is of necessity connected with something abnormal, and we have only to determine what that sound exactly is, and what physical elements can give rise to it. The combination of the evidence derived from these sources, with the history of the case, and the other symptoms of disease, forms the basis upon which our judgment concerning the pathological condition of the lungs ought to rest: it is most important to remember that no one of these facts, taken singly, is sufficient to warrant any deduction regarding its nature; and that the larger the number of facts which coincide, the more will this deduction partake of the nature of certainty.

The loudness of these sounds in the same individual, at different periods, or at different parts of the chest, depends on three circumstances—the size and form of the spaces over which we listen, the force with which the air moves or the voice is produced, and the power of conducting sound possessed by the superficial parts. We may exclude the second of those, as being in great measure under our control, with this remark, that now and then it happens that over an entire lung the breathing may be unnaturally loud in consequence of its having a vicarious duty to perform in supplying the defect of its fellow: the air simply moves faster and more freely—its sound is exaggerated, and not otherwise changed. In regard to the size and form of the spaces over which we listen, it must be remembered that not only are these changed by disease, increased or diminished in size, but at any given spot we encounter vesicles, small bronchi, and large bronchi, at different depths from the surface; and that if the

breathing in the vesicles be stopped, we shall hear the sounds in the larger spaces more or less loudly, according to the conducting power of the lung-tissue and the degree of noise the air produces in them. For example, consolidation will produce all of these effects in varying degrees : 1st, it gives rise to more or less difference in percussion resonance; 2nd, it impedes or suppresses vesicular breathing; 3rd, it increases the conducting power of the tissue; 4th, it makes the large tubes more rigid, and the breath-sound in them more noisy. Or, again, unnatural spaces or cavities, of varying size, existing along with more or less of consolidation, will give rise to a similar series of phenomena. On the other hand, unusual expansion of the lung, while it causes a stoppage of the vesicular breathing, is attended with opposite effects in increase of resonance, in diminution of the conducting power, and in lessening the noise of movement in the large tubes. Two further considerations must be borne in mind with relation to these changes in the breath and voice-sounds—viz., that the rhythm and quality of the breathing (the ratio of the inspiration to the expiration, and the softness or harshness of the breathing) vary with different sizes and forms of spaces, and consequently become the measure of their capacity ; while, by the power of the voice, we are best able to judge of the quality of the superficial structures as a medium for conducting sound, and consequently, of their degree of solidity. By some it has been alleged that when the tubes or parietes of a cavity are more rigid, the air is more easily thrown into sonorous vibrations, and that this cause is more powerful in producing vocal resonance than the sound-conducting property : the conclusion is the same in either case. Some allowance, however, is to be made for the size of the space, as it would appear to have something to do with the intensity of the vocal vibration of the air.

Adventitious sounds have reference to the presence of some extraneous matter which, in consequence of the movement of the air, or that of the lung-tissue, gives rise to sounds which have no resemblance at all to those produced by healthy breathing. They may be caused by the two surfaces of the pleura moving on each other with a rubbing sound, or by consolidation of the lung giving rise to crackling noises as it expands when air enters, or by air coming into contact with fluid, whether serous, purulent, or inspissated; and the sound in each of these cases may give very direct evidence of the physical facts which combine for its production; but standing alone, as a symptom of disease, it would be of comparatively small value in determining the condition of the patient.

CHAPTER XIX.

MODIFICATIONS OF NORMAL BREATH AND VOICE-SOUNDS, AND OF PERCUSSION RESONANCE.

DIV. I.—*The Clavicular Region.*—§ 1, *Breath and Voice-sounds with Dulness under one Clavicle*—§ 2, *with Excessive Resonance*—§ 3, *with Difference on Percussion slightly marked*—§ 4, *with no perceptible Difference.*

DIV. II.—*The Posterior and Lateral Regions.*—§ 1, *Breath and Voice-sounds, with Dulness on one Side*—§ 2, *with Excessive Resonance*—§ 3, *with Difference on Percussion slightly marked*—§ 4, *with no perceptible Difference.*

SUMMARY.—§ 1, *Condensation of Lung-tissue—Carnification — Hepatization — Tuberculization* — § 2, *Expansion of Lung-tissue—Emphysema*—§ 3, *Condition of the Pleura.*

WE now proceed to consider the method in which auscultation and percussion are to be applied in endeavouring to ascertain the physical condition of the lungs: and in this chapter we shall confine our attention to the modifications of breath and voice-sounds and percussion resonance, comparing each with the other as we go along, and leaving for the present out of consideration all other sounds whatever. It is true that in practice we shall not often find them so disjoined, but in order to arrive at logical conclusions from the premises submitted to us, it is absolutely necessary to compare the simpler classes of phenomena together before taking into account the third and more complex series: it will also have the advantage of preventing the student from acquir-

ing the pernicious habit of trusting to any sign as *pathognomonic* of a certain form of disease,—an error which such sounds are much more liable to produce than mere modifications of natural sounds.

Division I.—The Clavicular Region.

The evidence derived from this region is by far the most valuable portion of that which serves to indicate disease of the upper lobe: changes of structure seldom exist on its posterior aspect of sufficient amount to give rise to distinct auscultatory phenomena through the scapula, without also causing perceptible change in front: corroborative signs are generally found behind, and, possibly, disease which seems of small extent when we examine in front, is far advanced in the scapular region. Still the first and the most correct knowledge of its existence usually comes from the clavicular region, and it is a good rule that it should be the first examined.

§ 1. Percussion notes a marked difference between the two sides of the chest, and one has a dull, dead resonance, with a sense of resistance.

A. The breathing is louder on the duller side; there is a very evident prolongation of the expiratory murmur; it has acquired an unnatural harshness and a blowing sound: the voice-sound is also louder, and probably changed in character as compared with the other side of the chest. There can be no doubt that the disease is on the duller side, and of some form associated with consolidation. In this region we meet with tubercular deposit, fibrinous deposit, and retraction of the lung consequent on effusion into the cavity of the pleura.

B. The breathing is weaker on the duller side, and is entirely superseded by some adventitious sound: the voice-sound is loud and harsh: the sound of the breathing is manifestly obstructed by some fluid mixed

with the air contained in the lung, and in addition to this we feel sure, from the deadness of the percussion-stroke and the loudness of the voice, that there is some form of consolidation present, generally the tubercular.

In addition to this, the more common condition, we find—

a. The dulness and deadness of the percussion-stroke most complete, and evidently not confined to the clavicular region, but extending throughout every part of the chest on the affected side; the rhythm of the breathing, if any can be heard at all, is altered by disproportionate length of the expiration, and the voice-sound has a loud ringing character. The chest is probably full of fluid on that side, but the existence of the condition is to be decided from a consideration of the signs appertaining to the remainder of the chest.

b. The sound on percussion may vary according to the force of the stroke: a gentle tap brings out imperfect superficial resonance, a firmer stroke distinct and decided dulness; the breathing is weak and not otherwise altered in rhythm or quality, but in addition to the vesicular murmur there may be heard a sound of distant blowing. This would point out some solid mass occupying a central position with reference to the lung.

c. There may be local swelling under the clavicle, and the breathing is entirely suppressed. Here we have no doubt of the existence of tumour, aneurism, or solid growth, as the case may be.

§ 2. Percussion notes a decided difference with exaggeration of resonance on one side of the chest.

A. The breathing is louder on the more resonant side. The percussion sound is tympanitic, while there is a sensation of wooden resistance to the stroke: the breath sound is heard as if one were blowing into a large empty jar; the voice-sound has the same character, called amphoric. These signs may be caused either by air in the pleura (pneumo-thorax), with an opening communicating between the lung and the pleural sac, somewhere near the clavicle, or by a cavity of very large size: in the one case the tympanitic resonance is general, in the other local.

Sometimes the percussion-sound is less distinctly tympanitic,

and there is no resistance; the breath-sound has a blowing character; the voice-sound is ringing. This condition is often met with in the first stage of pleuritic effusion: its true nature is only revealed by exploring the remainder of the chest.

B. The breathing is weaker on the more resonant side, or absent; the resonance is remarkably clear, with great elasticity: if any breathing be audible, it generally consists of a long, distant blowing, expiratory sound; there is no voice-sound. Here we have decidedly emphysema of the upper lobe of the affected side.

Occasionally with tympanitic resonance the breath-sound is simply weak and distant, its rhythm not necessarily altered; the voice-sound varies. Such is the effect produced by a small portion of air confined in the pleura: a rare circumstance, which sometimes follows on paracentesis, and has even been alleged to be the result of spontaneous development.

In some cases of pneumo-thorax, while the percussion resonance is tympanitic with a wooden tone, the amphoric breath and voice-sounds may not be heard, or only heard at a distance; either because the opening is temporarily closed or is situated at some other part of the lung: these cases can only be rightly judged of by comparison with the remainder of the chest.

§ 3. There is little difference on percussion, and no resistance on either side.

A. The breathing is loudest on the duller side.

a. Its rhythm is altered, the expiratory sound is especially prolonged, loud, and harsh; the voice-sound is also louder than on the more resonant side, which seems to approximate to the healthy standard. We have here a less marked form of consolidation: most probably, from its situation, tubercular, but possibly due to other causes.

b. Its rhythm is natural. On the opposite side the inspiratory sound is deficient, and the expiratory sound is prolonged, but without any degree of harshness, any change in quality being rather indicated by softness and weakness: the voice-sound is louder on the duller side, but not exaggerated, while on the other it is weak or almost absent. This is sufficient

to prove that the disease is on the more resonant side, and that the condition is one of dilatation.

B. The breathing is weakest on the duller side. Its rhythm is altered, it has a wavy or jerking character, and the expiration is prolonged: the voice-sound, in contrast to the preceding case, comes out much more loudly on that side on which the breathing is deficient. The condition is one of commencing consolidation.

§ 4. Percussion fails in detecting any difference between the two sides of the chest.

A. The resonance on both sides may be exaggerated; the chest remarkably rounded and resilient, and moving very little in respiration; the upper ribs not descending as far as they ought in expiration, while in inspiration the lower ribs are usually drawn inwards: the inspiratory sound is short and deficient, and the expiratory prolonged and distant; the voice-sound more or less abolished, as the disease affects chiefly the upper or lower part of the lung. Such are the physical characters of emphysema affecting both lungs.

B. Both sides may be duller on percussion than in health.

a. The deficient resonance may depend upon loss of elasticity of the ribs, and the breathing may still be natural and equal on both sides, or it may have undergone some modification and be accompanied by adventitious sounds.

b. The dulness may be caused by consolidation when the breath and voice-sounds will be necessarily modified. The consolidation is, I believe, never equal on both sides, and each will somewhat differ in the auscultatory phenomena present. They will correspond either to some of the conditions already mentioned, or will more properly fall under the next section.

C. A slight difference may exist, but the ear may fail to detect it. On comparison of corresponding

portions of the two lungs, somewhere or other a difference in rhythm or quality of breath-sound and in the intensity of the voice-sound is distinguished by auscultation; and we will suppose that no corresponding changes are discovered in an examination of the rest of the chest. Fortunately adventitious sounds very generally are present to aid our diagnosis, but when absent we have to decide what circumstances justify us in assuming the existence of disease in the upper lobes. The question is a weighty one, because here it is that tubercle is generally first deposited; but we must not forget that general symptoms indicating the possibility ought to be present to justify the assumption. Reverting to § 3, and imagining the difference on percussion to be so slight as to be overlooked, we find that there may be local emphysema or consolidation, and that in either case the expiration may be prolonged, but that the inspiration in emphysema tends to softness, in consolidation to harshness; further, that if the voice-sound differ, it is weaker with the prolonged expiration of emphysema, louder with the prolonged expiration of consolidation, than at the corresponding portion of the opposite lung. One important fact simplifies the inquiry very much: it is this, that if there be no adventitious sound in emphysema, we shall have little or no cough, and no general symptoms: we have therefore only to decide what difference in the results of auscultation is sufficient to determine what the general symptoms are due to commencing consolidation. (1) The most certain indication is when on one side the inspiration is shorter and the expiration longer than on the other. (2) The next in order of distinctness is when the inspiratory sound is wavy or jerking while it is even and continuous on the opposite side. (3) When both sounds are longer and louder on one side, the indication is only trustworthy if they be also harsh and unnatural there; or, when this exaggeration is confined to the left side, for on the right side they are often louder in

perfect health. (4) Expiration heard only on one side when no other change is observed, is a suspicious sign. (5) Inspiration heard louder on the left side is also suspicious. (6) The voice-sound heard louder on the left side along with any of the changes just mentioned is more to be regarded than when heard louder on the right.

When a difference is established by percussion, it is evident that the lungs are in different states, and yet neither may be absolutely healthy; the same condition may have commenced in one which is advanced in the other. Considerable experience may be requisite to justify the assertion that both are diseased, but the conclusion may be a correct one, with very imperfect knowledge, in the cases referred to in § 1, that there is consolidation on the duller side. The dulness is absolute as well as relative; the breath-sound is changed in rhythm and quality as well as louder, when not obscured by morbid sounds, and the voice-sound points to the same conclusion.

But let us be very careful how we take the next step and determine what that consolidation is. It is of the utmost importance to leave the mind as much unbiassed as possible by the facts elicited by percussion and auscultation in the clavicular region, because the conclusion must rest quite as much upon the history of the case, and upon the evidence derived from other regions of the chest; and till these are compared together we are not in a position to form any opinion whether the cause of consolidation be tubercle, pneumonia, or pleurisy.

No distinction has been here made between the varieties of blowing sounds, whether diffuse or tubular, bronchial or cavernous. In so far as these names express conditions of lung they are objectionable, and in so far as they express differences of sound they may be of value to us afterwards in deciding what is the actual cause of the consolidation; but at present it is quite immaterial to our inquiry whether the sound be formed in a large bronchus or in a vomica. The difference is one of degree, not of kind, and the fact is simply that a blowing sound is heard on that side which is dull on percussion, and we determine that these two circumstances taken together prove the existence of consolidation.

Dulness on percussion would seem to be opposed to the idea of the lung being hollowed out by cavities; and the conclusion would appear to be not unnatural, that when the breathing is louder from this cause, the resonance on percussion ought to be greater than on the opposite side. Such, however, is not usually the case, and it is only to be observed when a large cavity

exists near the surface: the percussion sound then presents the character of wooden hollowness (of this kind is the cracked-pot sound); and an expert auscultator can by percussion alone feel pretty certain regarding the causes of such differences: the student must be content at first with the broad distinctions of increased and diminished resonance and resistance. The long blowing breath-sound heard with a tumour on one side of the chest, is to be accounted for by its pressing on some large bronchus: on careful auscultation it will be noticed that this sound is heard in addition to, not instead of, the vesicular breathing; the latter, however, is weaker than on the healthy side.

When remarkable resonance is heard, as referred to in § 2, it is to be noted first whether this be general or local; and next whether the sound represent merely a great exaggeration of the natural sound with complete resiliency, or have acquired any peculiar or tympanitic tone, and whether it be accompanied by a sense of resistance: the examination of the posterior part of the chest will readily clear up any doubt between a large cavity and a condition of pneumo-thorax: it will equally answer the question as to the presence of fluid in the pleura and of emphysema in the marked form to which this section refers: the possible contingency of a small portion of air occupying the upper part of the pleura is best solved by the history of the case. It is very rarely met with except after the operation of paracentesis; but it probably does sometimes occur from spontaneous decomposition of the purulent fluid of empyema.

The cases ranged under § 3 are those most likely to be confounded together by a learner: his ear is sufficiently educated to know that there is a difference on percussion, but he may mistake the sharpness of the tone of slight consolidation for an increase of resonance. It is a good plan to compare not only the opposite sides of the chest, but also the upper and lower parts on the same side, when it will at once be perceived that there is a greater difference between the resonance above and below on the duller side than on the more resonant one: for this indication to be conclusive, the chest must be symmetrical. Still, the fact does not determine which lung is the seat of disease, and the first impression is very probably that it must be on the duller side, when in reality it is perhaps on the more resonant one. The safest course to pursue in all cases of doubt is to compare the whole auscultatory phenomena, not only as heard at corresponding portions of opposite lungs, but as heard in different parts of the same one: we may conclude with pretty great certainty that if under either clavicle they deviate much from their general character throughout the rest of the chest, *there* disease of some sort exists; and whether that be of the

form of consolidation or of expansion is to be resolved by the fact that comparative dulness and increased voice-sound (which always to a certain extent go together) are found on the healthy side when the disease is emphysema, on the diseased side when it is tubercular. The presence of a dilated bronchus in the emphysematous lung, causing blowing breath-sound, cannot so readily mislead us in this as in the following section, where the result of percussion is negative: in this case the absence of dulness or want of resiliency should be sufficient to guard against error.

There is one source of fallacy which must be avoided. When emphysema exists to a considerable extent throughout the chest, and has been accompanied by repeated attacks of bronchitis, it frequently happens that all the tubes are to a certain extent rigid and dilated. Now, if the emphysema be chiefly of the lower lobes, and one of the upper lobes be less affected than the other, the breathing may be almost entirely suspended throughout the chest, while the dilated bronchi of the least diseased structure give rise to sounds under one clavicle which have the character of being produced in larger spaces, and not in the vesicles; and on this side there is by comparison dulness on percussion. How do we know that this is not a case of consolidation? Simply by considering the condition of the rest of the lung: we may be tolerably certain that, in extensive emphysema, the existence of tubercular or other consolidation is not to be looked for.

The cases comprised under § 4 demand a little more consideration, because the information derived from percussion is unsatisfactory; and the last series represents a most important class of cases,—early phthisis, in which no information can be obtained from the rest of the chest; adventitious sounds, too, are often wanting; and unless we can establish a distinct relation between general symptoms aud auscultatory phenomena, our judgment must be held in suspense.

In health there is no great difference in the intensity of the breath and voice-sounds under each clavicle in the same individual; except that they are very slightly more intense on the right side than on the left. Scarcely any two individuals present sounds exactly alike, and what would be the effect of disease were it heard in one, is the normal condition in another. But though these limits of health have a very wide range, they have reference to a certain standard with which the student cannot too early make himself thoroughly familiar; and when in any particular case he finds the clavicular region on each side alike deviating from it, he must institute a comparison with the other parts of the chest.

A patient does not generally seek for relief from symptoms

of emphysema alone; it is a permanent condition of ill health which has been the growth of years, and has been increased by every cold; and it is only when bronchitis supervenes that he thinks of asking for medical advice. The sounds of bronchitis are then heard in addition, and hence it often happens with inexperienced auscultators that the mingled sounds of the mixed diseases are taken as those of emphysema itself, and the possibility of emphysema without bronchitis is forgotten.

When partial dulness exists on both sides, from mere loss of resiliency of the ribs, the main source of error is the existence of a dilated bronchus. An elderly person who has long suffered from chronic bronchitis presents very often rather a flattened chest; the loss of elasticity in the ribs causes resistance on percussion, and tends to give the stroke a dull sound; the large tubes become thickened and dilated, with loss of elasticity; the vesicles do not expand and contract with their usual freedom, may be closed by thickened mucous membrane, or, when adventitious sounds are present, by inspissated mucus: under such circumstances, just as happens in emphysema, blowing breath-sound both with inspiration and expiration may be present, with locally increased voice-sound; and inasmuch as the alteration in condition and especially in form of these tubes is unequal, the changes detected by auscultation are also unequal. When, in addition to this, the signs of general bronchitis are present, it becomes almost impossible to determine whether at the apex there may not be either tubercular consolidation or a number of small cavities, or whether there be only dilated bronchial tubes; and the final decision must rest more on correlative signs and symptoms than on those of percussion and auscultation; and we shall have not unfrequently to wait till the general bronchitis be gone, before pronouncing a decided opinion. Should the case then be submitted to a fresh examination, and nothing remain but the ill-defined dulness on percussion, and a diffuse blowing-sound of expiration, nearly equal on both sides, without the local distinctness of amphoric breath and voice-sounds, we may conclude with great confidence that there never has been any tubercle.

It rarely happens that consolidation is equally advanced in both lungs, and an expert auscultator can generally detect a difference in shade between the dulness of the two sides; but I must confess that I have seen serious mistakes made in attempting to determine by percussion alone which of the two was the most solidified lung.

From the advanced stage in which the dulness on percussion is unquestionable, it gradually passes, in cases of tubercular deposit, into that in which percussion fails in detecting consolidation at all: our means of appreciation are not sufficiently

accurate, and the two sides of the chest are not even in health shaped exactly alike; while the difficulty of course is increased when the deposit is deep-seated, and healthy, or nearly healthy structure intervenes between it and the parietes. But when auscultation is taken along with percussion, the difference between the two sides becomes more apparent, and the existence of morbid structure is proved by the changes in rhythm and quality of breathing and loudness of voice, as well as by the adventitious sounds, which not only differ from what is heard in the rest of the chest, but are also unequal on its opposite sides. The expiration is always more audible and somewhat prolonged, while the inspiration is sometimes loud and harsh, sometimes weak and defective; the exaggerated voice-sound, in the latter instance, forming a most striking and trustworthy contrast.

Assuming that a difference on percussion is not clearly made out, some unusual sound may at once determine that local change of some sort has passed upon one lung; but in its absence, or for further confirmation of its cause when present, we compare carefully by auscultation corresponding portions of either lung. It may happen that on one side the breathing is stopped by a plug of mucus in one of the tubes: this may be removed by causing the patient to cough and dislodge the obstruction. In doubtful cases the act of coughing is of use in other ways, by changing the character of the sounds heard, and also by causing the patient to take a deeper inspiration than we can get him to do by ordinary means.

Such a slight condition of emphysema as may possibly exist with no relative difference in percussion resonance, is of no practical value, except as it modifies the sounds of bronchitis when any such are present: our chief concern is to be able to detect with some degree of certainty the early deposit of tubercle. Rational diagnosis alike seeks to avoid forming hasty conclusions from insufficient premises, and neglecting evidence which, however slight, is of real import; and with this view the indications of early deposit have been ranged in the last subdivision of this section pretty nearly in the order of their importance. It is to be remembered that alteration of rhythm, or quality of breath-sound, is much more important than mere loudness or distinctness, and that naturally both the breathing and the voice are louder on the right side of the chest than the left.

A word must be said of other phenomena as evidence of consolidation, which are derived, not from the lungs themselves, but from the sounds produced in the heart and arteries, which are transmitted through the lung. When the heart-sounds are heard more loudly at the right apex than at the left, or a blowing arterial murmur is heard in the subclavian artery, generally on the left side, there is reason to suspect consolidation; but

both are unquestionably only of value as confirmatory of other signs.

Such is a general outline of the evidence as to the condition of the lungs derived from the combination of percussion resonance and alterations in the breath and voice-sounds in the clavicular region. Many of the more obscure points require for their elucidation an examination of the other parts of the chest, and in all cases a diagnosis must never be attempted without making it: the evidence derived from adventitious sounds has yet to be considered, and my object has been to place the changes already spoken of in such a simple point of view as to lead the student by logical analysis to form for himself a correct opinion of the state of the patient. For this reason many of the more delicate modifications which find place in elaborate works on auscultation and percussion have been purposely omitted: to a practised ear such varieties may all be sufficiently intelligible, as indicating peculiar conditions of the subjacent tissue; to the student they are only productive of confusion. Let us never for a moment forget that these investigations as aids to diagnosis ought not to serve as an opportunity for a parade of skill on the part of the observer, but are to be instituted solely for the better determining the form of disease under which the patient labours. At the same time the student ought not to be deterred from making himself acquainted with all the more complex phenomena of auscultation; for in this, as in all other branches of knowledge, the man who is most familiar with the more abstruse facts will most readily appreciate the simpler ones: and the evils that have resulted from paying too great attention to physical diagnosis have arisen quite as much from imperfect knowlege of the facts it discloses, as from disregard to symptoms derived from other sources. In the exercise of a sound judgment, and with the view simply of ascertaining the condition of disease, and its most appropriate treatment,

a practised ear will be of essential service: in following the paltry object of a display of skill in determining the exact condition of an obscure case, the most dexterous is constantly misled: I would even add that the self-satisfying curiosity which seeks to investigate all the morbid phenomena with reference only to post-mortem appearances is a less estimable quality than that which, while satisfied with a more limited knowledge, has its sole aim in alleviating suffering and curing disease.

Division II.—The Posterior and Lateral Regions of the Chest.

In comparing together the amount of percussion resonance and the modification of breath and voice-sounds, we find ourselves much limited by the various circumstances already mentioned as interfering with the application of percussion at the lower portions of the chest, and the indistinctness of its results upon the scapula; but here we have fortunately to deal less with disease of small amount and limited extent, more with general conditions of whole lobes or the entire side of the chest. The breathing differs in intensity most materially in different patients, and the student should first endeavour to catch the sound about the inner edge and angle of the scapula on the healthy side if he suspect one to be diseased; then to compare this with the other: from thence he may trace it upwards and downwards and to either side, listening at the same time to the sound of the voice. It is a good plan to get the patient to talk continuously on some subject; because, not only is the voice thus heard, but at the end of each sentence a deeper inspiration is made, which thus becomes audible, when, as sometimes happens, the natural murmur is so weak as scarcely to be heard at all: practically I think this plan more convenient than causing him to count one, two, three, &c., as many auscultators do; the latter

gives more equal intensity to the sound of the voice than general conversation, but minute differences in vocal resonance are not of much value: it is important, however, in all cases to hear the natural respiration if possible without the intermixture of the sound of the voice.

§ 1. Percussion elicits a marked difference in resonance between the two sides, with much resistance on the duller side.

A. There is no breathing at all to be heard at the base of the lung, on the dull side; at a higher level, varying in different cases, it first becomes audible; and at the upper part prolonged expiration is heard louder on the dull side posteriorly: the voice-sound is exaggerated and ringing at the upper part, and at one particular elevation it has a peculiar tremor and shakiness, which has received the name of ægophony. These circumstances indicate that the absence of breath-sound is caused by the effusion of fluid.

B. The breath-sound is nowhere wholly inaudible, or, at all events, it is heard quite low down in the chest; usually adventitious sounds are present, but somewhere or other the breathing has a loud blowing sound, is harsh and distinct, and the expiration unusually prolonged. The voice-sound is exaggerated throughout, and at one part has a ringing brassy quality, which is often mistaken for ægophony, but wants its vibratory character. These are indicative of increased conducting power of lung-tissue, due to consolidation; and it will be a question, when percussion dulness is very marked, whether any effusion of fluid accompanies the consolidation.

C. In chronic cases the breath-sound may be nowhere inaudible, with considerable dulness on one side, when the want of resonance is caused by a thickened pleura after an attack of pleurisy has subsided. It is chiefly marked by the extent of surface over which the dulness is traceable, while the breathing is pretty uniform throughout. When the subjacent lung is healthy, the breath-sound is only weaker than that of the oppo-

site side; when other signs of disease are present it may be a cause of considerable obscurity.

D. The percussion sound is superficially somewhat resonant, but very distinct dulness is observed when the stroke is firm and forcible: the breath and voice-sounds are not much changed, except that the vesicular breathing is generally weak on the affected side, and is combined with the sound of distant blowing. The phenomena are the same as those referred to in the clavicular region; and the diagnosis of deep-seated tumour, so far as auscultation is concerned, really rests simply on such a state of things being found pretty generally throughout one lung.

§ 2. Percussion indicates a marked difference between the two sides of the chest, one of them being unusually resonant.

A. The breathing is heard, with a loud blowing, amphoric sound; the voice has a similar character; the percussion resonance, while tympanitic, has commonly a hard wooden tone: these are the characteristics of pneumo-thorax.

B. The breathing may be inaudible while the other characters remain the same. These, like the corresponding cases in the clavicular region, are also produced by the presence of air in the pleura; and it is when the evidence obtained from the posterior and lateral regions is analogous to that of the clavicular region that we can alone determine its existence with certainty when the amphoric breath and voice-sound are not heard.

C. Very rarely do we find the clear elastic resonance of emphysema on one side contrasting very strikingly with the percussion stroke on the other; most commonly the affection extends to both lungs; the inspiration is generally inaudible, and the expiration characterised by one or other of the signs of bronchitis, or heard as a distant blowing sound: the voice-sound is less distinct than usual.

§ 3. The dulness on percussion being less marked,—

A. The expiration is prolonged, and the voice-sound exaggerated where the dulness is observed, just as we

have already mentioned in similar consolidation under the clavicle.

B. A slight amount of emphysema of one lung produces effects similar to those mentioned in Div. I; louder breath and voice-sound on the duller side, without any character of harshness or alteration of rhythm: prolonged expiration is rather to be heard on the more resonant side; but, except it be accompanied by some form of superadded sound, this condition is not one of any importance.

C. In inflammation attended with pain, the motion of the ribs is interfered with, and there is slight dulness and want of breathing, while the voice is generally exaggerated: if a forced inspiration be taken we perhaps obtain the friction-sound of pleurisy or the crackling of pneumonia.

D. The breathing is sometimes weak and unequal on the two sides below: as we ascend, it becomes more distinct, but is harsh and unnatural; and above, blowing breath-sound is heard louder at one apex than the other; the voice is always unnaturally loud. Both lungs are, in truth, partially affected, but in one the signs of disease are much more evident: this is the usual condition in acute tuberculosis; it is always accompanied by corresponding changes in the clavicular region, and commonly by adventitious sounds.

§ 4. No difference is anywhere detected on percussion between the two sides.

A. The resonance may be natural.

a. Alterations in breath and voice-sounds may be heard at the apex, where they confirm the conclusions already arrived at in examining the clavicular region. A delicate ear may, indeed, make out dulness in the supra-scapular fossa; but cases continually present themselves in which it is not possible for the majority of persons to do so.

b. On one or both sides the sounds of mucus in the smaller bronchi may be heard, when there is no change

whatever in the density of the lung; this commonly happens in bronchitis.

B. Both sides may be unusually resonant; the chest full and rounded, the scapulæ far apart, and little movement comparatively observed in breathing; the breath and voice-sounds are both weak, or almost null, perhaps some distant blowing expiration is audible; very commonly adventitious sounds are detected. If similar circumstances have pointed to emphysema in the clavicular region, the diagnosis becomes certain.

C. Both sides may be somewhat duller than natural: rarely, indeed, equally so on both sides, but still such as not to be very distinctly different. This may occur in œdema of the lungs, deep-seated pneumonia, fibroid degeneration or pneumonic phthisis, and general tuberculosis; a difference in percussion resonance is least perceptible in the first of these affections and greatest in the last, in which, over the scapula and under the clavicle, it can almost always be made out: when the lungs are œdematous, the presence of moist sounds leaves us in no doubt; in pneumonia the dulness may sometimes be determined by percussion in the axillary region when it cannot be made out posteriorly. In any of these cases the presence of adventitious sound, or of change in the loudness and rhythm of the breathing, suffice to prove that there is something wrong, and we must assume that they in reality belong to the next class.

D. The difference on percussion is not observed. This does not form such an important class as it did in Div. I, because the early detection of insidious disease belongs especially to the examination of the clavicular region. When we fail to detect any dulness on percussion, the auscultatory phenomena must be more carefully inquired into if they lead to the conclusion that any consolidation of lung tissue has taken place. Adventitious sounds, especially in fibroid degeneration, are rarely wanting to aid the diagnosis,

but the actual changes in breath and voice-sound are just what have been already pointed out; harsh inspiration, prolonged expiration, exaggerated vocal resonance. It is to be remembered (1) that at the upper part of the chest behind, too much importance must not be assigned to them, when they seem to be normal in the clavicular region, because of the distribution of the large tubes towards the back of the lungs: (2) that at the lower part of the chest the voice-sound is of comparatively little value, because of the distance from the larynx; but in deep-seated pneumonia this is sometimes the only sign we obtain confirmatory of the evidence of general symptoms: (3) the mere weakening of breath-sound by emphysema, when increased resonance is not perceived, is of very slight moment, except in so far as it accounts for bronchitis being limited to one side of the chest: it is also to be borne in mind as affording an explanation of deficient respiration; because (4) in pleurisy, before dulness can exist, the breathing is suppressed, and the distinction between the two depends chiefly on the history, and the presence or absence of pain and fever.

Of the cases mentioned under § 1, it is to be remarked that no condition of lung gives such a dull, dead percussion sound, with manifest resistance, as that which is due to pleuritic effusion: the multiplying of evidences of its existence is therefore unnecessary, but its amount may be judged of by the bulging, more or less, of the intercostal spaces, the lateral displacement of the heart, the space over which breathing can be heard, and the downward displacement of the abdominal viscera.

The term ægophony is one of the opprobria of auscultation; and yet it has become so consecrated by use, that it is difficult to see how it can be got rid of: the name conveys no idea of the sound, but is so completely associated in the mind with the thought of pleuritic effusion, that it cannot be applied without suggesting a theory of the nature of the disease; it is therefore quite as objectionable as any other word which more explicitly asserts the condition of the lung (*e.g.*, cavernous). It is quite true that when the sound has been fully learnt, it will be recognised in its perfect form, under no other circumstances; but the

resonance of the voice is most commonly increased when there is dulness on percussion, and often acquires a ringing or even a shaky quality, which closely resembles ægophony, and is constantly mistaken for it. In using the term it must be limited to those cases only in which, over a small extent of lung surface, a hollow, squeaking, tremulous voice-sound is heard, which above and below passes into something else.

Sometimes, in consequence of the lung being fastened down to some part of the chest by old adhesion, the breath will be heard unusually low in cases of simple effusion, especially near the spine: this source of fallacy must be borne in mind, and an examination of the lateral region will give sufficient evidence of the presence of fluid.

The condition of the lung is very different in consolidation and compression; the one being a deposit within, the other a pressure from without: in both, the vesicles may be equally obliterated, and the mass equally solid and heavy; but in the one there is no loss of size, and all the tubes are patent; in the other all the minor tubes at least are collapsed as well as the vesicles. This circumstance fully explains the increased breath-sound as heard in consolidation compared with that heard in compression.

In a case in which there is consolidation of the lower lobe along with effusion of fluid, the upper lobe must suffer compression to allow space for its presence, because the lower is firm and incompressible: in it the tubes remain open while the vesicles are obliterated; and hence the diffuse blowing, and the diffuse exaggeration of voice which has been noticed. Superadded sound is very commonly present; in pleuro-pneumonia it will be heard as the fine, crackling sound called crepitation; in œdema of the lungs with passive effusion, as a coarser sound, which is never wanting: the œdematous condition seems to be one rather opposed to the production of ægophony, which often cannot be heard when there is clear evidence of fluid in the pleura.

Chronic thickening of the pleura may continue for long periods after all acute symptoms have subsided. I have observed dulness from this cause in childhood several years after a single attack of pleurisy. It only becomes of importance when any form of disease attacks the lung itself, and then the unusual circumstance of breathing being heard throughout the whole extent of dulness, at once points to some condition different from ordinary pleuritic effusion. A history of some acute attack at an antecedent period may generally be obtained in explanation of the circumstance, and we must judge of the condition of the lung just as if no dulness were present.

When a tumour is deeply seated in the lung, the dulness is diffuse, with little sense of resistance, and comes out more dis-

tinctly on firm percussion; the breathing is weak but superficial, not otherwise changed except that it is less audible than on the opposite side; a blowing sound will be heard when the tumour presses on one of the larger tubes, and it seems to be conveyed to the ear from a distance, in addition to the weak vesicular breathing heard at the surface; the distant blowing may also be sometimes detected at the back of the other lung.

The diagnosis of the cases referred to in § 2 is much aided by the character of the superadded sounds which are commonly present. This is especially remarkable in cases of pneumo-thorax; and in emphysema we know that bronchitis often co-exists, and gives rise to the various sounds of that disease. In the first bursting of air into the cavity of the pleura, the intense dyspnœa which it suddenly produces, determines at once the interpretation we ought to give to the tympanitic percussion sound; subsequently the invariable sequence of pleurisy and effusion—hydro-pneumo-thorax—is attended by other very peculiar sounds technically called the sound of succussion and metallic tinkling. The loudness of the breathing, anteriorly or posteriorly, depends entirely on the position of the aperture by which the air enters, and its continuing open or not.

Emphysema commonly affects both lungs, though not equally; its weak, prolonged expiratory sound can scarcely ever be mistaken for the peculiar amphoric echo of pneumo-thorax, and the absence of voice-sound in the one contrasts strikingly with its metallic reverberation in the other; not less different is the clear resiliency of the percussion sound in emphysema from that wooden hollowness which the tympanitic resonance of pneumo-thorax acquires from inflammation of the pleura consequent on the admission of air.

Under § 3 there is not the same liability to error that we found in the same class in the clavicular region; the differences observed on percussion are less delicate, and the early deposit of tubercle cannot be traced in the other parts of the lung. When dulness is perceptible, we have a more advanced form of disease, and there is not the same chance of error in mistaking its seat, when that happens to be on the more resonant side; still, it must be remembered, that the character by which we recognise an emphysematous lung is the combination of deficient, altered breathing with increased percussion resonance; all other morbid states cognizable by percussion at the posterior and lateral parts of the chest belong to those in which dulness and altered breathing go together. The respiration is weak and imperfect, or loud and harsh, over the seat of dulness; and according to the extent to which vesicular breathing, however imperfect, is heard, do we determine whether the disease affects the superficial or the deeper-seated structure of the lung, except when pain puts a stop

to the ordinary movement of the ribs on the affected side; but this very fact is one of the elements of diagnosis, and corrects our hypothesis of the condition of disease. It is, however, worthy of notice that, as compared with indications derived from the clavicular region, dulness on percussion, though only of slight amount, may be accompanied by changes of breath and voice-sound which correspond to marked dulness in front. The causes of consolidation are in many respects analogous to those mentioned in Div. I, but mere compression may be excluded, because at the lower part of the chest we have always in such cases the evidence of the presence of fluid.

The evidence of tubercular deposit is always somewhat more clear in consequence of the tendency to greater development at the apex than elsewhere. Consequently, as we trace the signs of partial consolidation increasing in distinctness from below upwards, we feel great certainty that the change is due to tubercle. The discovery of a local deposit at the apex of the other lung would put the question beyond doubt. For the same reason, the absence of signs of deposit at the apex would lead us to suspect that partial consolidation of other parts was due to fibroid degeneration.

The absence of any perceptible difference in percussion between the two lungs, as referred to in § 4, is a more constant condition in diseased states at the posterior and lateral parts of the chest than in front, but it is also less material to ascertain the more minute differences, which are indeed in great measure not to be recognised by the student. When evidence of disease at one apex has been obtained anteriorly, the breath and voice-sounds may differ more or less throughout the whole extent of the lung; but when in the lower lobes they are exactly equal on both sides, we feel great certainty in the diagnosis of phthisis. If the difference in percussion be not perceived, although really existing, as, for example, in general emphysema, in dulness affecting both sides of the chest, or in the early stages either of consolidation or dilatation, a correlative difference may yet be traced in the breath and voice-sounds, sometimes with and sometimes without superadded sound; and we must endeavour to ascertain the general character of the breathing in the individual who happens to be under examination, contrasting this, as the standard, with that heard on each side where the difference has been detected; that which deviates most is sure to be the seat of disease; the voice may then help to determine whether it tend towards consolidation or towards excessive expansion.

At the upper part of the chest it is important to remember the natural tendency to loudness on the right side, and this is especially remarkable over the spine of the scapula; but anywhere near the bifurcation of the trachea, owing to the different

direction of the bronchi on the two sides, local loudness, even when it has a blowing character, may be disregarded. At the base in chronic states, difference of breathing without adventitious sounds is of minor importance when no dulness is made out: in acute cases, the early checking of the respiratory movement in pleurisy, and the absence of almost any indication in deep-seated pneumonia, should not be forgotten. It sometimes happens that very distinct evidence from general symptoms is obtained of the existence of pneumonia when the only auscultatory phenomenon consists of a diffuse voice-sound, reaching the ear more loudly on the affected side; the breathing may be equal to, or only very little weaker than that on the opposite side: occasionally more careful auscultation may detect somewhere or other a distant blowing sound proceeding from the consolidated portion, which is not altogether concealed by the vesicular murmur.

Summary.

Percussion resonance and changes in the breath and voice-sounds serve to point out the greater or less relative density of the contents of the chest; and it is very important for the student to learn to reason logically upon the indications thus presented to him. We have therefore kept out of view for the present all the additional information which *adventitious* sounds necessarily convey, because the first question to be solved, before assigning a cause for any such sound, is whether there be or be not any change of structure, any increase or diminution in the solids, the fluids, or the air of that part where the abnormal sound, whatsoever it may be, is heard. We find, then, that the lung itself may be either more or less dense, and the pleura may contain either fluid or air: or we may have, for example, in advanced phthisis, dense lung surrounding a hollow cavity; and in hydro-pneumothorax both air and fluid in the pleura.

§ 1. Condensation presents itself in three forms: (1) carnification, when, from mere pressure, the air is excluded from the vesicles, and only permeates those larger tubes which are kept open by their own elas-

ticity; the most prominent example of this class is the leathery lung of pleurisy with no accompanying pneumonia: an analogous condition is found in some instances where the pressure is caused by a tumour, and we may regard in the same light the atelectasis of new-born children, the pressure in this case being simply atmospheric, the inspiratory act not having sufficient power to force the air into the minute tubes. (2) Hepatization: the parenchyma of the lung is solidified by an effusion of coagulable lymph, which occludes the vesicles, but does not fill up any of the tubes; the only real representative of this form is pneumonia: œdema, and engorgement of the lungs, which are both passive states, although increasing to a small extent the relative density of the tissue, do not produce the same occlusion of the vesicles, and do not give rise to similar auscultatory phenomena; the condensation from these causes is rarely such as to produce definite dulness on percussion. (3) Tuberculization, which is seen under very different aspects, either as minute deposits separated by certain intervals, and in so far obstructing either vesicles alone, or vesicles and tubes together; or as aggregated into masses, some of which have been expelled and have left hollow spaces remaining; or, again, what is very rare, as a uniformly diffused deposit, closely analogous to that of coagulable lymph. Percussion resonance can only show that the condensed lung is more solid than its fellow, and may give a rough estimate of the extent to which air is excluded; but it is quite a mistake to suppose that it can ever discriminate the cause of its exclusion: auscultation reveals more definitely the extent to which the air penetrates the lung, and also teaches us how far the tissue is changed as a medium for the formation and transmission of sound.

Recent advances in pathology have shown that all cases of phthisis are not due to tubercle. In the lower lobes a degeneration of the fibrinous exndation takes place after pneumonia,

which gives rise to phenomena very analogous to those caused by tubercular deposit. In discussing the auscultatory signs it is unnecessary to do more than allude to it as a condition which gives indications exactly corresponding to those of tubercular deposit so far as the density of the lung is concerned. When we speak of adventitious sounds we shall have to point out, that, as it is always accompanied by a condition of chronic bronchitis, the accumulation of mucus in the tubes greatly obscures the diagnosis.

In each of these forms of condensation the proper vesicular murmur is wanting. In the first the sounds are similar to those heard over a healthy trachea, but deadened by passing through the tough inelastic tissue placed between the large tubes and the ear; the inspiration and expiration are both loud and harsh, and the voice ringing; and these sounds are diffused over the whole space where the carnified lung exists, except where the voice is so modified by the presence of fluid in the pleura as to acquire the quality which has been denominated ægophony. In the second the breathing gives rise to a peculiar whiffing sound as it enters the small tubes, the sides of which have acquired hardness and increased vibratory power from the effusion of lymph around; and it is readily transmitted to the ear through the dense elastic structure: the voice has at the same time a very loud, sonorous, and metallic or brassy sound, from the same circumstances, and is diffused over the whole hepatized portion of the lung. In the third the characters vary very much according to the amount and the state of the deposit: in the early stage the breathing is heard in smaller tubes than in carnification, and does not produce in them the whiffing sound of hepatization; the voice is not ringing as in the one, nor metallic as in the other; there is indeed a period in tubercular deposit in which modified vesicular breathing is heard, while no marked change has passed on the voice at all; proceeding further, the vesicular breathing is more or less suppressed, and the lung acquires greater power of transmitting sound, so that the breathing

and the voice, which properly belong to the bronchial tubes, are heard at the surface, and are therefore louder and harsher than in health: this gradually increases in intensity till the tubes are encroached upon, when the breath-sound becomes more faint, and their elasticity being lost, the expiration is prolonged; at the same time consolidation has proceeded to a greater extent, and the voice-sound is therefore louder; next, the foreign matter softens and is expelled, the air begins to vibrate in larger spaces, and the breath-sound becomes louder, harsher, and more blowing; till at length the large cavity, with unyielding walls, gives out a long, loud, blowing inspiratory and expiratory sound: at the same time the voice-sound attains such loudness and distinctness that it seems as if it were produced at that very spot, and spoken up through the stethoscope to the ear. As might be anticipated, in the rarer cases in which tubercle is deposited in the same way as lymph, the auscultatory phenomena are also analogous.

In each of these cases diagnosis is aided by several other circumstances: in carnification by evidence of the presence of fluid or air in the pleura or of some solid substance which has pressed on the lung and expelled the air from its vesicles; in hepatization by the lower and back parts being more commonly affected; in tuberculization by the upper lobe being first or most extensively diseased. The difficulties are chiefly connected with the reversing of the ordinary rule regarding situation, and the combination of two conditions of condensation—carnification with hepatization, or with tubercles; tuberculization with hepatization; or even all three together. We have also to consider the condition of the opposite lung: when the breathing is much obstructed on one side, it is usually exaggerated on the other—puerile as it is often miscalled, and if it be equable throughout, the disease is probably not tubercular; if the apex of the comparatively healthy side be affected, the opposite

lung is almost certainly in a state of tuberculization; if the sounds at its base be changed the cause of disease in the other is probably inflammation.

§ 2. In cases in which the lung has become less dense than natural it is immaterial whether the vesicles be distended, as in the common form of emphysema, or the air pass into the parenchyma of the lungs, as happens when its structure is torn: the natural elasticity which expels the air at each expiration is lost in either case, the air stagnates, and the vesicular murmur is no longer audible: the sound of air moving in the large tubes would indeed be heard distinctly, were it not that the rarefied tissue has become a bad conductor; and hence it is only when superadded sounds indicate the motion of the air, or when the tubes, thickened, roughened, or dilated, cause unusual vibration, as it passes to and fro, that the distant sounds reach the ear at all plainly: the voice meets with the same obstacle to its transmission, and is only heard when the tubes are thickened or dilated. The adventitious sounds, therefore, stand with many for the evidence of emphysema, while in reality they are so only secondarily; the thickening and dilatation of the tubes, and the increased voice- and breath-sound which accompany them, are frequent sources of fallacy.

§ 3. No other condition of disease exactly simulates the dead, dull, inelastic sound of percussion, and the sense of resistance which is produced by the presence of fluid in the pleural cavity; occupying as it always does the inferior part, the intensity of the dulness gradually diminishes towards the apex, but of course it varies with the amount of fluid; and inasmuch as pleurisy does not necessarily imply the presence of fluid, the dulness may be caused by effusion of lymph only. When this is the case, the dull sound is mixed up with a certain degree of resonance, which has been

compared to that of striking on wood; one which in its greatest intensity is best heard when there is a thickened pleura with air in its cavity. If there be no pneumonia when fluid is effused, the lung is simply carnified from pressure; it is pushed upwards, and hence the sounds belonging to this condition are most distinctly to be made out under the clavicle; somewhere over the scapula ægophony is met with. When pneumonia is also present the tubes remain more generally permeable to air, and the voice-sound is diffuse, somewhat metallic or brassy, but modified by the superstratum of fluid, so as to approach to ægophony; it differs, however, in that it is diffuse and not local. If chronic thickening of the pleura exist, the breathing is weaker, but not otherwise modified by this circumstance.

The tympanitic percussion sound of air in the pleura is very rarely pure; there is almost always a thickened membrane, which gives a wooden tone to the resonance, and fluid usually exists at the base. Percussion over a large cavity has an amphoric or cracked-pot resonance, which is somewhat analogous, but no mistake need occur from this cause if any degree of care be used; because at the lower and back parts breathing, probably much altered and mixed with various morbid sounds, can be detected where there is only a cavity at the apex, while none can be heard in pneumothorax, save where the air escaping from the lung causes the long amphoric blowing of expiration.

CHAPTER XX.

ADVENTITIOUS SOUNDS IN THEIR RELATION TO ALTERED BREATH- AND VOICE-SOUNDS.

Classification.—§ 1, *Interrupted Sounds*—§ 2, *Continuous Sounds.*

Div. I.—*The Clavicular Region.*—§ 1, *With marked Dulness on one side*—§ 2, *with excessive Resonance* § 3, *with less marked Difference on Percussion*—§ 4, *with no perceptible Difference.*

Div. II.—*The Posterior and Lateral Regions*—§ 1, *With marked Dulness on one side*—§ 2, *with excessive Resonance*—§ 3, *with less distinct Difference*—§ 4, *with no perceptible Difference.*

Summary. *The real Teaching and relative Value of Adventitious Sounds.*

We have next to consider what further light is afforded by adventitious sounds as to the causes of that change of structure which has been indicated by alterations in breath- and voice-sound and in percussion resonance; and also what they teach us concerning the state of the lungs, in cases in which we have been unable to detect any change of density.

Various modes of classification have been adopted by different authors, but they have all been framed more or less on theories regarding the mode of development, either with reference to the situation in which the sound is supposed to be generated, or to the amount of fluid assumed to be necessary for its production. The names which authors have thus either fancifully or theoretically imposed upon these sounds have too often only served to mislead the student, by causing him to attach the idea of a particular condition of disease to the name of some given sound, or

by rendering it impossible to understand the exact character of one upon which various names have been bestowed. We have endeavoured in the preceding chapter to limit the names used to terms expressing the character of the sound heard, and the same course will be followed with reference to this new class of phenomena, in so far as it can be done without roughly discarding customary terms. Perhaps there is no advantage in classification at all, but it may tend to simplify matters if they be divided into interrupted and continuous—including in the former those that consist of a series of distinct noises or minute explosions, and in the latter those that form only one prolonged sound.

§ 1. *Interrupted Sounds.*

a. Crepitation consists of a succession of fine crackling sounds, commonly so minute and so close together that the ear can scarcely detect their distinctness.

b. Moist Sounds; the least objectionable term which has been employed to designate a rattling noise in which the separation of the individual explosions is more distinct than in crepitation: they convey the idea of air passing through a small quantity of fluid in minute bubbles.

c. Gurgling Sounds are only a modification of moist sounds, but are yet easily recognised as a class by themselves, the air evidently gurgling or passing in large bells through a considerable amount of fluid.

d. Metallic Tinkling.—This might also be called amphoric dropping, conveying to the ear the idea of distinct drops falling with a plash in a large space, and producing a ringing metallic noise.

e. Closely connected with the preceding is the plashing sound heard when the patient moves quickly, or is shaken, in cases of hydro-pneumo-thorax. It is called the sound of *succussion.*

These sounds pass by insensible degrees into each other. Crepitation may be so very fine as to be

mistaken for a continuous sound (of friction for example), or it may be so very coarse as to be analogous to a moist sound; theoretically very distinct, the value of such sounds can only be estimated practically by the co-existence of other phenomena. Moist sounds may be divided into fine and coarse; they hold a position intermediate between crepitation and gurgling. Among these may be classed a sound which has been very inappropriately called dry crackling, which consists of single clicks recurring at longer or shorter intervals; when speaking of it apart from moist sounds, of which it is, in certain circumstances, the precursor, it will be distinguished by this character. Another modification is the squeaking sound, which approaches to gurgling, and conveys the idea of its being produced by a large bubble, in consequence of the viscidity rather than the quantity of fluid. Gurgling, again, sometimes consists of solitary bubbles, at very considerable intervals, exploding in a large empty cavity with a hollow metallic or amphoric ring, which is scarcely distinguishable from metallic tinkling.

§ 2. *Continuous Sounds.*

a. Sonorous and Sibilant Sounds.—These consist of a prolonged tone, grave or shrill, or simply of a continuous hissing noise, accompanying the greater part of the act of inspiration or expiration, or both together, but chiefly the latter; it is that noise which, when loud enough to be heard without applying the ear to the chest, is called wheezing. The depth or shrillness of the note indicates, within certain limits, whether the sound be produced in larger or smaller tubes.

b. Friction Sound, caused by the rubbing together of two roughened surfaces of pleura, which, in their healthy state, glide noiselessly over each other. It has been already noticed that crepitation is sometimes so fine that it can scarcely be distinguished from friction, when the ear cannot discriminate the distinct

explosions of which the sound is composed. In a similar manner, friction may be so coarse as to be mistaken for crepitation. The chief differences are these: crepitation is more deep-seated, friction more superficial; fine crepitation accompanies the act of inspiration only, is quite rhythmical with it, and terminates with it: friction may occur at any period of the respiratory act, is very commonly heard both with inspiration and expiration, or is intermediate between them, and is not rhythmical with the inspiration. The one is evidently part of the sound produced by the movement of the air in the lung during inspiration; the other has nothing to do with the respiratory sounds at all, but with the movement between the lung and the chest. Along with these distinctions must be taken the correlative evidence as to whether the affection be one of the lung or of the pleura.

c. Crumpling Sound.—It most nearly resembles the crumpling together of tissue-paper; it is heard most frequently at the apex of a tuberculous lung. Believed by some to be caused by the stretching of old bands of lymph, its rationale is not well understood, and its value is not great.

d. Creaking: a very similar sound heard on deep inspiration, when the air first begins to penetrate a previously carnified lung. It has no interest but as a matter of curiosity after the subsidence of an attack of pleurisy. Not unlike to this is the creaking produced by old bands of lymph in the lower region of the thorax, or the rubbing together of roughened portions of pleura over tubercular deposit.

No attempt has been made to give detailed descriptions of these sounds, because they can only be learned by experience: good examples of each should be sought out, and carefully listened to, before making any attempt to discriminate them in obscure cases.

Division I.—The Clavicular Region.

§ 1. With marked dulness on one side.

A. When that dulness is due to interstitial deposit we may have any of the interrupted sounds, from fine crepitation to gurgling and metallic noises. In the greater number of cases interstitial deposit at the apex is tubercular, and the sound heard serves only to show the particular stage of the disease; but when its character is that of fine crepitation, when the breath-sound has a loud, diffuse, blowing character, and the voice a brassy resonance, we must look to the general symptoms to see whether we have not to deal with pneumonia. Clicking and squeaking sounds, with suppressed or blowing breathing, and loud vocal resonance, exist from the commencement of tubercular softening; but with the marked dulness now under consideration we are more likely, in cases of phthisis, to meet with abundant coarse moist sounds and gurgling, indicating the existence of cavities: the character of the breathing may scarcely be distinguishable, because of its being thus superseded, but, when heard, it is harsh and blowing, and the voice is always loud. When the superadded sound has a metallic character, it indicates the existence of a cavity of some size, and then the breath-sound will have something of amphoric blowing, provided the fluid which causes the bubbling does not oppose the free ingress of air into the cavity: the voice-sound becomes painfully loud under such circumstances. Friction-sound may accompany both forms of interstitial deposit, but in phthisis it is generally peculiarly creaking.

B. With fluid in the pleura. The entire absence of adventitious sound, when the breathing is blowing and the voice ringing, is of itself a very important point in diagnosis, naturally suggesting the absence of deposit in the lung, and leading to an examination of its lower and back parts. Friction-sound is sometimes heard just under the clavicle, but more com-

monly, when audible, it is to be found somewhat lower down.

c. In the case of deep-seated tumour, while the breathing is weak, and the voice probably unchanged, there are also generally no morbid sounds; at least, there are none which belong to it as a tumour, and those in the lung are only the result of bronchial irritation: if it be an aneurism, there will be others connected with the circulation.

§ 2. With marked resonance on one side.

a. When the cause of this is the presence of air in the pleura, we shall have our diagnosis greatly confirmed by the absence of gurgling or metallic noises in the clavicular region; this fact, even when metallic tinkling or plashing are not heard behind, assists in distinguishing the case from one in which a large cavity presents characters of breath- and voice-sound, which equally deserves the name "amphoric."

b. When the resonance is due to emphysema, we find that if severe bronchitis exist, moist sounds are audible in various parts of the chest, but rarely under the clavicle: with any degree whatever of bronchitis, sonorous and sibilant sounds are heard there; with no bronchitis, emphysema gives rise to no adventitious sound.

§ 3. When the dulness is not so marked.

a. In cases of consolidation of the lung from pneumonia, the dulness is generally distinct; but though this sign be wanting, the existence of fine crepitation with whiffing breathing and brassy voice is sufficient to cause further inquiry. The consolidation is more commonly tubercular: crepitation of a coarser kind, with prolonged expiration and diffuse exaggerated voice-sound, accompanies the rapid development of tuberculosis; a certain amount of chronic pneumonia is probably coincident with it in these circumstances, but the crepitation is not so fine, the breathing is not whiffing, and the voice is not brassy, as they are in

the simple inflammation of the upper lobe. In the more ordinary development of tubercles fine moist sounds often occur early with some suppression of the breathing, but with increase of the voice-sound: towards the end of the first stage the breathing becomes louder and more blowing, clicking or squeaking sounds are heard: the coarsest sounds are only found with decided dulness.

Sonorous sounds, of a local character, sometimes exist along with the slighter dulness and exaggerated voice of early phthisis; they greatly obscure the character of the breath-sound; and in contrasting such a case with the next, it is of the utmost importance to observe that they are heard on that side which is relatively the least resonant. Friction and creaking are both occasionally heard; the former coexists with either form of consolidation, the latter always with tubercles: crumpling sound is generally regarded as a very certain token of tubercular deposit; but to give force to either of these signs, the breath and voice-sounds should also be conformable to such an hypothesis.

B. When the lung, over which dulness is observed, happens to be healthy, the other being emphysematous, the absence of any morbid sound on the duller side, and the existence of sonorous sounds on the more resonant one, are important aids to diagnosis; but the latter are only audible when there is also bronchitis. They are not entirely limited to the clavicular region when emphysema is present; and this circumstance may be of use in judging of an obscure case, when a dilated bronchus produces auscultatory phenomena, resembling those of an empty cavity; moist sounds may be heard with very severe bronchitis, but they are never limited to the apex, and are generally audible there, only at the very end of the expiration.

§ 4. No difference being detected in percussion resonance.

A. When very extensive bronchitis exists, both moist and sonorous sounds may be audible at the apex, but especially the latter: if either be heard at one apex only, while posteriorly the adventitious sound, of whatever character, prevails to about the same extent in both lungs, or if it continue to be heard at either apex after it has ceased in other parts of the chest, we have reason to suspect at least a tendency to phthisis, if not the actual presence of tubercle.

B. When on both sides of the chest we trace slightly increased resonance on percussion in the clavicular region, a similar condition is sure to be found in the rest of the chest. It very generally happens that a patient applying for relief in such circumstances is at the time also suffering from bronchitis, and sonorous, or sibilant, or even moist sounds, are to be heard on both sides; and then their value in the clavicular region is chiefly negative, inasmuch as they are heard less distinctly there than elsewhere.

C. When both sides of the chest seem equally deficient in resonance, and the sounds heard in the clavicular region can be detected elsewhere, they will consist of the varieties of moist sounds indicating bronchitis, or very generally distributed tubercular disease. The diagnosis between these states depends so much upon the contrast between the upper and lower portions of the lung, that their consideration must be postponed for the present. When the morbid sounds are confined to the apex, there must be in reality a difference in percussion, and the case belongs to the next subdivision.

D. Some difference on percussion exists between the two clavicular regions, but the ear fails in detecting it. To the student this class is necessarily a larger one than to the experienced auscultator: it is one which requires more than any other the exercise of careful discrimination in pronouncing a judgment, and it is important, because to it belong the instances of incipient disease. In no class of cases is adventitious

sound of more value in forming a diagnosis, provided it be taken in connexion with the alteration of the breath and voice-sounds. Moist sounds, especially those which have a squeaking or clicking character when found along with jerking or wavy breathing, or prolonged expiration and increased vocal resonance, indicate most certainly the presence of tubercular deposit, which perhaps never affects both lungs equally. Coarse moist sounds, or anything approaching to gurgling, can scarcely exist without very decided dulness. Very fine moist sounds approach so near to crepitation that they are apt to be mistaken for it: if dulness be not pronounced, it is scarcely possible that such a phenomenon should find its explanation in the existence of pneumonia; a more probable solution is that capillary bronchitis has been set up by the presence of tubercle. Sonorous or sibilant sounds, when only heard at one apex, are also evidence of local bronchitis; and whether the prolonged sonorous expiration be due to the expansion of the tissue by emphysema, or its consolidation by tubercle, is a question that must be solved by the relative characters of the breath and voice-sounds detailed in the previous chapter. It is one of vast importance in diagnosis, which the character of the adventitious sound alone cannot decide, and, in fact, any preconceived ideas of the association of sonorous sound with emphysema may very possibly lead us into error. A creaking or friction-sound, with exaggeration of the voice and prolonged expiration, and still more decidedly, a crumpling sound at either apex, are of much value in determining early tubercular deposit before dulness on percussion becomes very perceptible. The presence of any strictly local morbid sound at either apex, as it points out the certainty of structural change there, acquires immense significance when other symptoms indicate the possibility of tubercular disease, and, still more, when the other indications of percussion and auscultation give

countenance to the idea of consolidation at the apex, where the local sound is heard.

Of the cases included in § 1, with marked dulness on one side, it is to be remarked that adventitious sound, when it is of the interrupted kind, generally indicates that the change in density is due to interstitial deposit: its fineness or coarseness being determined by the size of the tubes or spaces in which it is formed, and the character of the exudation by which it is caused. When dulness is marked, and the sound fine, it may be pretty confidently assumed that the condition is one of hepatization, either with or without tubercle; because miliary tubercles could not account for the dulness when existing only to such an extent as to produce irritation and exudation in the small tubes and vesicles. When the sound is coarser, and consequently formed in the larger tubes, or in a number of small cavities, the general symptoms and history must determine whether we have to do with the second stage of pneumonia or with phthisis; the latter being the ordinary, the former a very unusual cause. When large bubbling sounds are heard, we are sure that considerable hollow spaces exist, which can only be the result of tubercular cavities, or of the much rarer inflammatory disorganization of lung-tissue, which is always accompanied by fetor of the breath and sputa.

The continuous sounds are seldom heard with marked dulness. Friction is occasionally met with under the clavicle when the dulness is caused by pleurisy, but is more commonly absent. Sonorous sound, as indicating a minor degree of irritation of bronchial tubes, not extending to their minute ramifications, might be taken as confirmatory evidence that the dulness was caused by a tumour.

When resonance is excessive on one side (§ 2), the only sound which can be of much value in the clavicular region is the sonorous: by its presence the movement of the air in the large tubes becomes appreciable, when in consequence of the interposition of emphysematous lung, in which the air is all but stagnant, no breath-sound at all would be heard on the resonant side. Moist sounds, too, may sometimes be detected on the resonant side when the bronchitis is severe, but these rather belong to the next section.

In § 3 we find the very important contrast between partial consolidation, which is generally tubercular, and partial emphysema. The very fine sound of irritation of the smallest tubes which sometimes accompanies miliary tubercle, comes very close upon the crepitation of pneumonia; sometimes, too, the tubercular deposit produces a real pneumonia of slight extent, with

genuine crepitation: such cases must be regarded from a general point of view, which includes all the signs and symptoms, or else an error in diagnosis is very likely to be made; and while admitting the high probability that the consolidation has a tubercular origin, we must still not forget the possibility of simple pneumonia.

The clicking and squeaking sounds of softening tubercle are very decisive when the difference in percussion resonance on the two sides is not very great; and equally valuable is the sonorous sound of bronchitis with emphysema: the one heard on the duller and the other on the more resonant side. But sometimes the several explosions or bubbles are more numerous, and assume the form of moist sounds, and these, as well as the sonorous, may be heard either on the duller or on the more resonant side. It may happen, too, that the student, while recognising a difference, is mistaken in regard to the relative resonance of the percussion stroke, and his interpretation of the cause of the sounds is utterly wrong: they mean, perhaps, only the presence of local bronchitis, but they do not show why it exists. Error in such cases is best guarded against by a careful consideration of the indications derived from the rest of the chest; if no moist sounds be heard elsewhere, or if no evidence of emphysema be obtained from other parts of the same lung, there will be a strong presumption in favour of the difference in percussion sound being due to tubercle. It need only be added that the presence of any obstruction in the bronchial tubes, while giving rise to some other sound, is very apt to interfere with the breath-sound and deprive us of the indications of consolidation which it might afford.

Creaking and crumpling sounds are less frequently met with in the cases referred to in this section than in the following one; but as they decidedly belong to those in which some form of consolidation has occurred, they at least serve to determine the question of percussion dulness, and to give great preponderance to an hypothesis of tubercle as its local cause.

In § 4 we meet with the cases most important to the physician, most puzzling to the learner—the first stages of phthisis; with the exception of a few instances in which small cavities have formed in the lower lobes, there are none connected with auscultation in which it is so difficult to come to a decided opinion. It is true that the patient cannot know whether we be right or wrong, and that it is a *safe* course to give a rather unfavorable prognosis in all cases of doubt: it is true that this course *is* pursued by many of the most popular and most successful practitioners, but it is also true that this is the course of quackery and imposture, and I believe that no earnest student will be satisfied with it, and that no right-minded

physician feels quite comfortable in practising the little deception which such a method implies.

Here it must be admitted that superadded adventitious sounds are sometimes extremely valuable, because when we cannot find anything wrong elsewhere, they suggest the existence of local disease, and that local disease may be tubercular. The crumpling sound, when heard, is, like the wavy or jerking breath-sound, that which is most constantly associated with tubercular deposit. Creaking only proves the previous existence of local pleurisy which very frequently is set up by, and, perhaps, sometimes ends in, tubercle. The fine moist sounds and the sonorous sounds referring only to bronchial irritation, derive their whole value from being the exponents of local action, whether they be heard at the apex only from the first, or linger there when they have ceased to be found elsewhere.

Division II.—The Posterior and Lateral Regions.

§ 1. When there is marked dulness on one side.

A. In simple serous effusion the absence of any abnormal sound confirms the diagnosis, proving that there is no affection of the lung: when fibrin is also effused, friction may occasionally be heard, but not always. The point at which it is most frequently detected is near the axilla, and towards the front of the chest: and this is the necessary result of the circumstance, that the lung floats upon fluid, which cannot alter in volume during respiration; consequently its free edge at the point furthest from its attachments is that which will most readily partake of the movement of the fluid as it rises and falls with the decreased and increased capacity of the chest in breathing.

B. When changes exist in the interior of the lung along with the effusion of fluid, we have still no sound at all at the base.

a. In certain cases as we ascend in our examination of the chest, we come upon blowing, breathing, and coarse crepitation, gradually shading off towards the upper and front part of the chest into nearly natural vesicular murmur, the relative position of all the

sounds being dependent on the site and intensity of the inflammation in the lung.

b. In other cases there are throughout very abundant moist sounds, diminishing in intensity and in degree of coarseness towards the upper and front parts of the chest.

These two conditions are very dissimilar, and are to be recognised by the different character of the voice and breath-sounds; but they are still more marked by general symptoms, to which we shall subsequently refer: the one is pleuro-pneumonia, the other pulmonary œdema, with passive effusion into the pleura.

c. When the fluid begins to be absorbed after pleuritic effusion with no change in lung-structure, a crumpling sound is heard, on deep inspiration, analogous to that observed at the apex in some cases of tubercular deposit. It is an auscultatory curiosity rather than a phenomenon of any real practical value.

§ 2. With marked resonance on one side.

A. When pneumo-thorax is accompanied, as it very soon is, by effusion in the pleura, two sounds may be produced which are very diagnostic; the one a plash, if the patient be swayed somewhat quickly from side to side, technically called succussion, which exactly corresponds to the shaking of any liquid in a half-empty jar: the other, a dropping of the fluid in which the shrunken lung has been bathed, while the patient remained in the horizontal posture; it falls in successive drops from its lower border upon the surface of the fluid, when he sits up, with a peculiar ring, which is denominated metallic tinkling. These phenomena are neither of them constant; and it is to be noted that, by various authors, the term metallic tinkling is often applied to any interrupted sound which has a metallic resonance.

B. In emphysema it is necessary, as already mentioned, for the production of adventitious sounds, that bronchitis be present. If moist sounds be the result,

they are louder and more distinct in general bronchitis on the non-resonant side, and never exist to any great extent in a very emphysematous lung: when found only in the dilated lung, they are generally also few, and coarse, heard perhaps only towards the end of expiration, and very often superseding all breath-sound whatsoever. The sonorous sounds, on the contrary, are more audible on the resonant side: a prolonged sonorous expiration, with excessive resonance, is nearly certain evidence of emphysema and bronchitis.

§ 3. When the difference on percussion is less marked, especially in regard to resistance.

A. Consolidation existing on the duller side.

a. The coincidence of fine crepitation with loud blowing or whiffing breathing, and exaggeration of voice, is very characteristic of pneumonia: it is usually local, and perhaps shades off into a coarser sound; it is generally found in the lower lobe, and seldom rises above the middle of the chest.

b. When the dulness is more extensive, the blowing character of the breathing less marked, and the crepitation of a coarser kind, especially when this is audible over the upper part of the chest, we may suspect that the consolidation is tubercular. The hypothesis is confirmed if we find that the greatest amount of crepitation and the loudest breath-sound are heard above, and that both equally diminish as we descend, though occasionally fine crepitation may be heard at the base. Acute general tuberculosis of one lung, is generally marked by such differences on auscultation, as are quite sufficient to denote that it is not pneumonia, still we must look to other circumstances for correct diagnosis, because there is often a certain degree of chronic pneumonia present in such cases. The condition of the patient is very different from what it could possibly be if there were the same extent of sthenic inflammation: and the opposite lung very generally gives evidence of the development of tuber-

cles at its apex. As soon as clicking or squeaking sounds at the apex take the place of crepitation, the apparent obscurity of the case is removed.

c. Moist sounds may be heard very extensively in one lung, which is the seat of a certain amount of dulness, from the breaking up of scattered deposit: when limited to the lower lobe very similar phenomena are developed by the suppurative stage of pneumonia; the moist sounds are closely analogous, and the exaggeration of the voice and blowing breathing of cavities there do not differ much from what is ordinarily heard in pneumonia, but the dulness on percussion is not so pronounced.

d. In the commencement of pleurisy, slight dulness is often accompanied by friction before fluid is effused. Occasionally, the exudation is wholly fibrinous, and the friction-sound so intense, as to resemble crepitation.

e. If the evidence of consolidation be limited to the upper part of the chest, the same rules are applicable as those already detailed in the previous Division; with this difference only, that partial dulness over the scapula corresponds to marked dulness in the clavicular region. Morbid sounds when found in both places, generally tend mutually to elucidate each other.

B. When the difference in percussion is caused by excess of resonance on one side, the absence of any morbid sounds on the duller side, and their presence on the more resonant one, would decide that the case was one of emphysema.

When moist sounds are to be heard on both sides, they will probably be most abundant on the duller one; and then the question must arise whether this be not the seat of disease. Assuming that the condition be one only affecting the lower and back part of the chest, we have to consider the phenomena connected with the breath- and voice-sounds as indicating expansion or consolidation, especially observing on which side they deviate most from those heard a little higher

up; we have also to consider the characters of the moist sounds themselves, whether large and coarse on the duller side, as they would be in the softening of tubercle and in suppuration of the lung, or whether, on the contrary, while finer and more numerous on that side, they are only found as a few coarse bubbles, where the greater resonance is observed, the air moving in the large tubes while it is stagnant in the vesicles.

Prolonged sonorous expiration, so constantly heard in emphysema, would probably decide at once that the resonant side was that on which the greatest amount of disease existed: and it is to be remembered that such evidence may often be obtained in the clavicular region, when the lung is emphysematous at its lower part, and the accompanying bronchitis is of such a character that nothing but moist sounds can be heard behind.

c. The hypothesis of the existence of a tumour deeply-seated would derive great confirmation from the absence of any superadded sound.

§ 4. When no difference is perceived on percussion.

A. The percussion being natural.

a. The absence of morbid sound proves the lungs to be healthy, and taken in conjunction with the same evidence in front, leads us to look elsewhere for the cause of any cough that may be complained of.

b. Both sonorous and moist sounds are to be heard in cases of bronchitis, the former usually in the early stage of an acute attack, or where the disease is subsiding, the latter being its more ordinary manifestation, and being usually most distinct at the lowest part of the lung. When moist sounds are very fine and limited to one side, the affection has been often mistaken for pneumonia: we must carefully ascertain whether the localization can be accounted for by consolidation, of which evidence may be found in altered

breath- and voice-sounds. If this suspicion be negatived, we are justified in believing that the case is one of simple bronchitis. It is much more usual to find moist sounds on both sides; and it is my belief that when the percussion is really natural, healthy breathing will always be found at the upper part of the chest: in recent cases it is often accompanied by some sonorous sounds from the scantiness of the secretion; in chronic cases, it is sometimes of rather a harsh character from loss of elasticity in the air-tubes. When the breathing is otherwise altered at the upper part, some further change has taken place in the lung, and there is in reality either increased resonance or dulness on percussion. Sonorous sounds at the commencement of the attack are more frequently limited to one side than moist sounds.

B. The resonance is increased on both sides. This may vary very greatly in amount, and when bronchitis is present, emphysema gives rise to all sorts of moist and sonorous sounds. When the latter predominate, the diagnosis is plain enough: with the former, if the excess of resonance be small, the fact that moist sounds are heard above as well as below may lead to the suspicion that the case is one of very generally disseminated tubercle; this is especially to be remembered in the emphysema of early life. The doubt is best solved by a comparison with the clavicular region, considering whether the sounds heard there would be best explained by the hypothesis of general emphysema or early tubercular deposit. Then, again, the moist sounds of early phthisis are usually fine, those of emphysema are essentially coarse, and bronchial effusion tends to accumulate in the lower or most dependent part of the chest.

C. Both sides may be equally dull.

a. When double pneumonia or double pleurisy is its cause, the extent of the dulness and the severity of the general symptoms are generally such as to leave no doubt on the mind of the observer: the signs

enumerated in § 1 are then found equally on both sides. It is highly probable, if the dulness be slight, and the other signs obscure, that any sounds which might be taken for crepitation are really only fine moist sounds, and do not indicate the presence of pneumonia.

b. Moist sounds limited to the base are very common in cirrhosis of the lung and in pneumonic phthisis. They may be caused either by the chronic bronchitis which precedes and accompanies the cirrhosis, or they may be produced in the small cavities which form as the lung breaks up. The same condition is seen in tubercle of the lower lobes, but the affection is usually more advanced on one side, and the difference of percussion places such cases usually among those referred to in the previous section.

When moist sounds are heard on both sides throughout the whole of the posterior region, with some degree of dulness, they must be dependent on one of the following conditions :—œdema, engorgement, induration, or tuberculosis. The diagnosis of œdema of the lungs does not rest so much on any peculiarity of the physical signs, as on the circumstance of our being able to discover some present obstruction to the circulation such as produces œdema in other organs, especially disease of the heart or kidneys. Secondarily, it would derive confirmation from the expectoration being watery in place of puriform.

Engorgement, again, depends either upon obstruction to the circulation through the pulmonic veins, or upon gravitation of blood in fever, &c., when the patient is confined to bed. The morbid sounds partake of the character of crepitation, or fine moist sounds, and these have no distinctive marks. That they are not the consequence of genuine pneumonia, we only know from their extent, while the evidence of much consolidation is wanting : that they are not caused by bronchitis alone, must be proved by a consideration of the relative severity of the symptoms.

Tuberculosis of the lower lobes can scarcely be distinguished from fibroid induration, because in both there are usually present the signs of general bronchitis. On careful percussion we may be able to detect some difference in resonance between the two sides in this form of phthisis : perhaps, too, clicking or squeaking sounds may be heard : if cavities have been formed, the voice-sound may be locally increased at those spots, or generally louder at the base than in the middle of the lung ; in-

formation may also be gathered from observing that prolonged expiration or vocal resonance is more distinct on one side than the other, showing more advanced consolidation there. But all these evidences may fail, and we turn to the clavicular region, and there perhaps we find proof of more distinct consolidation on one side than the other, and we are satisfied that the disease is tubercular: on the contrary, we may find no great difference on percussion, each appearing somewhat dull; auscultation may indeed reveal blowing expiration, and coarse moist sounds nearly allied to gurgling on one side, while the breathing is only harsh on the other, and yet this may be only caused by a dilated bronchus along with the induration, the apparent dulness being due to loss of elasticity of the ribs. It must be confessed that these cases give rise to very great difficulties in diagnosis: the constitutional symptoms, however, very generally point more distinctly to one form of disease than the other, and if we follow this suggestion, in a careful analysis of each of the signs just enumerated, we shall probably come to a correct conclusion. It is always unsafe to assume the existence of tubercular disease in the lower part of the lung without distinct evidence of its presence in the upper lobe. Such a mistake as that of confounding a dilated bronchus with a cavity can only arise from taking one sign by itself.

Sound principles demand that when we assign to blowing, breathing, or gurgling sounds this cause, we should also have distinct evidence of very advanced consolidation, because tubercular matter is not evacuated until the separate masses have been closely aggregated together.

These circumstances have been gone into with some minuteness because the cases are very apt to be misunderstood: the moist sounds passing from fine to coarse, as we descend, is just what we expect to meet with in bronchitis, and the mind is very readily satisfied with the explanation of all the constitutional symptoms which this disease in its chronic form affords, when it is very apt to simulate phthisis: the important point is overlooked that phthisis may simulate bronchitis: to guard against such an error demands close scrutiny and careful reasoning, for it must be remembered that the prognosis in the two disorders is widely different.

D. The difference on percussion may be unobserved because of the thickness of the walls of the chest.

a. Commencing pneumonia in one lung may be indicated by fine crepitation with exaggeration of voice, or there may be only a few moist sounds from irritation of the bronchial tubes, or even this may be

wanting, and nothing but exaggeration of the voice be found; these differences merely depending upon the distance from the surface at which the fibrinous effusion is taking place, the overlying lung tissue being resonant and but little implicated in the disease. Vocal resonance, therefore, taken along with general symptoms, occasionally becomes a valuable distinguishing sign between pneumonia, and bronchitis of one lung which no doubt has been often mistaken for it. Friction in the very early stage of pleurisy, before dulness can be detected, sometimes indicates the form which the inflammation is about to take, for undoubtedly the constitutional symptoms are very often pronounced before the physical signs give us any very definite information.

b. Dulness at the apex posteriorly is very apt to be overlooked. The restriction of moist sounds to the apex is a very important sign, because of the natural tendency of the fluid in the bronchial tubes to gravitate to the base of the lungs. All the morbid sounds mentioned, as occasionally heard in the clavicular region, when dulness is only slightly marked may be found over the scapula when no difference on percussion can be detected there; and in the supra-spinal fossa the crumpling sound is more frequently met with than anywhere else.

c. When the ordinary signs of bronchitis prevail throughout one lung, and are limited to the upper part of the other, we have great reason to suspect that the disease has a tubercular origin, even when we cannot make out any sign of consolidation at all.

In proportion as the thickness of the walls of the chest interferes with the evidences of change of structure derived from alterations in breath and voice-sounds and percussion resonance, so do the adventitious sounds acquire importance. The cases included under § 1 are therefore less dependent for their diagnosis on the latter characteristics than those in which the percussion sound is less distinct; but they may be of use when, for example, with disease of the kidney, we are anxious to know whether effusion into the pleura be merely passive, or the result

of inter-current pleurisy: the existence of friction would prove the presence of lymph. Still the right discrimination of all the cases mentioned in this section depends more upon the correct interpretation of all the other signs: whiffing breath-sound, is much more valuable than crepitation; inflammatory fever more important than either.

In § 2 we meet with two very important sounds,—succussion and metallic tinkling. The first of these cannot exist under any other circumstance than when air and fluid are present together in the pleura; the second, although liable to be mistaken for other sounds, is also, when pure, very distinct evidence of the same fact. But we must be able to assert the existence of pneumothorax when neither are heard, and we know that the effusion of fluid is a necessary consequence of the presence of air. It is unnecessary to explain why these sounds are sometimes absent; it is enough to be prepared for such an occurrence. It has happened to careless observers to mistake the gurgling sounds in the stomach for succussion; and by the best authorities the name of metallic tinkling is used when there is no pneumothorax: it is well to remember that the sound is merely that of fluid dropping in a partially filled cavity of some size, whether in the lung or in the pleura, and that the bursting of solitary bubbles in a cavity with a metallic ringing noise is only an imitation of it. There is not any chance of a careful observer mistaking emphysema for pneumo-thorax.

The coincidence of fine crepitation with the other signs of pneumonia, as mentioned in § 3, gives great certainty to the diagnosis, but this sign has been more than once alluded to as a very common source of fallacy. Cases of tuberculosis in which crepitation at the back of the chest is very distinct are rare; but they are to be borne in mind, especially when the history does not correspond with the suggestion which this sound gives of the existence of pneumonia. Tubercular deposit limited to the base, or more advanced there than at the apex, is that condition which causes the greatest difficulty in diagnosis with reference to the posterior region: such cases may be mistaken for pneumonia, but are more commonly confounded with bronchitis, as explained in § 4.

There is less chance of error when one lung is slightly emphysematous at its lower part, than when the same condition exists at the apex. If the sounds of bronchitis be limited to the resonant side, no mistake can be made, whether the difference on percussion be rightly or wrongly interpreted; if they be heard on both sides, although more distinct on the duller one, the suspicion of consolidation is not so apt to mislead as in the clavicular region: the possible varieties are detailed in the preceding

pages chiefly in order that the student may be able to give to himself a consistent explanation of what he hears.

The cases of real difficulty are enumerated in § 4, and though perhaps enough has been stated to show the grounds upon which diagnosis is to be made, a recapitulation in a less formal method may serve to make them more intelligible. We may at once exclude those in which some faint stethoscopic indication ekes out general symptoms, and shows that pleurisy or pneumonia is impending, or is actually present in minor degree, or is deep seated. Auscultation can do no more than lend a feeble aid, and no great reliance is to be placed upon it. We may also exclude those in which only imperfect information is derived from percussion, because the walls are too thick and unequal (*e.g.* in the scapular region) to produce definite results, while the other auscultatory phenomena are well marked and distinct. The cases to which we now refer are those in which the sounds of bronchitis are taken for something else, or those dependent on other causes are supposed to indicate its presence.

The sounds produced by bronchitis include two very distinct classes—the sonorous and moist sounds; the former are not apt to cause mistakes; and the only point to be remembered, is that when confined to one part of the chest, there is probably some cause for their localization, which must be sought for in consolidation, or expansion, or may be more vaguely traced out in a history of previous inflammation of the lung; and thus, while explicitly pointing to bronchitis, they may be the means of detecting other and more permanent disease. Moist sounds, again, vary very much in character; and the range of those which may be caused by bronchitis, and nothing more, is a very wide one: it is true in a general sense, that very fine sounds, even when not quite what may be called crepitation, are most probably excited by fibrinous or tubercular deposit, and that very coarse or large bubbles are only heard when there is a cavity; but these limits cannot be strictly defined. One leading characteristic of the bronchial exudation is its tendency to accumulate in the lower part of the chest, and therefore it is there that we seek for it; and in a large proportion of cases moist sounds, heard there only, are distinctive of bronchitis. The exceptions are so few, that if heard equally on both sides, except there be something incongruous in the history of the case—hæmoptysis, quick pulse, &c.—it does not demand any very close investigation: it is only when they are confined to one side that we have to inquire whether there be not some change in lung-tissue existing at the same time; and when consolidation is found, the probabilities are very greatly in favour of past or present inflammation or fibroid degeneration—very much against tubercle.

When the morbid sounds are not limited to the base, there

nay be found in the clavicular region or over the scapula sounds which closely resemble crepitation; but we may at once dismiss the idea that the whole of them can be caused by pneumonia, if the constitutional disturbance be not very great indeed, and we are reduced to the hypothesis of disseminated tubercle or of acute bronchitis. Sometimes the sounds at the apex are coarser or more sonorous, and evidently due to bronchial irritation; still there may be a substratum of tubercle. As a general rule it may be said that in such cases the finer the sound heard at the apex in association with moist sounds at the base, the greater the probability of tubercular disease; and the greater too the probability that in consequence of this circumstance, evidence of consolidation may be made out, which is more decided on one side than on the other.

The cases are naturally divided by their history into the acute and chronic; those of recent date, with simply mucous expectoration or mixed mucilaginous-looking sputa; and those of long standing, in which the secretion is distinctly purulent, or muco-pus. In recent cases the mode of incursion very often indicates the character of the disease, and is really much more trustworthy than the physical signs: in childhood the sounds may be clicking or squeaking, such as in adults we seldom meet with but in phthisis, and yet the case may be simply bronchitis; it is at this age, too, that we most frequently find the equally disseminated tubercular deposit, which fails in giving evidence of consolidation. The true nature of such cases can only be determined by their history and general symptoms. Sonorous sounds at the apex are less likely than any other variety to have a tubercular source when moist sounds exist at the lower part of the chest: in adults, when tubercles are present, the sound, of whatever character, is generally as distinct in front as at the back of the chest, and very probably more so on one side than on the other.

In chronic cases the history is often so similar, whether there be tubercle or not, that less aid is derived from this source; still, we may have a report of hæmoptysis, or suspicion may be aroused by the extreme rapidity of the pulse, the fine thin skin or clubbed nails of phthisis; and so great is the importance of such correlative symptoms that the stethoscopist may be wrong, and the man who never practises auscultation, right, in the interpretation of tubercular disease of the lower lobes: all the physical signs are readily explained by the hypothesis of bronchitis, and the general symptoms are attributed to the same cause.

The possibility of induration is suggested by the history of very long-standing bronchitis, and general symptoms resembling phthisis, while the usual signs are wanting. In connexion with this a common error is to be guarded against that differences of

sound at the apices necessarily indicate tubercles; rigidity and dilatation of tubes is so frequent in chronic bronchitis, producing a certain amount of blowing breathing, and giving a degree of coarseness to the moist sounds in one part of the lungs, while a slight amount of emphysema, or the closure of some tube with mucus, causes a suppression of all sound in another, that it is not difficult to account, in a general way, for changes in breath-sound and varieties of moist sound met with when there is no tubercle; but they are apt to mislead the inexperienced.

In the posterior region, when the idea has once been suggested to the mind of the observer, a coarseness of the moist sounds, a harshness of the breathing, and an exaggeration of the voice, will be discovered, which bronchitis alone will not account for. The breaking up of the tissue into small cavities, in pneumonic phthisis, is only distinguished by such indications being still more pronounced. The lungs are both nearly equally affected by the degeneration, and that forms an additional means of distinguishing it from tubercles involving the lower lobes.

The difficulty of ascertaining the exact condition of the lower lobes, so far as the breath-sound is concerned, is very often increased by the closure of tubes with mucus; and when the secretion is very abundant or much inspissated, no sound may reach the ear over a large portion of the posterior region, except a few large coarse bubbles. This is most remarkably the case when emphysema and chronic bronchitis are present together.

Summary.

In reviewing the facts which adventitious sounds really teach, we find, first, that their presence is a direct indication that something is wrong, even when the comparison of breath- and voice-sound with percussion resonance fails in pointing out that there is any change of density in the part; secondly, that in such circumstances the sound is probably due to bronchitis; thirdly, that when its character is quite local, we have reason to suspect that there is some localizing cause, but there is nothing in the sound itself which can warrant us in pronouncing decidedly upon the nature of that cause; fourthly, that when combined with other physical signs they rather tend to show the stage of the disease than its real character. When the student has been well tranied in the principles of

diagnosis, he may after a time pronounce with comparative certainty, in a large number of cases, on the condition of a patient from the simple evidence of such sounds, especially when they are heard in the posterior and lateral regions: such a proceeding, however, at all times liable to error, ought to be carefully avoided by a learner, and even persons of great experience fall into mistakes when trusting to them in the clavicular region, where their indications must be regarded as very uncertain. It is of great importance that this principle be kept steadily in view; the stethoscope, and medical diagnosis altogether, are constantly brought into discredit by conclusions regarding the state of the lungs being based on the evidence which these sounds afford, to the exclusion, not only of general symptoms, but even of the other physical signs, which are far more trustworthy in judging of change of structure. The presence of morbid sound is, indeed, readily detected, and offers a means of forming a rapid conclusion, while the comparative estimate of changes in breath- and voice-sound and in percussion resonance requires careful examination and logical reasoning to ensure correctness; and we are too prone to adopt the easier and shorter method: but this very facility in the one case is apt to lead to hasty generalizations and false deductions, which are more likely to be guarded against by the caution and accuracy required in the other.

The interrupted sounds for the most part show that there is some obstruction to the entrance or exit of air, which is overcome in a succession of jerks or explosions, varying in magnitude and frequency from the finest of crepitation to the coarsest of gurgling sounds: and, with certain qualifications, its fineness or coarseness is a measure of the size of the tube or space in which the sound is formed. But if the cause be one of general operation, the obstruction in the larger tubes interferes with the entrance of air into the smaller, and hence in simple bronchitis the sounds are seldom

of the finer kind; whereas in pneumonia and tuberculosis the irritation is limited to the smallest tubes, and the finer sounds are developed. This remark will be found true of the moist sounds heard in each disease, even if the hypothesis should be subsequently verified that true crepitation is produced by a wholly different mechanism, and is absolutely as well as relatively a dry sound. The interval occurring between the explosions, when they are few and coarse, or squeaking, varies chiefly with the relative viscidity of the fluid: bubbles of air passing through pure pus must of necessity be much larger than those passing through simple serum. The metallic timbre which interrupted sounds sometimes present is only produced by echo in a large space, which contains little fluid; it is alike present when the noise is caused by the bursting of a bubble or the falling of a drop: the metallic bubbling is the commoner circumstance in a large cavity, the metallic dropping in the pleura itself, but distinct dropping does also occur in large cavities.

The continuous sounds have no character in common beyond that which their name implies. Sonorous sound teaches that the air is thrown into vibration by some minor obstruction to its passage; there may be some plug of mucus which, itself vibrating like the reed of a musical instrument, produces a corresponding sound in the air, and converts a bronchus into a hautboy; or there may be some constriction of the tube which causes the air to pass with a hissing noise. It is supposed that the graver sounds are always produced in the larger, and the shriller tones in the smaller tubes. Friction sound is rather a curiosity than one which is readily available in diagnosis; pleurisy can be very well ascertained without it, and in the cases in which it might be expected to be of most value, when fibrin is poured out without serum, it is commonly so rough and coarse that it resembles crepitation rather than ordinary friction. Crumpling and creaking sounds indicate some hindrance to the expansion of

the lung, and are therefore only of value when other abnornal sounds at the apex are wanting, or when at the base we find difficulty in explaining the meaning of dulness.

No mistake is more frequently made in the interpretation of morbid sounds than the assumption that when heard at the apex they are certain indications of tubercle. The probabilities are, undoubtedly, very greatly in favour of such a conclusion; but it is precisely in the rare cases which are not tubercular that skill in diagnosis is most valuable in regard to treatment, and where a correct judgment requires the most careful consideration of all the circumstances. It were far better for their patients that medical men never took a stethoscope into their hands, and trusted solely to general indications, than that they should stop short of the knowledge necessary to enable them to discriminate such cases.

CHAPTER XXI.

DISEASES OF THE RESPIRATORY ORGANS.

§ 1, *Laryngitis—Acute and Chronic—Œdema of Glottis—Pressure on Trachea—Growths on Larynx.*—§ 2, *Croup—Diphtheria—Crowing Inspiration.*—§ 3, *Catarrh—Nasal—Ozæna—Laryngeal—Bronchial.*—§ 4, *Bronchitis—Acute—Influenza—Chronic—Bronchorrhœa.*—§ 5, *Emphysema—Complication of Bronchitis.*—§ 6, *Asthma—distinguished from Emphysema—Hay Asthma.*—§ 7, *Pneumonia—History and Symptoms—Auscultatory phenomena—Inflammation of Upper Lobe—Abscess—Gangrene—Chronic Pneumonia—Complications.*—§ 8, *Phthisis—History and Symptoms—Auscultatory phenomena—their rational Exposition—Tubercles at the base—Pneumonic Phthisis—Acute Tuberculosis—Complications of Phthisis—Grinders' Asthma, &c.*—§ 9, *Pleurisy—Early Stage—Advanced stage—Emphysema—Complication with Pneumonia—Passive Effusion—Complications—Pleurodynia.*—§ 10, *Pneumothorax—History and Symptoms—the presence of Fluid.*—§ 11, *Tumours.*—§ 12, *Diseases of the Lungs in Childhood.*

We must next proceed to a consideration of the diseases of the respiratory organs, in order that we may see how their origin and history aid us in their diagnosis, and in what relation the general symptoms stand to the facts elicited by percussion and auscultation. In this chapter it will be found necessary to deviate in some respects from the order adopted in the nomenclature of diseases, in order to contrast certain forms of disease which present points of re-

semblance to each other, and also to bring together those which, though anatomically distinct, are practically found in conjunction. With this view, a few diseases belonging to other sections of the classification will be examined in this place, because their most important characters and symptoms are those connected with the chest, and can only be studied in association with other pulmonary affections.

§ 1. *Laryngitis.*—This affection occurs in two very distinct forms, the acute and the chronic, which differ from each other very greatly in severity, and even in character, so that it is only when some fresh accession of inflammation has occurred that the chronic disorder assumes any practical importance.

In most cases of acute laryngitis the attention is at once arrested by a hoarse, prolonged, rather laborious inspiration, interrupting the speech and causing the patient to stop to take breath, while the voice is hoarse, or there is complete aphonia. The history may generally be summed up in a few words: after some exposure the patient has "caught cold," sore throat being the prominent symptom, and difficulty of breathing having come on early. The sore throat, the painful deglutition which usually excites coughing, and the hoarseness in the early stage, are very important as indications of the serious malady impending, as well as valuable guides when it is more completely developed; because the amount of redness of the fauces bears no proportion to the pain and difficulty of swallowing which the patient complains of. We are thus at once enabled to exclude common quinsy, which gives rise to the same symptoms, unaccompanied, however, by either hoarseness or dyspnœa in any marked degree: the discoloration in laryngitis, too, has generally a livid hue.

The progress of the disease is very characteristic: at intervals the difficulty of inspiration is much increased, and then a period of comparative quiet pro-

bably follows; but these spasmodic attacks rapidly increase in frequency and urgency, till each inspiratory effort assumes a convulsive character, the face grows dusky and is covered with clammy perspiration, the shoulders and clavicles are heaved upwards in laborious breathing, the larynx moves up and down in a tumultuous manner, and instant suffocation seems impending; the patient can scarcely make the attempt to speak, or if he do, it is only in a short, hoarse whisper.

At the commencement of the attack there is usually a good deal of febrile excitement, a hot skin, quick, firm pulse, and flushed face: as the insufficient aeration of the blood goes on, and begins to tell on the constitution, the pulse fails in power and increases in rapidity, the skin tends to coldness, the flush on the cheeks is changed to a dusky tint. All this bears upon correct diagnosis, although what it teaches be simply that there is some obstruction to the entrance of air into the lungs: the consciousness of the patient, indeed, points out that it is in the larynx; but we know that any cause might have the same effect upon the breathing, which opposed a similar obstacle to the inflation of the lung; such circumstances, we shall find, perplex the diagnosis of the chronic affection.

As in many other diseases of the respiratory organs, the patient suffering from acute laryngitis usually assumes the sitting posture; he cannot lie down with ease, but shows more restlessness and anxiety than under any other affection: cough is never prominent, perhaps rarely present, for the patient cannot fill his lungs sufficiently to produce it. His sensations point simply to the larynx, except that now and then there may be pain at the lower end of the sternum, caused by the laboured inspiratory movements. The evidence derived from auscultation and percussion is entirely negative: wherever the stridulous laryngeal noise does not prevent the breath-sound from being heard, the indications are those of health.

Besides this form of laryngitis, which may be termed the idiopathic, it is met with as a consequence of injury, such, for example, as the entrance of an irritant fluid or gas into the trachea: it supervenes, as already mentioned, on the chronic form; or it ascends from the inflamed trachea of croup, or descends from the inflamed fauces of quinsy. Its association with croup and the means of discriminating the two diseases will come under our notice in the next section: in each of the other cases, the history and symptoms are primarily those of the precedent affection; and a knowledge of its existence prepares us for the correct interpretation of sudden dyspnœa, raucous breathing, and symptoms of suffocation when the laryngitis supervenes.

There is also what may be termed a bastard laryngitis occasionally met with, consisting of *œdema of the glottis*. It is principally associated with the sore throat of erysipelas, and with renal disease: and this would lead to the belief that it has the character of low phlegmonous inflammation rather than that of simple serous effusion. But the swelling of the vocal cords from this effusion is the dangerous circumstance, and that which brings it into association with laryngitis. The symptoms are less severe, and the inflammatory fever is absent; the dyspnœa, however, is sometimes equally urgent: the correct interpretation of the character of the obstruction is chiefly inferential; the co-existence of the other forms of disease excludes the idea of acute or sthenic inflammation; and when disease of the kidney is present, even if unknown, there is generally external swelling of the throat, as well as internal œdema.

The absence of auscultatory phenomena, indicative of disease of the lungs, is most important in regard to treatment. I have more than once seen the operation of tracheotomy performed without even a transient relief to the sufferer; with, indeed, in one case, manifest injury, from the excitement and alarm it produced. In these cases the diagnosis was based on insufficient

examination: there were, it is true, the sudden invasion after exposure, the rapid progress, the inflammatory fever, and the extreme dyspnœa, with discoloration of the face; but neither had there been sore throat nor aphonia, and unmistakeable signs in the lungs showed that if the larynx were implicated it was only secondarily: post-mortem examination revealed what is not inaptly called broncho-pneumonia of the most extensive kind, in each of these patients. The propriety of the operation must entirely rest upon the correct interpretation of the causes producing the suffocation which it is intended to relieve; but it is even more apt to be undertaken with a wrong impression when urgent symptoms supervene in chronic cases, than when the disease is from the first acute.

Aphonia is a very good measure of the extent of the inflammation, or rather of its progress, and of the effects it has produced. When the hoarseness has passed rapidly into complete aphonia the affection is unquestionably a grave one. Feeling an inability to produce any laryngeal sound, the patient may be content to speak in a whisper. It is to be remembered that this does not of necessity imply the existence of aphonia; and if no effort be made to produce articulate sound, we have at least the right to suspect that the patient may have the power to do so, but does not choose to exercise it. This is one of the common manifestations of hysteria; it is not likely to be mistaken for acute laryngitis, it rather simulates the chronic affection. Along with the aphonia there is often an unnatural barking cough, which tends to make the counterfeit more complete; in such circumstances tracheotomy has been performed without the very slightest necessity, in consequence of mistaken diagnosis. More commonly hysterical aphonia lasts for months or years, the patient all the time being able to speak aloud if she but made a real effort.

In chronic laryngitis the disease is not only of much longer duration, but of much less severity; and except when an acute attack supervenes, there is at no time urgent dyspnœa. The inspiratory act is sometimes noisy, and more laboured than natural; but generally the voice is much more affected than the breathing: it becomes rough and harsh, or husky, or may be lost. Chronic laryngitis is connected especially with two other forms of disease, the tubercular and the syphilitic, and it is therefore important to ascertain whether either of these conditions exists. In some cases disease in the larynx and trachea has proceeded much

further than in the lungs, where only a few miliary tubercles are found—*phthisis laryngea* it used to be called; and then its tubercular nature is not so readily made out: to one accustomed to watch all the indications of disease there is something very characteristic in the altered voice of phthisis, caused no doubt by the circumstance that such inflammation of the glottis tends to ulceration rather than to thickening of the cords. In the syphilitic form we trust more to the existence of secondary symptoms of any sort than to the history of infection, which the patient may have an object in denying.

Besides these varieties, chronic laryngitis may be left after a more acute attack of the idiopathic kind has passed away; and there would also seem to be some tendency to a recurrence of the disease in a chronic form, after any exposure, in a person who has once suffered from the acute disorder. In other instances we find it associated with disease of bone or cartilage.

The general symptoms depend more upon the condition of the patient in other respects than upon the severity of the local ailment, which is not such as materially to affect the health. There is frequently a feeling of soreness, or dryness of throat, with some difficulty in swallowing; occasionally the act of deglutition excites cough, which may end in retching: in many cases these symptoms are wholly wanting. Tenderness on pressure over the larynx may be observed; any alteration in form, or any degree of fulness, would lead us to suspect disease of bone or cartilage. Cough is very generally present, is harsh, and sometimes peculiar in tone: but less so, as a general rule, than in affections of the trachea.

The disease most liable to be confounded with chronic laryngitis is aneurism of the aorta: any tumour in the same situation would produce similar results; but practically this is the cause which most commonly originates them. By some physiologists it

has been assumed that the symptoms are produced by pressure on the laryngeal nerves, especially the recurrent; but no doubt much is due to the irritation produced by its actual contact with the trachea itself. The only conclusive evidence is the discovery of the tumour: a suspicion, indeed, that the dyspnœa and cough may not be the effect of laryngitis, will probably be suggested by the absence of soreness in the throat, and the character of the voice, which is not absolutely hoarse but has rather a cracked sound, and is wanting in power; the sound of the cough is not so rough, but generally more harsh and clanging. Such circumstances, however, only amount to bare suspicion: more value may be attached to the fact that while there is no soreness of the throat, there is often a peculiar dysphagia—a sensation of the food sticking fast in the gullet, which, like the changes in breathing and voice, may be partly due to interference with nerves, partly to pressure on the œsophagus.

In association with chronic laryngitis we find not only ulceration but sometimes *abscess*. It is rare that this condition can be recognised during life; it is almost always dependent on disease of bone or cartilage.

Various growths of a *cancerous*, *warty*, or *polypoid nature* are sometimes found attached to the larynx. The symptoms to which they give rise are very analogous to those of chronic laryngitis, except that occasional spasm is much more frequent, and the breathing is less disturbed during the intervals. Much light has of late been thrown on all these forms of disease by the introduction of the laryngoscope, which exhibits to view the changes in the configuration of the larynx, which could otherwise only be inferred from a consideration of symptoms.

§ 2. *Croup; Crowing Inspiration.*—Acute inflammation of the entrance of the air-passages in childhood is an affection quite *sui generis*. It is not here our business to enter upon its pathology, but merely to point out that, while in the adult the inflammation is commonly limited to the larynx, or at least derives all its importance from the inflammation attaching itself to the opening of the glottis, in childhood the trachea

is the chief seat of the inflammation; the larynx and the fauces are usually involved secondarily and to a less degree.

In the history of the case we either find that the child has been ailing for two or three days, with symptoms of cold attended by hoarseness, or that the antecedents have been so slight as to have escaped notice, and that the child has waked up in the night in a state of high fever, with a loud clanging cough and considerable difficulty in breathing. The attendant phenomena always indicate very marked febrile disturbance: the skin is hot, the pulse quick, and the face flushed, and the progress of the symptoms is closely analogous to those already mentioned in laryngitis. Hoarseness is an indication which deserves a first place among the evidences of the disease, because it is one which so seldom attends the common colds of childhood: next —if considered along with other circumstances— are the peculiar croupy inspiration which follows a fit of coughing, and the brassy or ringing noise of the cough itself: when taken alone, these signs have often led to mistaken diagnosis. As the disease proceeds, membranous shreds of lymph may be coughed up or expelled by vomiting, or patches of lymph may be seen on the fauces: this renders the diagnosis of the disease quite certain; but in some cases no membrane at all is found, the trachea and bronchi are simply inflamed and bathed in purulent secretion. Auscultation of the chest reveals noisy breathing, mixed with a variety of clacking or moist sounds, according to the character and extent of the secretion.

In diphtheria we have a specific fever, of which the exudation of lymph on the fauces is only a concomitant. That the false membrane sometimes spreads down through the larynx into the trachea is a circumstance which brings it into relation with croup, and has led to the two diseases being confounded together. Two points seem to be of the greatest value in diagnosis: first, that in the one, difficulty of breathing is essential, and exists almost from the very commencement of the attack, while in the other it is only accidental, coming on later in the disease, and

difficulty of swallowing is more commonly observed early: secondly, that the one disease is sporadic, occurring without any regularity in its appearance, while the other is epidemic. Exceptions are of course met with, and in childhood it is very difficult to look into the throat, and see there the evidence that the exudation is covering the fauces, as well as obstructing the breathing. Neither is it always possible to trace the previous existence of fever, though it may have been present for days. Still this fact is one of importance with reference to treatment no less than to diagnosis, since it is the fever that kills rather than the difficulty of breathing.

In attempting to discriminate between croup and acute laryngitis, we have first the very broad distinction that the one is a disease of childhood, the other of adult life: a form of tracheitis is indeed sometimes found in young adults, in which fibrinous exudation lines all the tubes, even to their minute ramifications; but this is confessedly so rare that it may be left out of account. Next we have the circumstance that there is little sore throat or difficulty in swallowing; and lastly, the stethoscopic signs of affection of the tubes, which, though obscured by the noisy breathing, are nevertheless capable of being discriminated. These indications also bear upon the important question of tracheotomy. Powerful to save life, when the larynx only is involved, it is generally absolutely useless when the bronchi are implicated, and not unattended with danger: the absence of stethoscopic evidence of bronchial inflammation, and the existence of sore throat, or lymph on the fauces, would justify our entertaining the proposition if it ever ought to be practised in croup. Both affections are alike liable to exacerbations and remissions, which are probably of spasmodic character; but in croup there are also violent fits of coughing, which are comparatively rare in laryngitis.

Crowing inspiration, or false croup, is often mistaken for the true, especially by those who are content with solitary indications: the appearance of impending suffocation is even greater in the spasmodic disease, and the inspiration following the temporary closure of the glottis, from which it derives its name, sounds very similar to that following a fit of coughing in croup; but in other respects the diseases differ very widely. The crowning inspiration rarely extends beyond the period of dentition, with the irritation of which it is closely connected: it comes on suddenly, without preliminary catarrh, cough, or hoarseness; it is not accom-

panied by inflammatory fever, and as soon as the paroxysm has passed, the breathing is completely free from obstruction. In all these respects it stands in complete antagonism to the true croup. It is evidently a paroxysmal disease, and more nearly related to the convulsions than the inflammations of childhood, as shown by spasm of the flexors of the thumbs and great toes, which is so frequently observed during the attack: it is especially associated with disorder of the primæ viæ, inflamed gums, and impetigo capitis leading to enlarged cervical glands.

§ 3. *Catarrh.*—Catarrhal inflammation only attacks mucous membranes, and is simply characterised by an unusual secretion of mucus. The general symptoms attending it are comparatively slight, and last but a very short time, though the local action proves that the disorder is of an inflammatory kind; and the perverted nutrition and disordered function continue when the general disturbance has long since ceased. Coryza or nasal catarrh gives the earliest and the best illustration of the term. It is in that case a true defluxion. But as the very same inflammatory action travels backwards through the larynx and down the bronchial tubes, we cannot withold the names of laryngeal and bronchial catarrh as applicable to each.

Very rarely does the membrane lining the nostrils put on any other form of inflammation, and the subject need hardly be referred to with reference to diagnosis; a "cold in the head" is a disorder with which all are familiar. Coming on suddenly, after exposure to cold or wet, it is usually followed by more general catarrh, and accompanied by sore throat, which either precedes or follows its first appearance. It is only to be remembered that it is one of the most prominent features of that form of catarrh to which the name of hay asthma is given, and that it may be part of an attack of influenza. We may be pretty sure that it

is not coryza when it is of long duration, or when the nasal secretion becomes puriform in character. In the one case we look for *polypus* as the probable cause of irritation; in the other we shall probably find *ulceration* of membrane or disease of *bone*, and to this the name of *ozæna* is given.

Laryngeal catarrh need never be confounded with laryngitis or œdema of the glottis. Its tickling cough is usually associated with some little soreness of throat: and in many persons the relaxation of the membrane gives rise to great hoarseness, or even to loss of voice, but the character of the sound emitted by the vocal chords is very different from that of laryngitis. The main distinction, however, rests on the absence of that obstruction to the breathing so eminently characteristic of the inflammation of the glottis.

In bronchial catarrh we have such a close approximation to bronchitis that it is scarcely possible to point to any line of demarcation between them. To such an extent, indeed, is this the case, that every "cold in the chest" is now-a-days called bronchitis. When nasal catarrh is present we ought not to assume that the inflammation of the bronchial tubes has passed the degree which is known as catarrhal without very distinct evidence that it is so: and in all cases true inflammation of such an extended surface as the pulmonary mucous membrane must be accompanied by a good deal of febrile disturbance. The remarks on the physical diagnosis of bronchitis will be equally applicable to bronchial catarrh.

§ 4. *Bronchitis.*—The two forms of this disease, the acute and the chronic, may be recognised by their history: the auscultatory phenomena are sometimes exactly the same in each; and when they differ, they derive their distinctive characters rather from the qualities of the secretion than from the fact that the membrane is in a state of recent or of long-standing inflammation, except in so far as dilatation or rigi-

dity of the tubes has been produced by repeated attacks.

In the acute form we obtain simply the history of cold-catching, which is, in the first instance, attended by a good deal of heat of skin and chilliness, by pain diffused over the front of the chest, and a tearing, or painful sense of tickling after coughing: there is, at first, no expectoration; but the secretion gradually increases in amount, generally becomes glairy and transparent for some days, and subsequently yellowish and partly opaque. The cough commonly causes headache during the febrile state, and there is some thirst and loss of appetite, without much acceleration of pulse.

The chest is perfectly resonant on percussion, so far as the bronchitis is concerned. The breathing is at first accompanied by sonorous sounds, which are believed to be graver when formed in the large tubes, shriller when in the small: moist sounds are next heard, which begin by accompanying the sonorous, and gradually supersede them altogether, until the declension of the disease, when they are again heard: the breathing first becomes natural at the apices, and the moist sounds linger longest at the bases: the voice-sound remains as in health. There may be some difference in degree, but these phenomena are usually met with on both sides alike, in simple bronchitis.

If the moist sounds be confined to one side, the case may be mistaken for pneumonia, especially when they are fine and limited to the base of the lung: the presence of sonorous sounds would be sufficient to prevent such an error; but when these have ceased the determination must rest on the absence of all dulness or exaggeration of voice at any part, as well as on the character of the expectoration, which is less adhesive and never rusty. When it has been decided that the case is one of bronchitis and not of pneumonia, we have still to account for the circumstance of one lung only being affected; and this we may perhaps learn from the history, as it either indicates an attack of inflammation at some former period, or tells of gradual emaciation, hæmo-

ptysis or some other symptom of commencing tubercular disease. It is often impossible to detect the signs of early phthisis while the bronchitis lasts; but the circumstance of the morbid sounds being most distinct, and lingering longest at either apex, is quite enough to excite suspicion.

When catarrh precedes or accompanies an attack of bronchitis it is extremely difficult to distinguish it from influenza, except in the severity of the concomitant fever: there is in the latter case decided quickness of pulse, coating of tongue, and heat of skin, with more intense headache, general lassitude, and depression, complete loss of appetite, &c. But, after all, the two diseases merge so completely into each other, that a case must be called influenza or bronchitis very often solely from the circumstance that the disorder is or is not epidemic. The same depression will attend severe bronchitis in a feeble person that marks influenza in the robust; and hence the inquiry into the patient's previous health, unimportant as regards diagnosis, is of value in determining on treatment; and although it must be a most dangerous error to treat the nomenclature of disease in place of the patient, the name of influenza sometimes serves to remind us of depression, and prevent unnecessary depletion. The term influenza is unfortunately constantly misapplied even by medical men.

Chronic bronchitis, when it occurs for the first time in any given case, is probably merely an unusual prolongation of an acute attack which has been neglected, or has found the patient in a condition of general debility; the history is that cough has continued after the symptoms of febrile disturbance, pain, &c., have subsided; the expectoration is more or less purulent; the auscultatory signs give no evidence of consolidation; nothing is discovered beyond the persistence of moist sounds. In such cases, however, careful search must be made for signs of early phthisis.

More generally there is a history of previous coughs and colds, and the present attack is either an aggravation of a constant condition of ill-health or has come on insidiously without acute symptoms: there seems to be a permanent liability to chronic inflammation of the mucous membrane, and this is sometimes coupled with a condition of emphysema. The patient

is not feverish: the pulse is sometimes quick and weak, and the tongue may be accidentally foul, but it is not dry, and there is no heat of skin: the condition of the bowels is important, because occasional diarrhœa would lead to the suspicion of phthisis. If emaciation do exist, the peculiar thinness of skin, and clubbed nails of tubercle, are not found in simple bronchitis; the face is often discoloured, dusky, or muddy, when the disease is severe, becoming remarkably so when emphysema is present, and having a more distinctly blue or purple colour when it is associated with disease of the heart. In severe chronic bronchitis the gait is stooping, from the shoulders being elevated, and in bed the patient cannot lie down; orthopnœa is however commonly associated either with emphysema or disease of the heart. The breathing is laboured, but not hurried; the cough is generally frequent and loose; the expectoration usually easy, but sometimes only possible after a good deal of coughing; it is muco-purulent, or almost wholly pus, in simple chronic bronchitis; it is watery, frothy, and abundant when the bronchial secretion is secondary on disease of the heart or kidneys.

Percussion either detects no difference between the two sides, or excessive resonance is especially observed on one. Sonorous sounds seldom exist in chronic cases, except when emphysema is present: moist sounds are heard loudest at the back of the chest, and in the most depending positions, where they are louder and coarser than elsewhere, except when the movement of the air in the small tubes and vesicles is impeded; and then scarcely any sound is heard, or at most a few large bubbles: sometimes local absence of breathing, in consequence of one of the larger tubes being temporarily plugged up, may perplex the observer.

In chronic bronchitis it is to be remembered, that both voice and breath sounds may be locally exaggerated by the thickening, dilatation, and rigidity of the tubes, but it seldom happens that such changes are of very unequal extent on the opposite sides.

A single dilated tube at one apex may cause some difficulty in diagnosis; but if there be dulness on both sides, it is nearly equal, and depends only on want of resiliency of the ribs; if there be dulness on that side on which the large tube is found, its real interpretation is, that there is excessive resonance on the other, where want of breathing indicates emphysema; if resonance be more marked over the dilated tube, it has none of the hardness and hollowness, or local characters of a cavity, but is diffuse and accompanied by elasticity and resilience. This is the only case of real difficulty in chronic bronchitis, when by many of its concurrent symptoms it simulates phthisis: the converse case, in which phthisis simulates chronic bronchitis, will be referred to subsequently. In a few words we may say, that all changes of percussion resonance, as well as most of those connected with breath- and voice-sounds, indicate something besides bronchitis; either tubercles, or emphysema, or pleuritic effusion, or inflammatory consolidation, or even œdema; and the correct explanation of the phenomena depends on considerations belonging to each of those states, not on anything specially connected with the moist sounds themselves, which only arise from the coincident bronchitis.

Bronchorrhœa is probably the best name for that condition of the lungs in which the secretion from the mucous membrane is due, not to inflammation, chronic or acute, but to secondary congestion induced by disease of the heart, or more probably to œdema of the lung, associated both with disease of the heart and of the kidneys. Except when partial dulness is produced by pleuritic effusion, there is nothing in the physical signs to indicate that this is not simple bronchitis: there is usually a difference in the expectoration, when there is no inflammatory condition of the membrane, and there is the still more important fact of disease existing in other organs. In other cases bronchitis is engrafted upon persistent disease of the heart or kidneys, and its symptoms are greatly aggravated in consequence. Among the complications of this disease, changes in the condition of those organs are the most common, and ought especially to be sought for in chronic cases; after all that has been said it is scarcely necessary to repeat that the existence of emphysema and tubercular deposit are each to be inquired into: in the acute form we find bronchitis complicating pleurisy and pneumonia or even pericarditis, and often present as a result of congestion in most diseases having a febrile character.

§ 5. *Emphysema.*—The association of this disease with bronchitis makes it desirable to point out its characters here rather than in connection with pneu-

monia. It has been already frequently alluded to, and a short résumé of the more important points connected with it must suffice. Its great and prominent feature is dyspnœa—laborious, in contra-distinction to hurried breathing; the respiration is generally slow, and yet the patient is conscious of dyspnœa, and makes complaint of it: there is no difficulty of articulation; but yet he may stop in the narration of his symptoms to take breath. In its most aggravated form, the elevated shoulders, the rounded back, and the full, highly-resonant chest, the peculiar weak, powerless cough and voice, and the dusky, somewhat earthy or muddy aspect, are all so striking that we need scarcely institute a physical examination to satisfy us of the existence of emphysema. Whether confined to one lung, or extending to both, the phenomena of a well-marked case consist of the slight descent of the upper ribs in expiration, heaving movement, with but little expansion of the chest in inspiration, while the lower ribs are drawn inwards; excessive resonance, and absence of breath-sound, or the substitution of prolonged distant expiration for vesicular breathing. It is of most importance as a complication of chronic bronchitis, aggravating all its evils, and permitting sometimes such an accumulation of secretion, that scarcely a bubble reaches the ear, although the tubes be quite full.

In its minor degrees it is often an unexpected cause as well as complication of bronchitis, especially when limited to one side of the chest: the obscurity of the symptoms sometimes leads to its being mistaken for early phthisis; while it not unfrequently affords an explanation of the existence of asthma. When the upper lobes are chiefly implicated, absence of voice-sound is a great help in diagnosis; but this is far from being constant: prolonged sonorous expiration is a more reliable sign, when some degree of bronchitis is present. It is unnecessary to repeat here the circumstances detailed in a former chapter by

which we decide whether relative dulness on percussion be due to consolidation of a portion of one lung, or to dilatation of the corresponding part of the other.

Slight general emphysema, in the absence of bronchitis, gives rise to few symptoms by which it may be detected. The patient perhaps suffers from repeated attacks of asthma, or any little cold is attended with much dyspnœa: in the intervals we find that the inspiratory sound is generally weak or deficient, or a rumbling noise only is heard, which cannot be classed as inspiration at all; but on deeper breathing some little sound becomes perceptible, which is followed by a prolonged distant blowing expiration. These cases are difficult to discriminate from those in which the breath-sound is naturally weak, and where the ear may be applied over any part of the chest without hearing anything in ordinary respiration.

This is not to be regarded as an unnecessary refinement; for where emphysema is present, there is to a certain extent less chance of the lungs becoming tuberculous than when the breathing is naturally weak. Sometimes, while the inspiration does not differ from that generally found in health, the expiration is universally prolonged. Are such cases at all emphysematous? This is a point apparently somewhat uncertain; but I conceive that one of the elements of emphysema is a suppression of the sound of inspiration, and that its distinctness is to be regarded as exceptional, only occurring in consequence of dilatation or rigidity of some tube near the surface.

As the emphysema becomes more extensive, so do the attacks of breathlessness become more frequent and more severe; and in addition to the ordinary complication of bronchitis, we have two others of much importance—hypertrophy and dilatation of the right side of the heart, as a sequel of the disease of the lung, and dyspeptic symptoms, which, while they have no immediate connection with the condition of the chest, interfere very seriously with the action of the diaphragm. Both tend to aggravate the dyspnœa; the one by sending into the lungs a larger quantity of blood than they can supply with air, the other by preventing the already distended lungs from receiving the limited supply, which each inspiration might otherwise introduce: the former is permanent, the latter only temporary in its effects upon the respiration.

The constancy of the prolonged sonorous expiration is easily explained by the loss of elasticity of the air vesicles, which deprives the lung of the power to expel any secretion existing in the tubes: hence it is that sonorous sounds are so characteristic of the disease, though in truth they depend upon bronchitis. The same circumstance explains why, with a larger amount of secretion, the moist sounds are almost suppressed; because the air is stagnant in the smaller tubes, and the fluid accumulates till but a few bubbles of air can pass through, and very coarse sounds only are heard at the end of inspiration, and more especially at the beginning of expiration.

§ 6. *Asthma.*—In speaking of the descriptions given by patients of the disease under which they are labouring, the necessity was shown of excluding any theory which the name given to the complaint might imply, when this name comprises not only the facts of the case, but the notions acquired of their causation. This is especially true of asthma; and when a patient calls himself asthmatic, it must be our first object to ascertain whether the dyspnœa be habitual, and of long continuance, or whether there be any paroxysmal character in the attack. We restrict the term to those cases in which the difficulty of breathing occurs distinctly in paroxysms, of longer or shorter duration, which at their worst cannot exceed two or three days, and more generally last only a few hours.

In such instances the malady comes on gradually. At first it is only during a catarrh that any shortness of breathing is experienced; by and bye it recurs more frequently, and with greater severity, either without the presence of catarrh, or terminating in it; and depends on such a variety of causes, that it is almost impossible to assign the true one. The paroxysm may be excited by local or atmospheric causes, or by derangement of stomach: it is unattended with fever, the skin generally being cold, and often covered with moisture: the prominent fact is inability to fill the chest with air, as manifested by the gasping for breath, and by the want of breath-sound in the lungs, while there is no permanent cause of obstruction at the

larynx or in the trachea, the patient having been quite free from dyspnœa before the paroxysm began, and knowing full well that he will be free from it as soon as it is over.

In a very large number of these cases there is some degree of emphysema; and the more the lungs are thus altered, the more easily is the asthma excited, the more severe is it while it lasts, and the longer its continuance. But there are cases in which we can trace no emphysema and we are cognizant of nothing but the spasm by which the air is prevented from entering the lungs with its ordinary freedom. The paroxysms are most apt to occur at night; and, besides the immediate object of shortening their duration, we have to consider their relation to local causes, or disordered stomach, with a view to their prevention. It is not unusual to find that certain persons suffer from an attack of spasmodic asthma each night that they sleep in a particular locality, and are perfectly free from it as soon as they remove elsewhere.

Hay-asthma is really a catarrh, and has nothing of the paroxysmal character. It cannot be distinguished from ordinary catarrh, except by its recurring at the same season of the year, by its being excited in the immediate proximity of its known cause, or by its surprising and almost immediate cessation on removal from such proximity: these discoveries are more frequently due to accident than to skilful diagnosis.

All other so-called asthmatic cases may be resolved into changes in the permanent condition of the lungs, or diseases of the heart and great vessels, or circumstances affecting the nervous system, and giving rise to spasm or paralysis of the laryngeal muscles.

§ 7. *Pneumonia.*—Inflammation of the lung presents itself to us either as an acute or a chronic disease. In the former we only learn that after exposure, severe cold has been caught: in its commencement there may have been rigor, or pain in the side; but these

phenomena are often absent. It is always attended with more or less of inflammatory fever, as indicated by the heat of surface, coated tongue, quick pulse, &c.: occasionally the combination of increased arterial action and insufficient aeration of the blood, together produce a peculiar dusky flush on the cheek, which is very striking. The breathing is hurried, and in severe cases the number of inspirations in a given time exceeds the normal standard in a much higher ratio than the acceleration of pulse. The cough is hard and dry, especially in the earlier stages, the tough adhesive phlegm being brought up with difficulty, and presenting very soon a rusty colour from an intimate admixture of blood: the expectoration is much more abundant, and more distinctly blood-tinged when the type of the inflammation is lower in degree. Pain is sometimes complained of, from the presence probably of a slight complication of pleurisy, and the patient has a general sense of illness much more decidedly than in bronchitis for example.

The distinctness of the auscultatory signs depends very much upon the position of the inflammation, whether near the surface or deeply seated. It attacks the lower and back parts of the lungs very much more frequently than the upper and anterior portions, and we have therefore much more confidence in the diagnosis when observed somewhere behind or to either side: the percussion dulness is not complete, and generally not very extensive: in parts the breathing is suppressed, in parts much exaggerated, but nowhere entirely absent, even down to the very edge of the diaphragm; the expiratory sound is longer in proportion to the inspiratory than in health, and when much exaggerated it becomes very loud and blowing, with a whiffing, metallic or brassy character, commonly called tubular breathing. The voice-sound is increased, and becomes diffuse, ringing, or metallic; but it has neither the sharpness of that produced in a large cavity, nor the shakiness of that which accom-

panies the effusion of fluid. When fine crepitation is distinctly heard as accompanying the foregoing phenomena, the diagnosis may be pronounced with certainty; the sound is not heard over the whole of the hepatized portion of the lung, but more commonly towards its edges, and sometimes only when a deep inspiration is made. The period of the disease during which really fine crepitation is audible—that form of it which consists of very fine crackling, heard only at the end of each inspiration,—is limited, and is soon succeeded either by its almost total cessation, or by its gradual transition through coarse crepitation into true moist sound. Sonorous sound is sometimes heard in consequence of the presence of bronchitis: and not only does acute bronchitis accompany pneumonia, but it may precede it, and among the aged is very often its exciting cause. In such cases the history is a good deal modified, and the auscultatory phenomena are not so distinct.

The condition just described is that of the fully-developed disease: but the practitioner may have to treat a case in an earlier stage, when the history is such as leads him to suspect inflammation of the lung, while yet there is no evidence of consolidation. He only finds that on one side the breathing is weaker than on the other, and then undoubtedly fine crepitation is among the surest and the earliest indications of what is going to happen: but while he fails in no part of the treatment which the general condition of the patient and the probability of the invasion of pneumonia would indicate, it is wise to abstain from a positive diagnosis until the signs be more fully developed; in order that he may not be misled in his judgment of subsequent symptoms, which may prove the disease to be something else, bronchitis or pleurisy for example.

It must be remembered, too, that when pneumonia is deep-seated, its presence will scarcely be marked by any physical signs at all; but if sufficient regard be

paid to the whole category of symptoms, we may be contented if the diagnosis derive confirmation from superficial weakness or deficiency of breathing, with local exaggeration of voice-sound, especially when these indications are met with at the side of the chest, at a distance from the large tubes, while percussion elicits no dulness, and auscultation detects no crepitation. In either of these cases the practitioner, by causing the patient to cough, or even only to talk, and thus securing deep inspiration, may develope the absent phenomenon of crepitation. One form of pneumonia in particular belongs to this class; it is that dependent on secondary suppurative fever with pyæmia. The small foci of purulent pneumonia are rarely to be discovered by auscultation; and the supervention of cough, with any alteration in the breath-sound on one side of the chest, is enough to show that secondary suppuration has attacked the lung; but here the question of which organ is attacked is merged in the more important one of a general crasis of the blood, indicated by the symptoms of suppurative fever.

The great error of physical diagnosis, in asserting that fine crepitation is pathognomonic of pneumonia, has been already mentioned. It may be quite true that there is one form of it which is never heard in any other condition of disease (yet even this may be exactly simulated by coarse friction-sound); it may be also true that, if this form be clearly and distinctly heard, pneumonia is certainly present; but if we take all the varieties of crepitation into account which we do hear in true pneumonia, they are clearly not confined to it. It is equally false to assume that crepitation is a certain indication of pneumonia, and that its absence proves the disease to be of some other kind.

The real value of crepitation is only as it confirms or is opposed to other signs of disease: when no other symptoms of pneumonia accompany its presence we must seek for some different explanation of the phenomena; its entire absence may lead us to suspect that we have been wrong in attributing other symptoms to pneumonia; but if that evidence be distinct, its degree of coarseness need not be regarded; nay, even when the character of the sound is entirely altered, and accompanies expiration as well as inspiration, it still does not stultify the diagnosis of pneumonia,

but only shows that an unusual amount of serous exudation has taken place—a fact which the character of the expectoration will probably sufficiently ratify.

Pneumonia is most frequently found in the lower lobes, and we consequently place most reliance upon the auscultatory phenomena when observed in that situation: we receive their evidence with more hesitation when confined to the upper lobe; and when the whole lung presents the same character of dulness, blowing breathing, and crepitation, we may be certain that, unless the general symptom be very grave indeed, the disease is partially if not wholly tubercular.

In distinguishing fibrinous from tubercular deposits in the upper lobe, we must remember that very fine crepitation is rarely met with at the upper part of the lung; consequently, the more continuous the sound appears, the more distinct its limitation to the inspiration alone, and the more equal its diffusion over a considerable space, the more probably is it caused by pneumonia. We have first to take into consideration the history of the case, the duration and general symptoms of the disease, and the character of the sputa: and next, to remember that, in such a situation, if the parenchyma be infiltrated with lymph, dulness must necessarily be very marked; the vesicles are occluded, and the vesicular murmur will therefore be annihilated; the tubes remain open, are inflamed and indurated, and the breathing will consequently be very loud and whiffing, and the voice-sound brassy, and much increased in intensity. It will also be remarked that these changes are pretty equally extended to the whole lobe of the lung, and its margin clearly defined by their extent, because they are often more marked towards its lower part than quite at the apex.

But not unfrequently pneumonia of the upper lobe is only engrafted on previous tubercular deposit, and then the crepitation is coarser, the breathing less whiffing, the voice not so brassy; the special signs and the general symptoms each approximate to those of

phthisis, of which we have yet to speak. One source of fallacy is when loud blowing breathing is heard in an empty vomica, and crepitation exists in its immediate neighbourhood; but if carefully examined clicking or squeaking sounds will be found mingled with the crepitation, which is always coarse; the expiration is more blowing, and less whiffing; the voice-sound is less brassy and more shrill; and careful percussion will detect a hollowness or wooden resonance over one particular point, which, under certain circumstances, presents what is called the cracked-pot sound; still more, these characters are strictly local, and limited to the immediate region of the cavity; above, below, and on either side, are heard the sounds belonging to tubercular consolidation; and, more than all, the history and symptoms are of phthisis, not of pneumonia.

Pneumonia occasionally goes on to the formation of abscess. Apart from those cases in which the suppuration is secondary such a termination is rare, and is most likely to be met with when the lungs are previously unhealthy, the subjects of chronic bronchitis or cirrhosis. The conditions known as pneumonic phthisis are also constantly attended with the formation of cavities, and this subject will occupy our attention in connection with tubercular phthisis.

In a very large proportion of cases the resolution of pneumonia is attended with puriform exudation and secretion; and when the sounds produced in a large tube are modified by being transmitted through hepatized lung, they so exactly resemble those produced in a cavity that mistakes have often been made in the interpretation of abundant purulent expectoration, with loud blowing breath-sound confined to some particular spot at the base of the lung. It is true that careful auscultation would prove this to be more diffuse than cavernous breathing ought to be; but this fact may be overlooked: another consideration, however, forces itself on our attention; when pneumonia terminates in abscess, some portion of the lung structure becomes disorganized, and pus evacuated from an abscess of this sort has always a fetid odour, and it is not safe to diagnose abscess of the lung in such circumstances where this character is wanting. This rule does not apply to secondary deposits which precede the pneumonia, gradually enlarging as the inflammation goes on.

Such cases are very commonly called gangrene of the lung; but while there is undoubtedly destruction of some portion of the tissue, the primary condition is suppuration, and they may be readily distinguished from true gangrene by the appearance of the sputa: in the latter always brown or blackish, in the former chiefly purulent; the odour in both is that of sphacelus, which impregnates the breath of the unfortunate patient, and is diffused throughout the apartment. Gangrene is a much more fatal disease than fetid abscess, and is generally not immediately related to pneumonia.

Chronic pneumonia seldom exists independent of phthisis; sometimes in a case of long standing, when the period of fever and rusty expectoration has gone by, we find evidence of consolidation, with coarse crepitation and moist sounds at the base of one lung. In the absence of the tubercular diathesis we may hope, and if the patient get thoroughly well, we may believe, that it is a case of chronic simple pneumonia; but such are rare.

Cases sometimes present themselves in which we find evidence of a low form of pneumonia coexisting with some other disease, and we must be careful that the diagnosis of pneumonia, however clearly made out, does not cause us to overlook the complication. Fever, for example, often presents such a combination, when it may require very nice diagnosis to say in how far the fever arises from the pneumonia, or the pneumonia from the fever. This is not merely an idle speculation, because important practical results in regard to treatment depend upon the decision. When properly considered, the treatment of one or other disease will not be blindly followed; but the educated practitioner will ever bear in mind the two very opposite diseases he has to treat together, and modify his remedies to meet the exigencies of the case—especially when an acute inflammatory disease supervenes on a chronic exhausting one. The combination with pleurisy will be subsequently referred to; its chief importance with regard to diagnosis comes from the manner in which it modifies the auscultatory phenomena: to its presence we must no doubt ascribe the circumstance, that sometimes the sound of crepitation, heard early in the disease, ceases, and instead of being replaced by blowing breathing, and other phenomena of advanced consolidation, the breath-sound itself becomes inaudible. It seems impossible that fibrinous deposit beginning near the surface should of itself cause a stagnation of the air in the large tubes, which can never be closed by such means; neither is there any reason why the sound of its necessary movement should not be transmitted to the ear, unless the lung be pushed aside by fluid. The condition already referred to, in which the presence of vesicular breathing at the surface prevents our hearing the blowing sound of deep-seated pneumonia is of quite a different nature.

The co-existence of delirium is not to be regarded as a separate disease, but as one of the phenomena of severe pneumonia. It is of much importance in treatment, and when appearing early may lead to the suspicion that miasmatic fever exists along with the inflammation; but one form of blood change is quite as liable to produce delirium as another.

§ 8. *Phthisis.*—Under this head it is proposed to consider all those forms of disease which are characterised by degeneration or disorganization of lung tissue. The most important is that which owes its existence to the scrofulous diathesis, the local development in the lungs being one of the most constant manifestations of the existence of scrofula with tubercle. The subject has been already referred to, and our present object is chiefly to review its history and symptoms, with reference to the auscultatory phenomena which mark its progress.

In its characteristic form and advanced stage both general symptoms and local phenomena are so distinct that no disease is more readily or more surely recognised: in exceptional cases it is not unfrequently mistaken for other diseases, while they in their turn are liable to simulate phthisis: in its early manifestation it is very important to be able to recognise it while yet latent, and before its symptoms are fully developed. Its sadly fatal course makes the conscientious practitioner view these early phenomena with great anxiety, and study their relations with the greatest care; and the dread in which it is universally held serves as a never-failing resource for the fraudulent and the avaricious, who pretend to detect phthisis when it does not exist, and promise a cure alike to those whom they thus deceive as to the true nature of their malady, and to those whom they delude with false hopes as to the powers of art, when their case is already past recovery.

The history comprises several points of considerable value in diagnosis: loss of relatives from diseases of the chest under whatever name, especially those occur-

ring at the period of adolescence; accounts of previous illnesses and ailments of the patient himself; and the mode in which his present attack has commenced. It must be regarded as unfavorable when cough has begun without preceding catarrh or coryza, but has been from the first dry and hacking: when during its continuance, or at its beginning, there has been hæmoptysis of the amount of a teaspoonful or more; and when in the progress of the case the dry cough has been changed for one accompanied by thin mucilaginous rice-water sputa, and that form of expectoration has been followed by thick yellow phlegm.

The general symptoms very often indicate the presence of hectic: the skin, especially that on the palms of the hands, being at times dry and hot, while at others it is bedewed with excess of moisture; there are also night-sweats, the pulse is quick and weak, the tongue frequently patchy, and sometimes preternaturally red, shining, or smooth. Along with this we have the particular indications of remarkable thinness of the skin, which can be pinched up, as if it were detached from the subcutaneous structure, and clubbing of the nails, with the occasional presence of diarrhœa: any signs of emaciation are of value when not traceable distinctly to disease of the chylopoietic viscera. The patient's appearance sometimes betrays weakness, with a mixture of languor and excitability; the eye brilliant, the cheek pale, with a hectic flush, and the whole aspect delicate. The respiration is observed to be quick, while the patient has no feeling of dyspnœa, and does not seek by posture to relieve his breathing. No complaint of cough, perhaps, is made till it be inquired after; there may be mention of wandering pains in the chest, of a feeling of tightness, or perhaps of local pain from intercurrent pleurisy. The voice is very often characterised by a slight degree of hoarseness, which, as the disease proceeds, may ultimately terminate in complete aphonia.

None of these symptoms are always present, and

some are very liable to be found in other diseases, but one or two have more value than the rest. Among these we reckon family history; hæmoptysis, when there is no disease of the heart, no relaxed throat, or spongy gums; quick pulse and night-sweats, thin skin, clubbed nails, and emaciation; especially when these are found about the period of puberty, and from that onward to the age of thirty. Hæmoptysis is studiously concealed by some patients in whom it has really existed, is much talked of by others in whom it has been only simulated, especially the hysterical and hypochondriac. The quickness of the pulse is generally an index of the severity of the disease; and a natural pulse, when the evidence of phthisis is distinct, is always a favorable indication as to the progress of the case. Clubbed nails seem to have some direct relation to the condition of the lungs and heart, and though most commonly seen in phthisis, yet attain even higher degrees of development in other diseases of the chest, when not a tubercle exists.

The auscultatory phenomena vary according to the site of the deposit and the progress it has already made. An important fact in their elucidation is, that tubercle has a remarkable tendency to be located in the apex of the lung; and that, however disseminated through other parts of the organ, it is very generally found there too; this law is all but universal: the converse is also true to a less extent; that in other diseases of the lungs the signs are more fully developed in other parts: we shall, therefore, consider the symptoms of tubercles at the apex first.

The facts of which auscultation and percussion in this region give evidence, are the original deposit of tubercle in solitary small masses, their gradual increase in size, the excavation of the lung which follows on their softening and expulsion, and incidentally inflammation and irritation of the bronchial tubes, of the pleura, or even of the parenchyma of the lung, which may be excited by their presence.

If the previous chapters have been carefully studied, the phenomena necessarily resulting from such causes will be known *à priori*. A very small amount of deposit can only affect the breathing in the way of making the expiration a little longer, and the inspiration a little shorter, and harsher or louder, or perhaps weaker, than on the opposite side, or by giving it a wavy or jerking character: the voice-sound will be a little louder: the percussion-sound can only be very slightly if at all altered; but it must not be forgotten that both voice- and breath-sounds have a tendency to be louder on the right than the left side in health. Sometimes a confirmation of the existence of tubercle in this early stage may be obtained from the heart's sounds being heard more loudly at the right apex than the left, which is impossible in health; a bruit in the subclavian artery, when it cannot be heard in the carotid or at the heart, is also of value, although the *rationale* of its development is not understood. These are, after all, very uncertain grounds on which to determine that so serious a disease as phthisis has begun, and yet they are sometimes all that auscultation and percussion afford. An opinion ought not to be pronounced on such insufficient data, if standing alone; but we may feel very safe in the deduction, if the history and general symptoms point to the probability of phthisis, and if the physical signs be only taken in conjunction with the whole evidence which the case supplies. But let me warn the student against supposing that he is reasoning accurately in taking them in conjunction with one only of the more general symptoms; such, for example, as a weak and quick pulse, or hæmoptysis: this is the most common cause of error.

As the disease proceeds, the evidence of consolidation becomes more distinct, and along with it we have signs of irritation of the bronchial tubes (sonorous and moist sounds), of inflammation of the pleura (friction and creaking sounds), sometimes of inflammation of

the parenchyma (true crepitation), or of the progress of the tubercular disease itself (clicking or crumpling sounds); and we admit the great probability that these signs are caused by the presence of tubercle: yet we cannot dispense with the evidence derived from the history of the case, because they only prove local consolidation, and no more, and this may be inflammatory.

Still further in the progress of the case the evidence of local consolidation is accompanied by louder blowing breath-sound from commencing excavation when the cavities are empty; and at a more advanced stage the dull percussion stroke may be converted into something approaching to tympanitic hollowness; the breath-sound is still more blowing, and the voice-sound is sometimes painfully loud, as if some one were speaking into the other end of the stethoscope: this cavernous sound, as it is called, is even more clearly brought out occasionally when the patient whispers. The necessary result of air entering these cavities when fluid is present is, that the morbid sounds are of a bubbling, gurgling, or even metallic character. An important fact in relation to this stage of the disease especially, is flattening or sinking of the ribs, and deficient movement in inspiration; without this our signs of excavation are probably altogether wrong, and we must look for some other explanation. The general symptoms, too, are necessarily more pronounced, and the history of the disease extends over a longer period.

The principal fallacy in the first stage is when the healthy lung is supposed to be tubercular because the opposite one is emphysematous: in the second, when pneumonia of the upper lobe is mistaken for tubercular consolidation: in the third, when a large tube is mistaken for a cavity, or a large cavity is mistaken for pneumo-thorax. In chronic pleurisy with empyema, attended by symptoms of hectic, sounds exactly resembling those produced by tubercular deposit may

be heard under the clavicle: the practitioner must be thrown much off his guard by some unusual circumstance, who confounds these two conditions; but what has happened more than once within my own personal knowledge, may happen again.

For the sake of the student we may point out more in detail the relations which the adventitious sounds present to the different modifications of breath and voice-sound observed in the progress of the disease.

The voice-sound steadily increases in intensity from the beginning of consolidation to its ultimate termination in the largest possible cavity. Not so the breath-sound: this is first commonly harsh and exaggerated, or wavy and jerking; then the inspiration becomes diminished in intensity while the expiration is prolonged; and subsequently, when cavities begin to form, each increases in loudness, but the expiration more especially becomes remarkably blowing. With this sometimes a crumpling sound may be heard early on deep inspiration; when the presence of tubercular matter gives rise to any inflammation, fine and coarse crepitation or moist and sonorous sounds are developed; the variations probably depending upon whether the vesicular structure or the tubes be more particularly the seat of the inflammatory action. Proceeding a little further, the sonorous sound is entirely replaced by moist sound, when the secretion from the tubes becomes more abundant; but in the same proportion does the air find difficulty in entrance, and the breath-sound consequently becomes partially suppressed: this condition is not necessarily permanent, and the lung may return to one in which the breathing is simply harsh and exaggerated. At this stage the presence of crumpling or of friction-sound or of one or two clicks is often of great service in giving certainty to the diagnosis, when bronchial irritation has passed away.

In the second period the difference in resonance becomes quite distinct; but the student may feel uncertain which of the two is the diseased lung, unless he compare the sound of the percussion stroke above and below on each side of the chest. The moist clicks now become more frequent, and are often mixed up with squeaking sounds; coarse crepitation and sonorous sounds are more rare, or are heard only in the vicinity of where the softening has begun; moist sounds are common. There are two circumstances which tend to produce these effects, the partial softening of small tuberculous masses, and the presence of local bronchitis; and though clicks and squeaking sounds be more distinctive of the former, and moist sounds of the latter, yet they

are by no means to be taken as their direct exponents, because each may be found in either circumstance. Another cause of the presence of moist sounds with deficient breathing is the recent occurrence of hæmoptysis: dulness is commonly present, but it is slightly marked: the circumstance of hæmorrhage having existed sufficiently explains the phenomenon, and, when heard only at the apex, moist sounds are pretty conclusive evidence that its cause is the previous deposition of tubercular matter, because we know of no other which can give rise to hæmorrhage at the upper part of the lung only. As a necessary consequence of the presence of the fluid, whatever it may be, that produces these sounds, the entrance of air is impeded and the breathing is deficient.

Advancing still further, the dulness becomes unmistakeable: indeed, the wooden or tympanitic sound over a cavity would always be called dull by any but an expert auscultator. The moist sounds become coarse, abundant, and mixed with larger bubbling, until a cavity of some size has formed, and then nothing but gurgling sounds are heard when the stethoscope is applied over it: in its immediate neighbourhood the signs are those of less advanced disease. When numerous small cavities exist, the condition is marked by more general coarse or bubbling moist sounds. But besides the size of the cavity, the proportion of air and fluid which it contains greatly modifies the sounds it gives out, and we may even have no adventitious sound at all. An empty cavity produces a loud blowing sound in breathing, but no gurgling; a full cavity gives neither one nor other, but only dulness on percussion; a cavity communicating freely with the bronchial tubes by an opening situated below the level of the fluid produces loud gurgling; one in which a small opening is similarly situated may give rise to only one or two resonant explosions: when the cavity is large and nearly empty, every sound produced within it has a metallic resonance; in a small cavity or one nearly full no such effect occurs.

There need be no practical difficulty in distinguishing this metallic clang from that produced by a similar cause on a much larger scale, viz., the presence of air and fluid together in the pleura: the great and constant distinction is simply that in the one case, if we turn to the back of the chest, we find the indications of lung tissue, however diseased, occupying its natural position; in the other we have the tympanitic resonance produced by its absence; and if any breathing be heard, it is only a loud blowing sound resounding through the empty cavity, while at the base there is complete dulness, from the presence of fluid, and no breathing at all. In addition to this there are two minor sources of information: the metallic sound is seldom produced by dropping when heard in a cavity, but is more com-

monly the result of solitary bubbles of air passing through the fluid; it therefore keeps time with the breathing—dropping does not: the voice is less like that produced by speaking into an empty jar, and seems rather to be spoken into the stethoscope.

Another general pathological fact may be turned to account in diagnosis—viz., that if tubercles be at all advanced in one lung, they are almost certain to exist in minor degree in the other; and when their presence is equally distinct in both lungs, they are still seldom found in exactly the same stage, or giving rise to the same modifications of sound. This is especially to be borne in mind when any one auscultatory phenomenon stands alone at either apex in a very marked degree, which would indicate an advanced stage of the disease, if it were found in conjunction with other corresponding signs and symptoms: alone, we must be content to regard it as an anomaly to be hereafter cleared up as the disease proceeds; but we may consider the possibility of morbid growth,—such, for instance, as encephaloid disease disseminated at the apex.

Tubercular disease is sometimes found solely or chiefly at the base of the lung: such cases are very apt to be misunderstood simply from the fact that they are so rare. When dulness on percussion is perceptible, and the morbid sounds are limited to one side of the chest, the phenomena may be caused either by old thickening of the pleura, accompanied by bronchitis limited to one lung, or by consolidation of lung-tissue and its results. Here our diagnosis rests to a very great extent upon the relative loudness of the voice-sound: it is not increased by pleuritic thickening, but it ought to be by consolidation. If along with this we find any degree of harshness of breath-sound in spite of the presence of moist sounds, the conclusion will be very much strengthened by it. Having thus decided that the dulness is due to consolidation, our next step is to determine its cause.

We have already alluded to the suppurative stage of pneumonia, and the occasional formation of abscess, and we have now to consider another form of disease known as *pneumonic phthisis*, and having a different origin from tubercular phthisis. Two varieties are recognised, the *acute* and *chronic*, and it is to the latter

we must now confine our attention. Like tubercle the consolidation is partial and incomplete, the progress is essentially slow, and the disease ends in disorganization of lung-tissue. The chief difference between them is the freedom of the apices from disease when the deposit is not tubercular. Pneumonic phthisis is perhaps more likely to be mistaken for chronic bronchitis, because it so often owes its origin to the repeated attacks of inflammation of surrounding tissues which accompany the exacerbations of long standing bronchitis. Fibroid degeneration seems to spring out of the process which in most cases only leads to hardening of the tubes. When deposit has taken place in both lungs, the dulness on percussion is not readily made out, and a hasty diagnosis having regard chiefly to the coincident bronchitis, whether depending upon the presence of tubercle, or associated with the exudation and subsequent degeneration of fibrinous material, is very apt to rest satisfied with having traced out the apparent cause of the moist sounds heard without going further. The existence of hæmoptysis, of emaciation, quick pulse, thin skin, clubbed nails, or any of the more important symptoms of phthisis, ought to put us on our guard against pronouncing too favorable a diagnosis in such cases.

It is a less rare occurrence to meet with tubercles equally disseminated through the lung: such cases are almost always recent, and this fact alone tends greatly to embarrass the diagnosis. Still the history wants something of the severity of an acute attack; it is insidious; there is not immediate prostration but gradual decline; there is often hæmoptysis; the febrile symptoms are commonly of mild character, but the pulse is quicker than the other symptoms would lead us to expect; emaciation cannot have proceeded far, nor can there be hectic fever till softening have commenced; commonly there is a general blue discoloration of the face, which most nearly resembles that seen in severe bronchitis; it differs from the dusky flush of

pneumonia, as well as from the blueness of diseased heart, and the dirty hue of emphysema; it is rather a flush or suffusion of face which, if the lungs were healthy, would be florid, and is dark-coloured only because the vesicles are obstructed. The physical signs at first resemble pneumonia, but of such an extensive character that they cannot possibly be caused by acute inflammation where the general symptoms are so moderate: indeed, the sounds, when more carefully studied, are not exactly those of pneumonia; the crepitation is coarser and more disseminated, the breathing and vocal resonance are both free from any brassy tone, all the phenomena are more distinct at the upper part, and, unlike pneumonia, they are not strictly confined to one lobe, but gradually decrease towards the base of the lung: the expiration is simply harsh and prolonged, and the voice exaggerated. At a later stage the signs resemble those of bronchitis, but the moist sounds are fewer and more squeaking, with prolonged expiration, especially at the apex, which is not the case in bronchitis. If one lung present such signs of disease, while in the other consolidation is commencing at the apex, most unquestionably the whole is due to tubercular deposit.

But we have also the acute variety of pneumonic phthisis, in which there is no tubercle present, and yet the symptoms and the evidence of disease are very analogous to those of tubercular infiltration. It is, perhaps, not of very great importance that we should be able to distinguish between the tubercular and non-tubercular forms of phthisis; in each there is a cachectic state as the cause of the degenerative process; recovery is in either case highly improbable, because destruction of lung tissue is its result. Still the information is not without its value, and the man who can form a correct diagnosis must be the more accomplished physician.

In both acute and chronic phthisis we rely most on the information derived from an examination of the

apices, where tubercle is so apt to be deposited. Much light again is thrown on the nature of the case by an accurate history. In the acute form the non-tubercular disease is more sudden in its attack, and usually more rapid in its progress, and the febrile state is more marked. In the chronic forms we find either the ordinary history of gradual decline so common in tubercular phthisis, or the chronic cough which has existed from childhood, with its ups and downs, and has at last brought on fibroid degeneration; or else there is a history of an acute attack which has degenerated into a form of consumption. Such a statement always requires close scrutiny, because it is so commonly made, and yet, in truth, the fact is so rare. In the further progress of the disease tubercle breaks up the lung into a number of small cavities; the same result follows fibroid degeneration, while in the other forms of pneumonic phthisis the tendency is to form one large abscess if suppuration occur.

In early phthisis, when the signs are still obscure, considerable difficulty in making a correct diagnosis may arise from the coexistence of bronchitis: on the one hand, we may recognise the bronchitis, and reason correctly regarding that, and yet be quite wrong in prognosis, because of overlooking the presence of tubercles; on the other, we may recognise the phthisis, and come to very false conclusions regarding its progress, because of attributing to it signs which are in reality due to bronchitis. When along with an attack of bronchitis we observe general symptoms leading to a suspicion of phthisis, it is wise to wait before giving an opinion as to the tubercular or non-tubercular character of the disease until the former have disappeared; it is a very suspicious circumstance when the morbid sounds linger at the apices after they have ceased in other parts of the chest: and this is still more true of bronchitis limited to one lung; the very fact of the limitation offers a presumption that there is something abnormal in the lung so affected.

Another common complication of phthisis is partial pleurisy near the apex of the lung: but the attack is not always so limited, and sometimes general pleurisy occurs when the lungs are already tubercular. It has been mentioned that the sounds heard in the clavicular region, when the lung is condensed by

pleuritic effusion, resemble those of consolidation with a cavity subjacent: the percussion sound, while dull, has often a sort of tympanitic resonance; the breath-sound is remarkably blowing, with prolonged expiration; the voice loud and ringing; and if bronchitis be present, moist sounds are also heard: but with moderate care such a condition ought not to be mistaken for phthisis. During the existence of pleurisy it is very unwise to give an opinion regarding the presence of tubercle. It is alleged by authors that double pleurisy is a suspicious circumstance; probably indicating a complication of phthisis, and the hint should not be lost sight of; but it amounts to no more than a mere suggestion.

Chronic pneumonia is occasionally seen in association with the tubercular deposit when it is widely scattered throughout the lung; and a somewhat more active inflammation coincides with a more rapid development of tubercle. During their existence they very much obscure any evidence of phthisis; but in a decided attack of sthenic pneumonia, we may feel great confidence that there is no tubercle: such at least has been the rule in cases coming under my own observation, and the nature of the two diseases is so distinct, that it is exactly what *à priori* we have reason to expect.

Severe and commonly fatal meningitis, in the form of acute hydrocephalus, is frequently found in the tubercular diathesis; and when inflammation of the brain occurs about the period of adolescence, it will often be possible to determine its nature by an examination of the lungs. Chronic peritonitis at the same age is another disease which very commonly has a tubercular origin, and calls for a similar examination. Diarrhœa may be rather regarded as a direct symptom than as a complication of phthisis.

Another variety of phthisis is that dependent on the constant inhalation into the lungs of fine particles of dust of such a character as to irritate the bronchial membrane, excite local inflammation, and produce a condition of chronic pneumonia, which like fibroid degeneration tends to disintegration of lung tissue. Any trade in which the atmosphere gets impregnated with dust, is liable to excite disease; but some are more notorious than others, and have given specific names to the affection developed in each case. We have thus "Mill-stone makers' phthisis," "Grinders' asthma," "Miners' asthma," each of them types of

disease under which the different varieties may be ranged. In diagnosis there is one indication which is of great value, viz., the microscopical examination of the sputa, which always contain traces of the irritating particles. The first hint of the possibility of such a cause being in operation, is part of the information necessarily obtained by a correct history. The auscultatory phenomena have no special significance.

§ 9. *Pleurisy.*—In its proper sense, one of the acute inflammations of the chest, it commonly sets in with pretty smart fever and stitch in the side. We find from the history, perhaps, that there has been some exposure to cold, and that the attack commenced with rigor. The ordinary symptoms of inflammatory fever are present, with considerable dyspnœa, manifested in quick, shallow breathing, with little movement of the ribs: the patient especially abstains from taking a deep breath, or making any attempt to cough, because the friction of the inflamed surfaces, caused by either act, excites or aggravates the sensation of pain: the character of the pain is sharp and darting, and it is referred to a spot just below the nipple, on the affected side. The face is seldom flushed, and the colour is not dusky, because there is no obstruction to the oxygenation of the blood as it passes through the lung. In the early stage the patient seldom lies on the affected side, as he does at a more advanced period—probably he complains that such a posture increases his sufferings; at this time, too, the physical signs are few and indistinct. They consist simply of impaired movement of the ribs over the whole side, or more particularly over that part where the inflammation has commenced. The breath-sound is more or less suppressed or jerking, in consequence of the pain attendant on full and perfect inspiration: the expiration appears prolonged: and this suppression as it partially extends to the healthy side, tends to diminish the contrast between

the two. The voice-sound is generally exaggerated at an early period over the seat of inflammatory action. Friction is sometimes heard very soon after the disease has commenced, and then there is always attendant dulness on percussion. Here the disease may stop, and no effusion of fluid occur. Occasionally in cachectic states the inflammatory fever proves fatal, with delirium and copious effusion of lymph, without any exudation of serum at all: in such cases the friction-sound may be very persistent and very grating, and heard over a large surface, imitating closely the crepitation of extensive low pneumonia. These, however, are exceptional cases; the friction is generally transient, and the patient either recovers rapidly, or the inflammation goes on to the effusion of fluid.

The disease, however, is not always rapid in its progress; and when the case first comes under observation, long duration does not exclude the possibility of pleurisy. It may happen that the early stage is scarcely marked, that there has been no pain, no febrile disturbance, nothing to denote what is going on, till dyspnœa appears as the result of the pleura having become full of serum. The patient may have had pain in the affected side for weeks or months from some other cause—dyspepsia for instance; and it then becomes quite impossible to fix the date of the commencement of pleurisy.

In the further history of the case, dyspnœa is a constant feature; ordinary breathing is interfered with; pain, if it have existed, subsides; the face is apt to be dusky or discoloured; and the patient very often seeks an erect posture, inclining to the affected side. Dulness on percussion is very manifest; at the base the sound is especially dead, inelastic, and resistant: higher up, while it acquires some degree of elasticity the resonance has nowhere the character of health. The breath-sound is absent at the base; above it is blowing, and the expiration prolonged. Any exception to this rule in simple pleurisy must depend on some

part of the lung being tied down by old adhesion; but as it cannot be so on all sides without its being so generally adherent that there is no room for fluid, the characters enumerated will be traceable somewhere or other on the affected side. Towards the middle part of the chest, generally about the lower angle or spine of the scapula, the quivering or shakiness of the voice-sound, called ægophony, is perceptible. When the pleura becomes quite full, the intercostal spaces bulge; the dulness passes the median line in consequence of the mediastinum being pushed over, and along with it the heart is displaced: this circumstance is to be observed earlier, and is always more palpable when the fluid is on the left side. The breath-sound is almost entirely suppressed: now and then the sound of friction may be caught, its position depending on the amount of fluid, the laws of gravitation, and the circumstance of air entering at all into the lung, and leading to relative change of position between it and the parietes. After pleurisy has lasted some time, the recurrence of rigor, followed by copious sweating, generally indicates the conversion of the serous effusion into pus; empyema as it is called.

The pleura and the subjacent lung, being so closely connected, are very often simultaneously attacked by inflammation; perhaps the exposure to cold, which causes the pleurisy, at the same time gives rise to pneumonia, or to bronchitis. In the latter case the sounds due to bronchial secretion accompany the changes in breath-sound more properly belonging to pleurisy: in other respects the physical signs are the same. But it is different with pneumonia: here the consolidation of the lung prevents its yielding so much to compression, and the fluid rises all around it; the upper lobe, which is not inflamed, is compressed, and the evidences of pneumonia are confined to the central region of the chest; necessarily modified by a stratum of fluid being interposed, and giving rise to unusual dulness. While this dulness indicates

pretty plainly the presence of fluid, the observer is surprised at finding the sound of breathing extending so far down, and for a moment doubts whether there can be effusion after all. In others of these complicated cases the signs of pneumonia may have been detected early, but the consolidation may not have proceeded far, or may have been limited to the outer part of the lung, which is then pushed so far away from the side of the chest by effusion, that the crepitation and blowing-sound cannot reach the ear, and the conclusion may be arrived at that very severe pneumonia exists when, in truth, it is very slight. In all of these cases we derive some information from the character of the expectoration. Simple pleurisy shows nothing more than the ordinary secretion of mucus, which is brought up with difficulty, or not at all; more abundant expectoration indicates pretty surely the existence of some degree of bronchitis; rusty expectoration most certainly that of pneumonia.

It is well to limit the term hydro-thorax to those cases of passive effusion in which the existence of fluid in the pleura is only one form of local dropsy; not forgetting, however, that a low form of inflammation of serous membrane is one of the most common occurrences in dropsy connected with Bright's disease. Hydrothorax is marked by the comparative rarity of true ægophony, and the constant presence of the moist sounds of bronchitis, or rather bronchorrhœa, as the necessary result of an œdematous state of the lung. The amount of fluid is never extreme when there is no inflammation, and commonly it is found in both pleuræ, which is very unusual in pleurisy.

By the general statement that dulness extends in greater or less intensity throughout the whole side of the chest in which pleurisy with effusion is present, it is not meant to deny the existence of a sort of tympanitic sound at the apex, to which attention has been called by some auscultators. To my mind the name seems misapplied, and is apt to convey to students a wrong notion of what they are likely to hear. It somewhat approaches to the "cracked-pot" sound; and it is important to remember that this kind of wooden hollow resonance may be heard when the only change in structure in the lung is condensation from the pressure of fluid below: it has been mistaken for the resonance of a cavity.

It may sometimes be of use to the student to observe whether the relations of dulness and want of breathing to the resonant lung be at all altered by change of posture: the gravitation of the fluid, and floating of the lung upon its surface, bringing the breath-sound to a position where before it was absent, would be strong confirmatory evidence of pleuritic effusion.

In the early stage obscurity is chiefly owing to the circumstances that there is no change of structure, and that the only evidence which a physical examination can afford is suppression of breathing, from imperfect action of the lung: but this stage cannot last long; and pain of some days' standing, without effusion of lymph or serum, cannot be pleurisy. In the more advanced stages, the difficulties are caused either by consolidation of lung-structure preventing its being floated up by the liquid, or old adhesions fixing it firmly in its place. It is impossible to point out all the variations in auscultatory phenomena which the latter may produce; but the fact of a previous attack ought to have been ascertained in obtaining the history of the case, and the observer is thus prepared to look for unusual effects in making his examination. When the adhesions are very extensive, there is a permanent deficiency of resonance which, though of no great amount in the majority of cases, may yet be perplexing, especially in children, where the parietes are thin, and changes of resonance consequently great.

The most important feature of passive effusion is that it has occurred during the continuance of a disease which tends to cause dropsical accumulations: and the probability that such is its true explanation may be shown by the presence of anasarca in the lower limbs, or of disease of the heart or kidneys, even when there is no dropsy elsewhere. On the other hand, if hydrothorax be the first fact that is brought to our notice, its insidious progress, and the absence of pain or fever in the commencement, ought to lead us to look further into the case, in order to ascertain if there be any other condition of disease with which it may be associated. There is greater reason for such a suspicion, if the effusion be on both sides.

Still more constant is the association of all other forms of disease of the chest with pleurisy: pneumonia is perhaps the most constant; then phthisis, which especially developes a local and asthenic pleurisy without serous exudation; less frequently bronchitis, which seems to be more distinct and independent, only excited by the same cause, and developed simultaneously.

Pleurisy is also met with as the result of accident,—fracture of the ribs, with local injury of the serous membrane. This fact is one that ought not to have been passed over in obtaining the history of the case, and it can scarcely be so, because the patient knows of the injury and feels the pain, while he knows nothing

of the pleurisy; he therefore talks of his accident as the cause of his sufferings. It is the business of his medical attendant to find out the pleurisy, remembering that the signs will be a good deal modified by the cause; for the same suppression of breathing on the painful side will occur as in pleurisy, because of the aggravation of the pain by breathing: but when the movement of the fractured rib is prevented by the support of a bandage, the breathing is again at once in great measure restored, if pleurisy have not supervened. Spitting of blood may have attended the accident, the lung structure having been torn; and we may find emphysema or pneumo-thorax, complicating the diagnosis.

Pleurodynia is sometimes in all probability only a very limited form of pleurisy, which speedily contracts adhesions, and gives rise to no positive auscultatory phenomena; such we may feel sure is its meaning when it occurs in a case of tubercular disease. But the name is more properly applied to muscular rheumatism affecting the intercostal and other respiratory muscles: it occurs as a sudden attack of pain in the side, which interferes with the breathing, catches the patient in attempting to cough or inspire deeply, and may even give rise to the motionless condition of the ribs and want of breath-sound which have been spoken of as accompanying the early stage of pleurisy. The diagnosis rests on the absence of febrile disturbance, the extent over which pain is felt, the existence of superficial tenderness, and the character of the pain, which is rather a diffuse soreness, as if the side had been bruised, than a sharp stitch, like that of pleurisy. The presence of rheumatism in any other organ would tend to corroborate our opinion, as also the fact of its being excited by any muscular movement, such as raising the arm, or bending the body from side to side, though such a circumstance is sometimes also observed in pleurisy.

§ 10. *Pneumo-thorax.*—This seems the most proper place for introducing a few remarks upon this condition, as it is so closely related to pleurisy. Its history is necessarily one of previous ailment: if the

patient be known to have had phthisis, we conclude that the air has made its way by ulceration from within outwards; if he be known to have had pleurisy, we suspect empyema has existed with suppuration and abscess of the lung. It may also occur as the sequel of an accident causing rupture of the lung, or of a natural or artificial opening through the parietes for the exit of pus or serum from the pleura: in such cases the amount of air is commonly less than when an ulcerated opening into the lung exists. In cases of phthisis there has probably been a sensation of something having given way in a fit of coughing or in some unusual strain; in empyema the first event is the discharge of a large quantity of pus by expectoration: the latter is, however, a very rare occurrence. In either case there is excessive dyspnœa, sometimes with, sometimes without pain on the affected side: and fluid, if not previously present, is very soon secreted.

The febrile symptoms are generally evident enough, but not severe; and they necessarily present a low type in consequence of the previous condition of the patient. His aspect is generally expressive of anxiety and depression, with more or less dusky discoloration of the face. He very commonly seeks a semi-erect posture, inclining to the side of the disease; but not unfrequently there is no urgent dyspnœa till some movement is attempted which immediately brings it on.

The affected side of the chest is rounded and motionless, has a loud tympanitic resonance, with a wooden hollowness if pleurisy exist; and in that case there must also be dulness at the base, in proportion to the amount of fluid. Throughout the whole of the side there is entire absence of the vesicular murmur: at the upper part some of those sounds may be heard which accompany consolidation, when such a condition has prevented the lung from completely collapsing. Amphoric breathing is heard more or less loudly as we chance to listen near to or at a distance from the

opening into the lung, and in proportion to the freedom of communication; but it may be suspended by temporary closure of the aperture.

Occasionally the amphoric breathing is heard so loudly all over the chest as to leave no possible room for doubt; and when the amphoric voice-sound is present, it is also usually very general and consequently very conclusive. If the aperture be closed, the stillness throughout the chest is such as no extreme of emphysema ever simulates; if there be any doubt, we observe that on the affected side there is none of the heaving movement of the upper ribs, and the drawing inward of the lower, so remarkable in extensive emphysema; while on the opposite side there is no prolonged or sonorous expiration; we only discover exaggerated natural breathing (puerile as it is called), so far as the lung is healthy: and this is most evident about the centre of the chest, where we escape alike from the signs of tubercle, and of bronchitis or partial pleurisy on that side. The history of the case is also entirely different in the two diseases.

But there are other signs which are still more easily recognised, when fluid is present as well as air. In the erect posture, if the lung have shrunk so that its base does not reach the level of the fluid, we hear, on listening at the back of the chest, when the patient first rises up, a dropping of the fluid, in which its posterior portion was floating when the patient lay on his back: it has a metallic sound, and is known as metallic tinkling. At first the drops fall in rapid succession, gradually becoming fewer, until they cease altogether. This sound is very characteristic; and when observed along with the other signs of pneumothorax, the diagnosis amounts to a certainty. The occurrence of pleurisy with effusion of fluid is almost a necessity after the admission of air into the pleura if the patient's life be prolonged: but we may not catch this peculiar sound, simply because the lung touches the fluid even when the patient is erect. We

may then move the upper part of the patient's body backwards and forwards as he sits, while the ear is applied to the chest, to catch the plashing sound of succussion. Doubt has been expressed whether the stomach sounds might not be mistaken for those produced in the pleura; but they can only be so by one who has never heard true succussion: when heard and recognised it affords as perfect confirmation of the other signs as metallic tinkling.

A doubt is more likely to occur when a very extensive cavity is present in phthisis, and all the sounds have acquired a metallic resonance somewhat analogous to the character they present when formed in the pleura itself. Cavernous breathing is only separated by a very slight difference from amphoric breathing, and the bubbles of air may burst into the cavity with a ring exactly like metallic tinkling. The diagnosis is really not difficult. We seek to know both by percussion and auscultation whether the lung generally touches the chest-wall, or is at a distance from it, by the presence or absence of general tympanitic resonance, and the extent to which breath-sounds and moist sounds are audible when we get to a distance from the seat of the excessive resonance.

Air may be generated in the pleura by decomposition of fluid, or may be admitted by paracentesis: in such cases there must always have been previous pleurisy. The air rises to the top, causes a local tympanitic sound, and deadens the sound of breathing, because it is a bad conductor when interposed between two solid substances—the lung and the parietes. The fact is a mere curiosity, and has really no practical bearings. It might be mistaken for a cavity with unusual resonance, and so might lead a hasty person to say that there was phthisis coexistent with pleurisy. Such a diagnosis is always hazardous; for what are supposed to be the most common signs of phthisis may be exactly simulated by those of pleurisy with accompanying bronchitis, while there is no tubercular deposit whatever in the lung. On careful consideration of the condition referred to, it will not be difficult to perceive that the resonance is too great for anything but air in the cavity of the pleura, and that the auscultatory sounds are only deficient in distinctness: we may also generally

cause the resonance to change its place by altering the position of the patient.

§ 11. *Tumours.* The difficulties of diagnosis which attend diseases of the chest are much increased when we attempt to determine the presence of tumour. More true wisdom is often shown in a confession of ignorance than in an assumption of knowledge; and though a man of large experience and pathological information may sometimes give a shrewd guess at the true solution of the difficulty, there are points which render it almost impossible to reason correctly, because the facts are not only wanting, but to a certain extent unattainable. In such circumstances we must be content with the sort of empirical knowledge which amounts to no more than this—"I have seen such and such a case, and it turned out so and so, and I think it highly probable that this case will have a similar termination." Such acquirements are the reward of careful observation, and among the most valuable acquisitions of the accomplished physician.

Tumours in the chest are usually either aneurism or morbid growth. The latter is found sometimes disseminated through the lung, sometimes developed from the glandular structure at its root, or attached to the parietes; and the indications will necessarily vary according to its site: the former, from the situation of the great vessels, presents symptoms somewhat analogous to that of growths from the root of the lung.

The history of these cases is so far alike, that there is never anything to fix a correct date for their commencement, because in most instances the patient has only become conscious of inconvenience when some other disease has supervened. Neither do particular classes or forms of growth produce any constant series of effects, the phenomena being commonly casual or accidental, and not essential. The patient generally complains of cough and dyspnœa, and sometimes of pain: difficulty of breathing is most perceptible when the tumour presses on some of the large tubes, or, as it would appear, when it involves the recurrent nerve and produces spasm or paralysis of the glottis.

The discovery of cancer or of aneurism elsewhere, in situations where their nature is more easily recognised, or signs of

disease of the heart, would give significance to symptoms otherwise anomalous: no reliance can be placed on the absence of what is called the "malignant aspect," because the colour of the face is so liable to be altered by the condition of the lungs; interference with the proper aeration of the blood necessarily produces a dusky hue.

Nodules of encephaloid disease may cause modifications in percussion resonance, and in the character of the breath-sound, or they may give rise to bronchial secretion and moist sound; and most frequently the latter is the only evidence of disease. We can do no more than satisfy ourselves that the balance of evidence is against the existence of phthisis as its cause. Scirrhus perhaps gives rise to more important changes in the breathing and vocal resonance: the physical signs are very like those caused by a vomica, while the condition of the opposite lung is unlike that which is produced by tubercular deposit, and the general symptoms do not point to such an advanced condition of phthisis as implies the formation of a cavity. Sometimes the appearance of peculiar expectoration, which has been compared to thin currant-jelly, gives an assurance of the true character of the disease; but it must be confessed that very little can be done in making out the diagnosis of such cases.

Tumours at the root of the lungs are more easily recognised when the disease has made some progress; in their early stage there is nothing to point out their existence. As soon as they are of sufficient size to produce pressure on the bronchi, there will be irritation, probably secretion, and fits of dyspnœa, closely resembling asthma: of still larger size, they are apt to cause dysphagia, or to interrupt the current of the circulation; and now the patient begins to find out that in one posture he is more liable to suffer than in another. When the tumour has attained a certain magnitude there is dulness, not perceptible on gentle percussion, but brought out by a firm stroke, most marked near the sternum, and not to be detected in the axilla, or towards the side of the chest. The breathing is generally weaker, with prolonged expiration heard at a distance; the sounds of the heart are transmitted loudly over the seat of the tumour, and even beyond it. The patient perhaps breathes in a wheezing manner with considerable labour, or the respiration may be obstructed to nearly the same extent as it is in laryngitis; the cough is often weak and powerless, like that of emphysema, but has more of a paroxysmal character, and sometimes a loud brassy clang: a fit of coughing very generally terminates with a raucous inspiration. In many of these respects the analogy to laryngitis is very striking, and the most marked difference between the two is, that when the obstruction is in the larynx itself, the voice is either hoarse or destroyed, while when it is lower down in

the trachea, the voice is scarcely altered in tone; it is only deficient in force.

The interruption to the circulation caused by the tumour may at once lead us to infer its existence: it presses upon, or even surrounds and encloses the superior vena cava, in consequence of which, tortuous veins begin to develope themselves over the chest and abdomen, and the blood finds its way by a backward current into some pervious channel; sooner or later this venous obstruction gives rise to œdema, which is then limited, in a remarkable manner, to the upper half of the body. This happens chiefly with malignant growth. When aneurism exists additional signs are sometimes derived from the arterial circulation: the force of the current is diminished in some one or more of the arteries, causing perhaps a notable difference between the two radials at the wrist; or both alike to be almost imperceptible, while the heart's action is very generally, but not always, increased: a bruit may be heard in some unusual part of the chest, while there is none at the heart, or it may be heard loudly at both, and be almost inaudible at intermediate points. Sometimes, again, the ordinary systole of the heart is heard unusually loud at some particular point, and this may be regarded as the effect of aneurism, when the sound has a knocking or jogging character, which is only preliminary to a similar impulse being felt, as soon as the disease has approached nearer to the surface.

Sooner or later aneurism shows itself externally by wearing away the ribs, and forming a pulsating tumour on the front of the chest, or by pulsation, which can be felt when the finger is pressed deeply behind the sternum or clavicle, except in the case of the descending aorta, when it sometimes produces no symptoms upon which reliance can be placed: slight dysphagia or dyspnœa, with pain in the back, caused by pressure and wasting of the vertebræ, sometimes leading to paralysis, may be the only symptoms: no bruit is usually audible in this situation; but would be of considerable significance if heard in an adult; in the child, cardiac murmurs are often very loud over the back. Solid tumours in the chest do not often pulsate, but the possibility of pulsation being only communicated should be borne in mind in attempting to discriminate their character.

Tumours in connexion with the bones of the chest seldom give rise to any symptoms likely to call for examination, until there is swelling externally: those forming in the anterior mediastinum, which cannot find exit from the chest, and press inwards on the heart, the arteries, the veins, and the bronchi, do however produce symptoms more or less resembling those of pressure on the root of the lung. The very marked dulness which they cause on percussing the sternum leads at once to the recognition of their

presence; and the question is then only between enlarged heart or aneurism, and growth from bone.

The coexistence of active pleurisy, or of passive effusion into either pleura, sometimes greatly complicates the diagnosis of thoracic tumours.

§ 12. *Diseases of the Lungs in Childhood.*—This chapter would be incomplete if a few words were not said upon the differences in diagnosis between the diseases of children and those of adults. In the first place, the resiliency of the chest makes the indications from percussion much more obscure and uncertain; at one time dulness seems to be well marked, which, after all, is only due to congestion; at another, real consolidation produces only a difference in tone, which cannot properly be called dull. Secondly, the respiratory sound is so much louder and shriller, that changes in character, except in its relative suppression, cannot be predicated of it with anything like the same certainty as in adults. Thirdly, the loudness of the voice does not assist us much in determining the sound-conducting power, and hence the degree of consolidation of the lung. And fourthly, the remark in regard to morbid sounds in adults, that no one is pathognomonic of any certain condition of lung, is infinitely more true of children. Crepitation in its true sense is not heard in pneumonia, clicking and squeaking sounds are heard when there are no tubercles, and gurgling noises when there are no cavities. The explanation of all these circumstances is simply that in the lungs of the child every sound generated anywhere throughout the lungs is heard with almost equal distinctness at any part of the surface; and therefore, whatever the affection may be, the bronchial sounds prevail: at the same time the mucous membrane is more easily irritated, and secretion excited by slighter causes; and hence it happens that sonorous sounds are very seldom present.

In the diagnosis of the diseases of childhood we are therefore very dependent upon the history of the case

and the amount of febrile disturbance; but it must be remembered that the quick circulation of childhood is much more readily excited than that of the adult, and the comparison must not be made between the pulse of infancy and that of age, in coming to the conclusion that a child is suffering from inflammation of the lungs. That this is constantly done there can be no doubt, from the frequency with which mothers report that children have had such attacks, and that they have been told so by their medical attendant. Inflammation of the chest, whether as pleurisy or pneumonia, is not by any means a frequent ailment of childhood—pleurisy is especially rare in the first years of life, and when pneumonia is present its symptoms are invariably urgent. If anything be needed in the way of auscultation to confirm the diagnosis (and it is always wise to practise it), we find perhaps some difference in tone on percussion between the two sides of the chest, or it may be, absolute dulness; the breathing probably differs on the two sides, and we may be able to say that one is harsher than the other, more commonly, however, it is only less distinct on the affected side, and then, in place of crepitation, we find moist sounds; or at all events very coarse crepitation,—never the fine sound heard in the adult. Along with this there may be very considerable bronchial irritation of the other lung, so that all the signs of disease may be suspected to be due to bronchitis, and in fact the cases are quite exceptional in which unaided auscultation can determine that it is not so. It has often been my lot to see such a mistake made when the general symptoms were not taken into account.

Bronchitis occurs either as acute or chronic. In the former the sonorous sounds are very rarely heard; there is a good deal of fever, but it is not so severe as that of pneumonia, the skin is not so pungent, and the signs of imperfect aeration of the blood are not present: the breathing is louder or weaker, according to

the amount of secretion present, and this often differs on the two sides. The principal indication derived from auscultation is the very general distribution of the morbid sounds; the absence of any difference in percussion would confirm the impression that the disease was simply bronchitis, but dulness on one side behind must not be taken as a proof that pneumonia is present; not only may an appearance of dulness be produced by mere congestion, but the existence of tubercular glands at the root of one lung which may have tended to excite the bronchitis may also be the cause of absolute dulness.

Chronic bronchitis, which so often simulates, or is simulated by phthisis in the adult, is often quite undistinguishable from tubercular disease in infancy. Here dissemination of tubercle is the rule; its aggregation in masses, except in the bronchial glands, the exception. It is from the aspect of the child and the history of the case alone that we can judge, aided probably in some measure by the general symptoms, and occasionally by the character of the sputa. When we learn that the patient has had an attack of measles, or has suffered much during dentition—that the constitution has not rallied, but cough has gradually supervened; when there is a pallid, transparent skin, with long eyelashes and brilliant eyes, and the child is peevish and irritable, or languid and unexcitable, or remarkably quick and intelligent—suspicions of tubercle are naturally excited: and if in addition to this we find emaciation, debility, heat of skin, followed by perspiration and diarrhœa, the probabilites are greatly increased. If, on the contrary, we learn that the first attack was feverish, or that, after hooping-cough some years before, there has been great liability to coughs and colds; if the face be dusky, or the lips discoloured, and, except from dread of an impending cough, the child's temper be not materially altered; if, in addition to this, we learn that the cough ends in copious expectoration, even though that should be

tinged with blood,—the diagnosis and the prognosis are considerably more favorable: hæmoptysis in childhood is by no means a sign of phthisis. The stethoscope can scarcely afford any assistance in discriminating these affections: and it must be added that, when judicious treatment is employed in cases which have all the aspect of tubercle, the children so completely recover from the attack of bronchial irritation accompanying it, and are so often lost sight of subsequently, that no person of any experience will venture to give a decided opinion except in very clearly marked examples of each disease. It is to be remembered that when the bronchial affection has passed, the signs of remaining consolidation at the apex are never found in childhood; if any localization of tubercle prevail at this period of life, it is only in the glands at the root of the lungs.

CHAPTER XXII.

EXAMINATION OF THE HEART.

History and General Symptoms—Changes independent of Disease—Special Signs.

DIV. I.—*Evidence of Alteration in Size—Increased Impulse—Irregular Action—Extended Dulness—their Mutual Relations.*

DIV. II.—*Auscultatory Phenomena.*—§ 1, *Modifications of Normal Sounds—in Intensity—in Distinctness—in Rhythm—Reduplication*—§ 2, *Friction—its Characters—its Indications*—§ 3, *Endocardial Murmurs—their general Characters—Review of the Circulation*—(A) *Diastolic—Aortic—Mitral*—(B) *Systolic*—(1) *at the Apex—Mitral—Tricuspid*—(2) *at the Base—Aortic—Pulmonic-Blood-sounds in general.*

WHEN considering the history and general symptoms of diseases of the chest, it was remarked that dyspnœa and palpitation are the chief subjects of complaint with patients suffering from disturbance of the circulation, and that the history of the attack is usually obscure and imperfect. It may be added that these symptoms are much more frequently mentioned when their cause is merely functional than when organic lesion exists. Pain is an almost constant attendant on pericardial inflammation: it is also occasionally met with in old structural changes, presenting itself sometimes under the form of angina. A history of rheumatic fever, any indications of a tendency to dropsy, or the presence of chronic lung affection, and especially of bronchorrhœa, are each of them more or

less valuable in estimating the probability of disease of the heart. In most instances, however, its presence may be very conclusively shown by the action of the pulse, the discoloration of the face, the impulse against the ribs which accompanies the movement of the organ, and the characters of the sounds produced, as they are changed by specific forms of disease. Errors in diagnosis chiefly arise from confounding the signs of the functional with those of the structural maladies.

We must presume that the student is familiar with the position and average force of the impulse which each stroke of the heart conveys to the finger placed between the fifth and sixth rib; with the usual extent of dulness on percussion observed in the præcordial region, when it is of normal size; and with the sounds which accompany its systole and diastole in a state of health, hence called systolic and diastolic, or first and second sounds of the heart. In each of these particulars, changes may be perceived which are quite independent of disease of that organ: its position may be altered by effusion into the pleura or peritoneum: its impulse may be rendered more evident by emaciation, or by consolidation of the lung, or may be lessened by opposite states: the sharpness and force of the shock may be greatly increased by mere nervous excitement: and the præcordial dulness may be diminished or increased in extent, as it happens to be more or less covered by resonant pulmonary tissue.

Nervous palpitation without increase of size of the heart itself, will be observed to vary much in intensity from time to time, and this especially according to the mental condition, whether of excitement or of depression. Attention directed to the organ greatly influences it, and not unfrequently the fact of making the examination is of itself sufficient to excite or increase the palpitation, which again gradually subsides: this condition is one which attracts the patient's notice much more than palpitation depending on real disease.

Division I.—Evidence of Alteration in Size.

Those deviations from the normal conditions which afford the most certain indications of changes in the dimensions of the heart, and ought therefore to be especially studied by the learner, are the following:— When the heart beats lower down than in health; when the usual shock of its impinging on the parietes becomes diffuse, heaving, undulatory, or irregular; when the dulness on percussion is extended in an inward or an upward direction: and in connexion with this the existence of sounds which are not heard under ordinary circumstances.

With the exception of the stethoscopic signs, all of these derive their value from their affording the most conclusive evidence which we possess of changes of size in the organ; and this consideration ought always to be taken into account in making a diagnosis of disease of the heart. For no important deviation from health can long persist without affecting the muscular structure; and alterations in thickness, in capacity, and in power are those which are really efficient in developing the secondary affections accompanying the advanced stages of disease.

1. The apex beat being felt at a lower point than usual, is almost a certain sign of enlargement.

2. When the action is heaving and powerful, lifting up the stethoscope, or even the head of the listener, at each impulse, the walls must necessarily be thickened; in such cases the sharpness of the stroke is lost, and its duration prolonged. When the impulse is more diffuse and less forcible, the heart coming in contact with different portions of the chest at successive intervals during the prolonged systole, with an undulatory movement, and a distinct stroke is not felt, we have reason to believe that the enlargement depends more on increased size of the cavities than on thickening of the walls.

3. Irregularity of action is very important, although

of somewhat indefinite signification. It must not be confounded with intermission when a single beat is occasionally omitted or abortive, or a short pause occurs at certain intervals. Continued irregularity must be regarded as a positive sign of disease, but it may co-exist with almost any form of lesion. It is probably most frequently met with in disease of the mitral valve.

4. The extension of dulness towards the sternum derives its value from the circumstances that there the heart is uncovered by lung, and the liability to error is consequently not so great as when an attempt is made to measure it outwards. In enlargement of the heart the percussion dulness is, no doubt, extended in every direction, and a practitioner well versed in the physical aids to diagnosis would be able to detect the exact dimensions of the organ, in spite of the interposition of resonant lung-tissue: the student cannot expect to do so with accuracy. In an upward direction diminished resonance may be distinguished with tolerable readiness; but when the sound is clear over the sternum it is probably due to some other cause than hypertrophy: it is, for example, especially marked in distension of the pericardial sac after pericarditis.

5. In connexion with the preceding indications, the stethoscopic signs are most valuable in explaining the causes of increased or irregular action. The abnormal sounds are produced by actual changes in the relation of solids and fluids, and enable us to assert more or less positively what is the nature of the change, and inferentially to trace the course which disease has followed.

The altered position of the impulse may possibly be due to an adherent pericardium; but in this case there is very generally also hypertrophy, and the idea of enlargement is probably correct. If it can be shown that there is no enlargement, this alteration of the impulse affords the most reliable evidence of pericardial adhesion, which after all can only be guessed at.

There ought to be no difficulty in distinguishing the heaving

impulse of hypertrophy from the short, sharp stroke of nervous palpitation; and yet in very many instances people are told that they have disease of the heart in consequence of the one being mistaken for the other.

Undulatory movement, in strict language, is only produced when the pericardium is full of serum; a largely dilated heart merely simulates it: in the one a wave is transmitted from the apex towards the distended upper extremity of the sac, at each systole; in the other, different portions of the organ come in contact with the chest in succession, but the definite course of a wave cannot be traced: the one occurs during an acute attack, the other is seen in chronic disease.

Irregularity is best recognised by the action of the pulse: by it the meaning of the term intermission is also more readily understood: the abortive contraction of the heart produces no pulsation at the wrist, and a beat is lost just as much as if the heart stood still. The word "uneven" is used to signify a pulse of unequal force: an irregular pulse implies inequality in the duration as well as in the force of successive beats. Irregular action may subside under treatment, but during its existence it is a permanent, not a temporary, condition; hence we speak of continued irregularity as a sign of disease.

Intermission begins as an occasional interruption which presents some degree of regularity in its recurrence. Such a condition may go on for years without change, or may present itself from time to time, the heart's action being perfectly normal at other times. Occasionally, under the influence of some exciting cause, the intermissions become more frequent, and the ordinary degree of regularity in their recurrence is lost. A heart which has only dropped one beat in ten, or fifteen perhaps, will intermit at every third or fourth beat, and ultimately may lose all appearance of regularity as the intermission comes sometimes at the alternate beat, sometimes at the third or the fourth. This irregular intermission closely resembles true irregularity. It is distinguished chiefly by the circumstance that occasionally the heart will beat with perfect regularity for a time in the midst of its apparently irregular action.

The extension of dulness towards the sternum can only deceive when there is a morbid growth in the interior mediastinum: the dulness in such a case does not usually terminate on a level with the base of the heart. It is of importance to observe whether the apex continue to beat in its usual position, lest displacement be mistaken for enlargement.

In combining together the indications just named for the purpose of diagnosis, we find—

a. That irregularity, combined with increased action or extended dulness, greatly increases the probability of hypertrophy or dilatation.

b. That with a very feeble pulse, if there be signs of hypertrophy, there is a strong presumption in favour of mitral valve disease.

c. That when the heart's action is feeble, as well as the arterial pulse, irregularity rather points to thinning of the walls, fatty degeneration, or adherent pericardium.

Irregular action seldom accompanies hypertrophy without valvular lesion; whereas it is most commonly present in dilatation and thinning of the walls, whether the valves be healthy or not. The character of the pulse varies with the peculiar form of the valvular lesion; but the condition of disease present is generally best known by the character of the endocardial murmur. It now and then happens that, when the mitral orifice does not close during the systole, no bruit can be detected; and then the extreme feebleness of the pulse contrasting with the force of the heart's action, serves as a very useful guide. When valvular lesion has not led to alteration in size, it is not accompanied by irregularity of action.

It must also be borne in mind that very considerable hypertrophy may be almost completely concealed by over-lapping of the lung, and therefore great caution must be exercised in deciding that irregular action depends on simple atrophy or fatty degeneration. Each of these subjects will be again referred to more in detail.

Division II.—Auscultatory Phenomena.

In very many instances these alone are sufficient to determine the existence of disease in an early stage, before any change has occurred in the actual dimensions of the organ; in other instances they explain the causes of the change. They may be divided into modifications of normal sounds, and morbid sounds—"bruits," or "murmurs," as it seems better to call them, to distinguish them from those which, *par excellence*, are called *the sounds* of the heart. These bruits, again, comprise those formed in the peri-

cardium and those formed within the heart, sometimes classed as exocardial and endocardial: the only pericardial bruit is friction; the endocardial, on the other hand, are divisible into the systolic and diastolic.

Much confusion is created by unnecessarily increasing the nomenclature of various sounds. It is quite allowable to employ a particular name to designate any unusual bruit, such as "purring," or "musical," but its exact character is now known to be of far less importance than its position and time of occurrence with reference to the rhythm of the heart's action. It seems quite unnecessary to introduce such a name as exocardial: if it mean to include sounds formed in the pleura, and not in the pericardium, the classification is objectionable; if it be restricted to the pericardial bruit, we need employ no other name than friction. Creaking is but a form of friction, and the name "to and fro" sound, which has been sometimes used, is only applicable to certain cases—a majority, truly, but not all. With regard to endocardial murmurs, again, the introduction of the words obstructive and regurgitant perplexes the student: either a systolic or a diastolic bruit may be regurgitant; and regurgitation may take place at any of the sets of valves; it merely expresses the fact of the ordinary current being reversed—a fact which is quite as explicitly stated when the bruit is named according to its time and place. If during the diastole the left ventricle be filled from the aorta as well as from the auricle, there is regurgitation; if during the systole the blood pass out into the auricle as well as into the aorta, there is also regurgitation; but any one who understands the mechanism of the heart's action knows that the expressions diastolic aortic, and systolic mitral murmurs, imply these facts, and have the great advantage of being definite statements regarding disease. Obstructive only means that there is an obstacle to the onward flow of the blood.

§ 1. *Modifications of Normal Sounds.*—To recognise the changes which take place in disease, it is most important for the student to learn the rhythm of the healthy heart-sounds. The longer of the two is called the first sound. This is followed by an interval; then comes the short second sound and the second interval; and we have a constant repetition of the same sequence —longish sound, interval—short sound, interval. This

is called the rhythm of the heart's sounds. In addition to this, there is an average intensity or loudness of the sound which can only be learned by constant observation of healthy hearts.

These sounds are variously modified in disease, even when no morbid sound is present.

a. They may have a ringing distinctness in consequence of nervous excitement: this is no indication of disease; it is transient, and when the palpitation subsides, the sounds resume their ordinary character.

b. The first sound especially tends to become short and sharp in thinning of the walls of the heart: the chief distinction between this and the preceding condition is its permanence, and its independence of excitement and palpitation.

c. They become dull and indistinct, though loud, in hypertrophy. The prolongation and indistinctness of the first sound in particular, is the reason why they are often spoken of as being weaker than the sharp flapping sound of dilatation.

d. Distance and obscurity of sound is produced by the interposition of fluid in the pericardium or overlapping of the lung, especially in emphysema.

e. The rhythm, or proportionate duration of each sound, is very liable to be altered in the commencement of an inflammatory attack: it is, therefore, very generally the precursor of some more definite evidence of change of structure; but it is sometimes associated with other forms of disease, and, it may be, casual and transitory, the sounds returning after a time to those of health.

f. Either first or second sound may be reduplicated. Each stroke of the pulse is represented by three or even four sounds heard in the præcordial region. It is generally the second sound which is reduplicated. When the first sound is reduplicated, it causes of necessity reduplication of the second. This modification does not always imply disease: it seems to be due to irregular muscular action, and we can only

decide from other circumstances whether the defect be in the muscle itself, or in the nervous system.

The most important of the modifications just enumerated is that in which the rhythm of the sounds materially deviates from the healthy standard. The relative duration of each sound and of each pause is in the normal state so constant, that it may be assumed with great confidence that disease is present when this relation is broken through. It is therefore of very great value in leading us either to discover past changes in structure, of which the evidence is imperfect, or to prepare for impending inflammation: it may thus lead to the discovery of an endocardial murmur which was not suspected, or may be the only proof left that pericarditis has preceded when friction is already abolished: while in cases of acute rheumatism, or inflammation in the chest, it prepares us for an attack of peri- or endocarditis: and in those cases in which it passes off without any further evidence of disease, we are left to conclude that our remedies have aided in warding off very serious mischief.

The loudness of the sounds depends so much more upon the proximity of the heart to the chest-wall than upon the intensity of the sound itself, that but little reliance is to be placed on it as an indication: and perhaps in no case is it so marked as in the palpitation of nervous excitement. The very same circumstance which most frequently serves to conceal the dulness, and increased impulse in hypertrophy, serves also to diminish the loudness of the sound; and therefore, when much overlapped by the lung, the one source of information does not help to correct the other. Its intensity is of most service in cases of nervous palpitation, and in thinning of the walls of the heart without palpitation; in the one the shrillness of the sound is opposed to the idea of hypertrophy, in the other it leads to the suspicion of change of structure, which is not revealed by any other sign.

Reduplication, like intermission, suggests some imperfection in the relation of nervous force and muscular contraction, in so far as one serves to regulate the other: but while we are able to draw a distinction between intermission and irregularity, as indications of disease, we are not able to lay down the same certain rules in reduplication. We may be very confident that when both sounds are reduplicated there is some form of disease present: reduplication of the second sound is very often caused by imperfect closure of the auriculo-ventricular aperture on one side, which causes the systole of one ventricle to terminate more quickly than the other; but it is also heard, like intermission, in what we call mere functional disturbance. It will be readily understood that when either sound becomes prolonged by the

presence of a murmur, the reduplication is lost in the continuous bruit. We do not, therefore, in practice speak of a sound being reduplicated when a murmur accompanies it: *e.g.*, we speak of a murmur accompanying the first sound, while the second is reduplicated; but we do not use the same language when the murmur accompanies the second sound. We may hear the sound and the murmur each quite distinct from the other: the one perhaps formed at the pulmonic, and the other at the aortic orifice, but we cannot hear two second sounds as well as the murmur.

§ 2. *Friction.*—The presence of friction is to be determined not so much by the character of the sound heard, as by the time of its occurrence with reference to the natural sounds of the heart. It has no further relation to them than that it is caused by the movement of the organ consequent on its alternate contraction and dilatation; hence it forms no part of the natural sounds, does not occur at the same instant, does not follow the same rhythm, but is usually heard somewhere between and distinct from them. The natural sounds may be inaudible either because effusion renders them indistinct, or because the friction is so loud as to overpower them, but it neither takes their place nor alters their character. Though called a "to-and-fro" sound, it is not necessarily double, but it certainly is so in a great majority of cases. Among its distinguishing features the following may be regarded as the chief:—

a. It may be heard anywhere over the præcordial space, and frequently only at one point distinctly; when thus circumscribed, it is especially to be sought either where the membrane is reflected at the base of the heart, or where the apex impinges against the ribs.

b. The sound is usually rough and grating, and seems to be superficial and close to the ear of the listener: it often suggests the idea of rubbing.

c. A double friction-sound is more easily recognised than when it is single: endocardial bruits are

also sometimes double, but in the to-and-fro friction the duration of each is more equal.

d. The time of its occurrence with reference to the natural sounds forms our best guide in determining its nature. It commences distinctly after the first sound and impulse of the heart: the to and the fro friction-bruits follow each other rapidly with a very short interval, which corresponds with the beginning of the second sound of the heart; then comes a longer pause, during which the first sound is again heard, followed up by the recurrence of friction.

During the existence of pericarditis, many circumstances occur to conceal the ordinary sounds of the heart; and when there is any difficulty in distinguishing them in the præcordial space, they should be listened for above the base of the heart, in the second intercostal space, in order to catch their rhythm.

There are two circumstances which chiefly tend to render friction-sound liable to be confounded with other bruits: viz., a scanty secretion of lymph, and an abundant secretion of serum: the friction may in either case be single. With scanty secretion it is almost always limited to the reflexion of the pericardial membrane at the origin of the great vessels, and might therefore be taken for an aortic murmur; but in addition to the indications derived from the other characters enumerated, it is especially to be noted that its position and point of greatest distinctness are below and not above the base; the very opposite is true of an aortic systolic murmur, and an aortic diastolic murmur presents other features which are very distinctive. If friction be obscured by the pressure of serum, the point where it is most likely to be met with is the apex: here too in position it is much below the ordinary situation of a mitral murmur; but it is further to be recognised by the circumstance that it is much louder when the ribs are depressed at the end of expiration, and may be very often rendered temporarily so by simple pressure.

Friction differs from endocardial murmur in its acoustic properties very decidedly, when a well-marked example is compared with the pure bellows-sound; and the student ought to make his ear familiar with their respective characters; but in many cases he must be prepared to find each approximate so closely to the other that the character of the sound is not sufficient to denote whether it be formed in the heart or pericardium.

The best mode of determining whether the rhythm of a double bruit heard in the præcordial space differ from or coincide with

that of the systole and diastole, is to listen above the base of the heart, where pericardial friction always becomes inaudible: when the ear is fully accustomed to the rhythm of first and second sounds as there heard, the stethoscope should be immediately passed to the point at which the bruit is most distinct; if it be pericardial, the ear will at once detect the difference in duration, and the want of harmony with that just listened to.

The discovery of friction may be taken as unmistakeable evidence of the presence of pericarditis, and hence the importance of being able clearly to determine its true character. In speaking of pericarditis the other symptoms will be pointed out; and while, on the one hand, these may be so striking as to leave no doubt in the mind of the observer that changes in percussion resonance, or in the rhythm and intensity of the heart's action, are due to pericarditis when friction cannot be detected, yet on the other, they may have been so slight that but for the presence of friction we should not know of the existence of the inflammation at all. The change of friction into creaking is far less common in the pericardium than in the pleura: when such a sound is heard, the principles of its diagnosis are the same as those already given for a single friction-bruit, and it will be all the easier because of its creaking character, which is so unlike an endocardial murmur. There is only one further question in regard to friction which the observer has to determine in order that his diagnosis of pericarditis may be quite certain; it is that the friction is really in the pericardium, and not in the adjacent pleura. Now, the only chance of its being in the pleura is, when it is local—to one side and not in front of the heart; and if the doubt be thus suggested to the mind, its validity can readily be tested by making the patient hold his breath; but it must be remembered that pericardial friction becomes more distinct, or may be only audible when the ribs are depressed, and therefore the patient should be taught to hold his breath after an expiration, not after an inspiration.

§ 3. *Endocardial Murmurs.*—Either sound of the heart may be prolonged beyond its ordinary duration, and lose its usual distinctness, when the sound is commonly called rough; or they may be entirely superseded by a lengthened bruit. This may present a character of extreme softness (the true bellows-murmur, or *bruit de souffle*), or that of a very harsh grating noise; it may resemble a musical tone. From the slightest degree of roughness or prolongation, to the loudest possible bruit, every link is filled up by murmurs which glide by insensible gradations into each other, and unite the extremes together under one common denomination. The essential element in their production is an altered relation of the blood to the solid structures, whether by change in the one or in the other; and they are only heard when the blood is in motion. They therefore correspond exactly to the systole or diastole of the ventricle as the blood is passing out of, or into that cavity: they may commence a little before, or a little after the true time of the natural sound; they may be carried on through the interval of pause, but they cease directly when the opposite action comes into play, either to be followed by the natural sound heard in health, or by a bruit corresponding in time to it.

Their character, as caught by the ear, is always more or less blowing, the passage of fluid in this respect offering very close analogies to that of air through a constricted aperture. We are not sufficiently familiar with the laws of its production to be able to deduce from an analysis of the character of the sound the exact changes in which it originates, but in general terms it may be assumed that when the murmur is very soft the solid parts are not very greatly altered, and that when very rough, grating, or musical, there is either very considerable constriction, or a semi-detached mass floating down the current, and throwing the blood into vibration as it

passes. It is a point of some difficulty to determine when roughness and prolongation ought to be set down as only a modification of normal sound—when they ought to be regarded as something additional or superadded taking its place; the booming first sound of hypertrophy, and the reduplicated second sound of unequal contraction, ought never to be called bruit.

The readiest mode of determining whether the murmur be systolic or diastolic is to place the finger where the heart can be felt striking on the chest. If the sound commence at a period equally distant from each of two impulses, and intermediate between them, the sound is diastolic, it ends just before the heart strikes on the chest. If, on the contrary, it be nearly coincident with the stroke, it is systolic—it commences about the same time as the impulse, and ends long before the next stroke is felt. When the murmur is systolic, the sound produced by the moving of the blood may be either due to alterations in the orifices through which it passes, or to changes in the character of the blood itself, or to a combination of both. But if a bruit be recognised to be diastolic, it may be decided at once that there is valvular imperfection; and in the majority of instances there is disease of the aortic valves, by which blood is allowed to return into the left ventricle.

If we consider the mechanism of the circulation, it is evident that the force with which the blood passes from the auricle into the ventricle is much feebler than that by which it is propelled into the arteries, and also that the power of the left ventricle is very much greater than that of the right; and inasmuch as the circulation through the arteries is carried on during the interval between one systole and the next by the resiliency or contractile force of the vessels, the rebound in the aorta and in the pulmonic artery is in each case in proportion to the muscular power of their respective ventricles. Confining our attention for a moment to the left side of the heart, we find the blood during the systole compressed on all sides with the whole force of the ventricle: it is driven against the mitral valve, which it closes with a noise; it rushes against the aortic valve-flaps, pushes

them open before it, and passes on into the aorta. During the interval that follows, it remains for an instant at rest; each set of valves hangs loose in the fluid. The diastole follows; during this period the blood flows towards the ventricle, from the auricle through the mitral valve, from the aorta against the aortic valve, which is closed by the rebound. During the second interval of silence, the valve-flaps again hang loose, and then the systole recommences.

It is obvious that, while the whole force of the ventricular contraction bears upon the blood contained in that cavity, a very slight degree of imperfection of the mitral valve-flaps will permit leakage through that aperture, and the backward current will necessarily be accompanied by a systolic mitral murmur. A very small amount of obstruction at the aortic orifice will also be sufficient to throw the blood into vibration as it is driven over it with the whole force of the ventricular contraction, and a systolic aortic murmur will be heard. On the other hand, when the diastole occurs, the blood is moved onwards slowly, and with very little force through the mitral valve by the contraction of the auricle, and it would require very great roughness indeed to produce a diastolic mitral murmur; and at the aortic orifice the pressure of the blood against the valves being due only to the resiliency of the artery, a minor degree of imperfection will not permit the blood to flow backwards through that aperture. Still the backward current produces a bruit more easily than the onward current, and a diastolic aortic murmur is much more frequently observed than a diastolic mitral. We establish the following as the order in which endocardial murmurs are most likely to occur:— 1. Mitral systolic; 2. Aortic systolic; 3. Aortic diastolic; 4. Mitral diastolic, which is extremely rare.

With reference to the right side of the heart, it need only be observed that all the forces brought into play are proportionately much weaker, and that as a pathological fact disease of the right side is much rarer than that of the left side of the heart. For both reasons, murmurs are much more rarely heard on that side; and when present, they indicate a very considerable amount of disease.

The vibration to which we give the name of murmurs really occurs in the blood itself; it is dependent on changed relations of blood to tissue, and may be excited by alterations in blood as well as by disease of tissue, or by the action of both causes together. When dependent on tissue change, it is much more certain to be produced by such alterations as permit two currents to intermingle by regurgitation, than by those which only offer an obstruction to its progress. When the blood alone is altered regurgitation is impossible, and murmurs are only produced in

the onward current. The force of the current through the mitral valve is never sufficient to throw the blood into vibration, in consequence of blood change, but its combination with tissue change may be sufficient for the production of a diastolic mitral murmur. I believe a diastolic murmur at the tricuspid valve to be impossible, a systolic one is a curiosity. On the other hand as the blood escapes from the ventricles by the aortic and pulmonic orifices, vibration due to blood-change is easily excited, and tends greatly to exaggerate any bruit caused by roughness of the aortic valves. The terms "functional" and "organic" are those commonly used to distinguish a blood-murmur from a valve-murmur.

A. *Diastolic Murmurs.*—The circumstance that this class of murmurs is never produced by alteration in the quality of the blood alone, leads us to consider them first. In practice we have only to determine whether it be due to disease of the aortic or the mitral valve.

a. The probabilities are much in favour of the former, considering the relative frequency of each.

b. Mitral diastolic murmur, as it presupposes very considerable change in texture in the valve, cannot, one would imagine, exist without a mitral murmur also accompanying the systole: this is not necessarily the case in patency of the aortic valves.

c. The position at which each is heard in its greatest intensity, and the direction in which it is prolonged, are distinct, though not differing so greatly as to form such a ready means of diagnosis as might be *à priori* expected.

d. Further evidence of insufficiency of the aortic valves, if this be presumed to be the cause of murmur, is to be obtained from the character of the pulse, which seems to be left almost empty by the blood falling back upon the heart after each stroke, and again filling the artery with a jerk.

The aortic diastolic is, in fact, a murmur of regurgitation, while the mitral is not; and this would of itself, apart from the consideration of force, explain the different frequency of each: for a bruit is most readily produced by the intermingling of two

opposing currents, and it is not necessary that there be any roughness or constriction of the aortic valves: a smooth aperture left by tearing or ulceration of a valve which permits regurgitation, when the recoil of the blood follows the systole, of necessity causes a diastolic murmur by encountering the opposing current of the blood. Hence a systolic bruit at the aortic valves is not always to be heard when a diastolic one is present, as I believe is unavoidable at the mitral orifice. With this, too, is closely connected the fact that the position at which the sound is heard in its greatest intensity is not so different as might be supposed. In some cases, no doubt, the blood is set into vibration as it passes the roughened or constricted valves in its backward course; but in other instances the vibration only begins when it meets the current from the auricle: in the one case it can be traced for several inches in a slanting direction, from the root of the aorta towards the apex, of pretty nearly equal intensity throughout; in the other, while the direction remains the same, the length may be diminished to about an inch near the centre of the heart. The mitral diastolic murmur reaches to about the same point, and it will be readily understood how difficult it must be to determine a difference in direction, although nearly at right angles to each other, when the whole extent in each case does not exceed an inch. There is, however, one point characteristic of the mitral diastolic murmur: the vibration is produced at the valve itself, and the sound is always heard in greatest intensity there, and diminishes in distinctness as it passes across towards the sternum to meet the line of the aortic diastolic murmur: such a circumstance, without the hammering pulse, would be to my mind sufficient for the diagnosis. On the other hand, a hammering pulse would very probably decide in favour of insufficiency of the aortic valves, even when the loudest sound seemed to be nearest to the apex.

B. *Systolic Murmurs.*—The first question for consideration with regard to a murmur of this class is whether it be formed at the apex or at the base of the heart; and this is to be determined by the relation of its point of greatest intensity to the outline of the organ given by percussion, and the position of the apex-beat. A very moderate degree of care in making the examination is generally sufficient to determine this point, which can only be rendered doubtful when there is no special locality where the intensity is greater than elsewhere.

1. *Systolic Murmurs at the Apex.*—Commencing at the centre of the heart, we listen to the quality and rhythm of the sounds heard there, and move the stethoscope gradually downwards and outwards: the first sound will have lost its distinctness, and will present a character of roughness at the centre, which becomes a decided bruit at the apex.

a. When the bruit is dependent on imperfect closure of a valve, the ear generally detects a spot of limited dimensions at which the murmur is much more distinct than elsewhere—the roughness of the first sound passes suddenly into loud bruit.

b. This point of greatest intensity varies somewhat from unknown causes. In insufficiency of the mitral valve, it is to be found most commonly on a level with the apex, about an inch nearer to the sternum; and next in frequency about an inch above the apex-beat, near to the nipple; less commonly somewhere between those points.

c. When the murmur is heard in greatest intensity considerably to the right of the apex beat, or at the end of the ensiform cartilage, we may suspect that it is due to imperfection of the tricuspid valve: but this sound is less local, and therefore less certain.

d. If the murmur, though decidedly more distinct towards the apex than at the centre of the heart, present no local point of greatest intensity, we may still conclude that it is a valvular sound if the heart be increased in size, and, in all probability, a mitral murmur.

e. Occasionally, mere changes in the quality of the blood produce a murmur which is audible over the centre of the heart, but seems to become more distinct towards the apex. It is therefore necessary, in such cases, to study the history and symptoms with care, in order that our diagnosis may not be at variance with some particular indication which has been overlooked.

2. *Systolic Murmurs at the Base.*—Proceeding in the same manner from the centre of the heart, the murmur becomes louder and more distinct as we travel upwards; but the ear seldom comes upon a point where its intensity is so suddenly increased as at the apex. Here it is that bruits dependent solely on blood-changes are most commonly found; and it is sometimes a matter of great difficulty to determine whether there be any structural alteration or not.

a. When a diastolic bruit is also heard, there is necessarily valvular disease, and, as we have already mentioned, probably disease of the aortic valves.

b. If there be evidence of enlargement of the heart, the bruit is also almost certainly dependent on disease of the aortic valves, or root of the aorta. It must, however, be clearly made out that it is real hypertrophy and not mere nervous excitement.

c. A murmur which can be distinctly localised at the base of the heart, and is only faintly audible or cannot be heard at all above the third rib, is probably due to disease of the valves; one which is diffuse and cannot be readily localised within the limits of the præcordial dulness, is more likely to be caused by altered blood.

d. A murmur which can be traced from below the third cartilage on the left side to the second interspace on the right, is generated in the aorta; one heard most distinctly in the second interspace on the left side, is probably produced in the pulmonary artery. In the one case there may be disease of the valve, in the other there is probably only change in the character of the blood.

e. When there is any suspicion of disease, the history and general symptoms must be carefully inquired into: an anæmic state may account for the existence of a murmur, and, under all circumstances, necessarily increases its intensity.

Some authors distinguish pre-systolic and post-systolic mur-

murs from such as may more properly be called systolic. The names are ill chosen, and apt to convey a wrong impression, and the division is too minute to be followed by the student; but the possibility of some variation in the time of their commencement should be remembered, so as not to confound a systolic murmur, which does not exactly coincide with the apex-beat, with a diastolic one. The one *ends* at or near to the time of the beat, the other *begins* then, and ends long before the heart can be again felt impinging on the ribs.

As a general rule, blood-sounds are characterised by great softness; and a whizzing, grating, or musical noise may be safely concluded to depend on some valvular defect.

Local distinctness is one of the best distinguishing features of mitral insufficiency. It is to be traced when no hypertrophy of the organ is present, and very commonly coincides with a history of rheumatic fever. Irregular action, feebleness of pulse, congestion of the lungs, &c., leave no doubt as to the regurgitation of the blood through the mitral orifice when the position of the murmur is doubtful, and may even be sufficient to prove this condition when no murmur can be heard at all. It is not necessary to go into the further question whether the imperfect closure of the valve depend upon alteration in its own texture preventing the edges from accurately adapting themselves to each other, or upon changes in relation between the size of the cavity and aperture, and of the membranous valve, or of the length of the cordæ tendineæ; though each of these causes may give rise to mitral insufficiency.

An anæmic murmur is very seldom to be traced in greater intensity towards the apex, but that it is so occasionally is quite certain; and the fact must not be forgotton. The general indications which would confirm the opinion that it was due to blood-change only, are that the patient is young, and has never had rheumatic fever, and that the aspect is decidedly anæmic,—blood passing backwards through the mitral valve tends to produce blueness of skin, from obstruction to the circulation in the lungs. A bruit in the carotid artery or in the jugular vein, when none can be traced at the base of the heart, is also a valuable indication: the pulse in such circumstance is not at all deficient in power, but it may not be perceptibly so, even with decided mitral insufficiency, when regurgitation takes place only to a small extent. It may be suggested, in explanation of this form of blood-murmur, that the vibration is excited by the friction of the particles against the columnæ carneæ when the blood is in such a condition that it can be readily produced, and that it is heard with greater intensity towards the apex only because the base of the heart and the great vessels are deeply covered by lung-tissue, and the apex comparatively exposed in the particular

instances in which it has been noticed; and this is the more probable, because it very generally varies in position and intensity from day to day.

Tricuspid regurgitation seems to be a very common condition, and is very rarely indicated by the presence of a bruit. This is to be explained no doubt by the minor force of the right ventricle; and it is therefore only in conditions of very decided disease that a tricuspid systolic murmur is met with: such cases, pathologists know to be very much rarer than corresponding disease of the mitral valve.

At the base of the heart bruits are so often dependent on blood-changes, that the diagnosis can rarely be made with any approach to certainty from the character and position of the murmur itself; and we therefore look in the first instance to the aspect of the patient, the history of the case, and the evidence of disease of the heart from diastolic murmur or hypertrophy, to aid in the determination. In no case perhaps is error more liable to be committed than in mistaking nervous excitement for hypertrophy, and deciding that therefore the bruit heard is an indication of valvular disease.

In speaking of anæmia those circumstances were mentioned in detail in which an anæmic bruit is probably to be heard. It was there stated that, as the cause of the production of sound is in the blood itself, the motion among its particles during its passage through the healthy heart is sufficient to excite the vibration, and that the point at which the bruit is heard in its greatest intensity is only that which is most superficial; but that, as a general rule, it tends to be diffuse, and is audible over a large surface. In the majority of cases, a systolic murmur at the base heard relatively louder over the second interspace on the right side of the sternum, indicates disease of the aortic valves, while one relatively louder in the same interspace on the left side, directly over the base of the heart, or, extending towards the left shoulder, is only a blood-sound: a local bruit in the third interspace on the left side, which is not propagated in either direction, is most commonly caused by valvular disease.

As the *rationale* of these rules, the following considerations may be suggested. Bruits are all heard more loudly over an interspace than over the rib immediately above or below: the third interspace on the left side is that in which the sound actually produced at the valve is best heard; and for all practical purposes we may for the present disregard disease of the pulmonic valves altogether, and assume that the question lies between disease of the aortic valves and anæmia. True valvular sound is therefore necessarily heard best, unless the heart be much enlarged upwards, in the third interspace; and it may possibly not be propagated to any distance beyond, but heard there only: if, on the

other hand, any anæmia be present as well as disease of the valve, the sound will be propagated along the aorta, not along the pulmonary artery; and therefore it will be relatively loudest on the right side above the third rib, though not so loud there as where it is actually produced. The case of a simple anæmic bruit is quite different: there is no distinct point in the course of its passage through the heart where the blood is thrown into vibration, but wherever vibration occurs, the sound is produced: practically the pulmonary artery is most superficial, and therefore, though it can be heard in the aorta, the bruit is relatively louder in the pulmonary artery; it is consequently most distinct at that interspace where in very thin persons this artery may be often felt pulsating—the second on the left side.

In consequence of the statement here made, it will be seen that proof of the actual existence of anæmia, whiffing sounds in the arteries, "bruit de diable" in the jugular veins, &c., although it throw some doubt over the probability of true valvular murmur, must not be assumed to disprove it altogether. It is probable that when a valvular bruit is distinctly propagated along the artery, there is almost always some degree of anæmia to account for it; and that the really valuable indication is that there is a point at which the vibration commences, while its propagation along one vessel or the other is of minor importance; because, although it be true that a pulmonic valve murmur is exceedingly rare, the principles of diagnosis must recognise its possibility, and endeavour to prove its presence or absence. Such a murmur is very likely to be propagated along the pulmonary artery; and here, again, the only valuable indication would be the existence of a point somewhere below the third rib, probably very close to or under the sternum, from whence the vibration commences. If any one will take the trouble to listen to the sound heard in the carotid arteries in a few instances of acknowledged disease of the aortic valves, he will very quickly find that the propagation of the bruit depends on something else than the diseased valve which produces it, as the intensity of the bruit in the one situation bears no constant relation to its loudness in the other. This subject has been mentioned at some length, because the direction which the sound takes is often alluded to as the great indication in diagnosis.

An inquiry into the means of distinguishing between a blood-sound and a valvular murmur is necessarily somewhat complicated; and yet it may become of very considerable importance when, for example, in watching a case of acute rheumatism, we have to determine whether a bruit of some sort indicates the

supervention of endocarditis. The rules which may be laid down as the most valuable for the guidance of the student in such a case are the following:—1. To observe the point of its greatest intensity with reference to the three principal positions referred to, (*a*) the apex, (*b*) the base at the third left interspace, (*c*) above the base at the second left interspace. 2. To ascertain in how far at the points (*a*) and (*b*) it is capable of distinct localisation. 3. If its character be, on the contrary, at all diffuse, to observe whether it can be traced towards or across the sternum or towards the shoulder. 4. To watch, from day to day, whether there be any variation in intensity at different points.

In addition to these considerations, account must be taken of the past history of the case, as it may show the possibility of previous disease, as well as of the present condition of the circulation, as it may indicate such an amount of excitement as must of necessity exist when endocardial inflammation is going on, or such a state of quiescence as is incompatible with it. Nor is it to be forgotton that bruit is produced in many cases of thoracic aneurism, and that these have to be separated by their position before the sound is taken as an indication of disease of the valves.

CHAPTER XXIII.

DISEASES OF THE HEART.

History and Symptoms—Acute and Chronic Disease—Commencement often Obscure.—§ 1, *Pericarditis—its Signs and Symptoms—Suppurative Pericarditis—Tubercular Pericarditis—Adherent Pericardium*—§ 2, *Endocarditis—its origin in Rheumatic Fever—indications of Inflammation*—§ 3, *Valvular Lesion—with and without Bruit—value of Murmurs—Mechanism of the Circulation—other indications*—§ 4, *Hypertrophy*—§ 5, *Dilatation—Fatty Degeneration—Fibroid Degeneration—Myo-carditis—Associations of Heart Disease*—§ 6, *Angina Pectoris—Palpitation—Irregular Action—Syncope.*

The history of the various conditions of disease of the heart must of necessity present extreme contrasts, as they are calculated to interfere very greatly or not at all with the general comfort and well-being of the patient. Commencing as some do in the most gradual and imperceptible manner, a long period elapses in their history, during which they are utterly unsuspected by the patient, and may be only casually discovered by the physician: by-and-bye they begin to interfere with the circulation, and consequently with the breathing, and the patient becomes short-winded, or, as he supposes, asthmatic; and then an educated practitioner readily traces the true cause of the symptoms. In another set of cases a sudden strain is put upon the diseased organ, which overpowers its imperfect action, hitherto unrecognised, and irregular contraction, laboured movement, and impeded circulation

at once develop themselves, and are assumed to be the commencement of disease in the narrative of the patient. Not unlike these last are a few rare cases, in which the strain has been so great as to rupture some part of the delicate mechanism in states of perfect health, and to have been in reality the beginning of the disease. In yet another class we are able to trace the history of inflammatory action by pain and dyspnœa in recent cases, or by the account of circumstances likely to have excited it, in those of long standing, with continuance of disordered function since the primary ailment.

We thus divide the cases naturally into the acute and chronic diseases of the heart, the one forming only a very small section, exceedingly limited as to the causes of their existence; the other embracing by far the larger number of cases, which can be traced back either to partial recovery from an acute attack, or to a variety of other causes, some of which are very vague and ill-defined.

Among the acute cases we find pain or dyspnœa not unfrequently present; among the chronic they are unusual as a permanent condition, and when met with sometimes assume the characters of angina pectoris. The dyspnœa of inflammation may be spoken of rather as a catching in the breathing, or feeling of anxiety connected with it; that of chronic disease is more decidedly what patients call "shortness of breath," felt in running, in going up-stairs, &c. The character of the pulse, of course, very often offers direct evidence of disease of the heart; and, in addition to this, the presence or history of rheumatic fever, of inflammation of the pleura, of disease of the kidney and of dropsy, as the more constant associations of acute or chronic disease of the heart, are each to be viewed in the light of symptoms, or at least indications of its presence. Among them all, that which leads most frequently to the detection of cardiac inflammation is the presence of acute rheumatism.

§ 1. *Pericarditis.*—If any of the signs of those diseases just mentioned as being associated with cardiac inflammation be presented to our observation, and if on examination of the heart, pericardial friction be made out, there can be no doubt that pericarditis exists: other indications of inflammatory action will not be wanting, but here there is less need for the evidence of correlative symptoms than in other cases. When friction-sound is absent, it may be annulled either by the presence of fluid, or by universal adhesion: in either case, the general symptoms must be decided before we can be warranted in pronouncing such a diagnosis, and along with these, not in opposition to them, we shall find in the former very extended dulness, especially in an upward direction, and, as usually described, assuming somewhat of a pear-shaped form; undulatory movement may sometimes be visible over the præcordial space, while the heart's action is excited, laboured, or irregular, and the apex-beat somewhat elevated; the ordinary sounds of the heart are distant and indistinct over the position of percussion dulness, becoming louder and more natural above the space occupied by the fluid; tenderness over the præcordial space, pain, and dyspnœa, and great distress from any sudden movement, are also met with in such cases. On the other hand, when the surfaces are agglutinated together, the evidence is more obscure; perhaps the most important points, when taken in connexion with the general symptoms, are persistently perverted rhythm with nothing else to account for it, and a certain degree of obscurity of sounds, accompanied by increased and excited action. When along with these there are also præcordial pain, distress or anxiety, and dyspnœa, the diagnosis may be pretty certain in a case of acute rheumatism or severe pleurisy, where pericarditis is to be looked for, but can never be relied on when there is nothing else to guide us to it.

In the early stage, excited action, altered rhythm,

and creaking noise before friction is established, should prepare us for its appearance, in the course of rheumatic fever (see next section), or if pain in the region of the heart be complained of in the course of pleurisy, or albuminuria. In the latter disease, the plastic exudation is generally much less, the tendency to pour out fluid much greater.

In the course of pericarditis we must be prepared for the occurrence of pleurisy, and in inflammation of the pleura for its attacking the pericardium. When the friction occurs in the immediate vicinity of the heart, it may be difficult to say by which membrane the sound is produced ; because even when the breath is held, the impulse of the heart may cause pleuritic friction. Generally the diagnosis is not difficult, and, besides, it is not of very great importance.

The student must refer to the last chapter for the distinguishing characters of friction. His attention must, however, be specially called to two points in regard to the diagnosis of pericarditis. *a*. All double bruits are not friction. *b*. Friction may exist as a single sound. Independently of such considerations as its loudness, distinctness, rubbing character, superficial position, &c., which can only be learnt by the habit of constant observation, and are never thoroughly trustworthy, the best and safest indication is to be obtained from comparing the rhythm of the sounds heard over the arch of the aorta, beyond the pericardial sac, with that of the bruit wherever heard most distinctly. An endocardial murmur when double, corresponds in time to the 1st and 2nd sounds heard over the arch, while friction does not: a single murmur when anomalous in time is most likely to be pericardial ; if endocardial, it would correspond either to the systole or the diastole.

The occurrence of suppuration in the pericardium and the deposit of tubercles in association with inflammation of the membrane, can scarcely be considered as legitimate subjects of diagnosis. Anything unusual in the course of the disease would lead to further investigation and inquiry ; and the observation of any tendency to suppurative action, or the deposit of tubercle in other organs, might induce the observer to hazard a guess as to the actual pathological condition. Such an opinion can never be asserted with confidence.

Adherent pericardium is such a constant cause of alteration of dimensions, that it is much to be wished that we could form a

diagnosis with certainty. The signs are unfortunately few and uncertain. Endocardial inflammation stands in complete contrast to pericardial in this respect. We may have great difficulty in determining whether an endocardial murmur be functional or organic, but the valve once damaged, ever after gives unmistakable evidence of the fact; whereas pericardial friction proves distinctly the actual presence of inflammation, but when it has subsided we have no means of ascertaining what has occurred. After the attack has passed, the heart's action usually remains for a time quick and excited: and if the pericardium has become partly adherent, the muscular structure gradually increases in thickness, with dilatation of the cavities. If the pericardium be wholly adherent the same result may follow, but it may also become atrophied, and sometimes it retains the dimensions of health. If then we have a history of acute rheumatism with pain in the region of the heart, more particularly if we know that friction has been heard, and subsequently the heart's action becomes irregular, and it seems to be altered in dimensions, without valvular lesion to account for the change, we may fairly surmise that the sac has become adherent. The diagnosis would be confirmed if we found the apex beat tied down in any unusual position.

§ 2. *Endocarditis.*—The presence of an endocardial murmur is not decisive of endocarditis; for it may be of long standing, or it may be merely functional. Excitement of the heart's action, persistent and not arising from some temporary cause, as well as febrile disturbance and cardiac anxiety, must be present to render the diagnosis certain; indeed, in affection of the mitral valve, these symptoms may for some days precede the development of the murmur. And in old standing disease, where a murmur already exists, their occurrence may lead to a well-grounded suspicion of fresh inflammatory action and exudation, especially during the existence of rheumatism. Of murmurs developed under observation, the most important is that indicative of mitral disease, and next, that already described as found at the base of the heart, of local character, and inclining towards the right side of the sternum. When general symptoms are wanting, and the heart is quiet, a systolic murmur at the base, diffuse in character, or one heard best above the third

rib, may be generally disregarded; in cases of doubt it is, however, safer to act on the suspicion of endocarditis.

The origin and progress of endocarditis has been most carefully watched in rheumatic fever, but frequent mistakes are made, both in overlooking its occurrence and in assuming its presence when there is no inflammation of the heart.

The murmur at the base, at first developed by the presence of a few adhering vegetations, is of course very local, and indeed amounts to little more than a roughness of the first sound at the third interspace. The murmur at the apex, again, cannot be produced until the deposit is sufficient to prevent the proper closure of the valve: it is preceded by no change of sound, but appears suddenly, as soon as the lymph on the valves prevents their perfect adaptation. In neither case, therefore, does the stethoscope afford us very sure means of diagnosis in the early stage of endocarditis: the modification of sound at the base is the earliest when the aortic valves suffer; but it is in some measure obscure and uncertain, from the possibility of blood-change in rheumatism, and practically the aortic valves are not involved so soon as the mitral. Hence it is important to view general symptoms, and to anticipate the appearance of the physical signs, which come too late to be of much service.

In the progress of rheumatic fever, it is the duty of the medical attendant to examine the condition of the heart at every visit. No fact is better established than the association of cardiac inflammation with this disease; and if remedies can avail, the time for their employment is at the first inroad of the inflammatory action; the organ once spoiled is seldom restored to a perfectly healthy state: it is perhaps, therefore, not out of place to say a few words upon the subject of the precursory or premonitory phenomena, as they may be called. It would appear that, when the perspiration is less abundant and less sour-smelling, when the skin is dry and the odour rancid, the liability to cardiac complication is greater. The pulse is sharper and firmer, the heart itself becomes excited, its systole is sharp and shrill, and its impulse against the chest more perceptible, when there is any tendency to inflammation of that organ: but this

excitement may be calmed, and no further change observed. Next we find that there is some alteration in rhythm; the first sound seems to be shorter, and the first interval longer than in health; at least there is a notable change in the proportionate duration of the first and second sounds and the first and second intervals: this, too, may subside, but is very liable to be followed by more decided evidence of inflammation. Pain or dyspnœa may occur before friction or bruit of any kind, but they seldom precede the other indications, and ought not to be the first suggestion of cardiac complication. If after the changes just spoken of a slight creaking be heard, we may be sure pericardial friction is just about to show itself; if a slight roughness of the first sound at the base, that endocardial murmur will soon be detected.

Not unfrequently the cardiac affection, and the consequent changes in the sounds of the heart, have been developed before the patient comes under observation; and it is important to be able to determine what is the exact condition of the organ at the time of examination. The following rules may be laid down for the guidance of the student:—

a. When pericardial friction exists, the case is clearly one of pericarditis.

b. When an endocardial murmur is present, it is well to inquire whether the patient have ever previously suffered from rheumatism, or have had any symptoms of disease of the heart before his present attack.

c. A systolic aortic, or mitral murmur, as already described, found in a first attack of acute rheumatism, with no evidence of enlargement or irregular action, is very probably the result of recent endocarditis.

d. A murmur heard on the first examination of the heart in a second or third attack of acute rheumatism, or along with enlargement and irregular action, or when there is a history of previous palpitation, dyspnœa, or dropsy, is not to be regarded as evidence of

endocarditis, which can only be inferred from concomitant symptoms.

e. When pain and dyspnœa are complained of, and yet no morbid sound can be detected, the pericardium may be full of fluid. In such circumstances it will be observed that the natural sounds of the heart are obscure and distant in the præcordial region, but become clear and distinct above the base of the heart; the dulness is manifestly extended, especially upwards, and its pyriform shape may perhaps be made out, or undulatory movement may be seen. The action of the heart is excited and increased, or irregular; and this forms a striking contrast to the weakness of the sounds. (See last Section.)

f. In rare cases, universal adhesion of the pericardium may have annulled the friction-sound. This circumstance is to be borne in mind when the evidence of previous inflammation is distinct and the sounds of the heart are modified in a way that we cannot otherwise account for, especially when there is persistent alteration in rhythm. There is probably no combination of signs specially diagnostic of the condition here referred to.

The distinction between endocarditis and old valvular murmur is very constantly lost sight of; without any further question, a bruit is at once held to be conclusive evidence of inflammation. This is a very grave error in diagnosis, because, as we regard pericarditis and endocarditis as something different from the blood-change of rheumatic fever, and as of much more serious import to the patient's health and life, we are justified in disregarding the rheumatism, and trying at all hazards to save the central organ from damage; but such treatment is never to be adopted without reason, and is calculated to be injurious when based on a mistaken view of the case. At the same time it is to be borne in mind that a valve once thickened by inflammatory action shows a remarkable proclivity to future attacks, and at a *post-mortem* examination often exhibits fringes of fresh lymph, when the symptoms during life were scarcely such as would have justified, even if they had suggested, the diagnosis of endocarditis.

The harmony of general symptoms and physical signs has been

much insisted on in the preceding pages, because the blood-change that occurs in association with what we call rheumatic fever is unquestionably one that tends towards anæmia, as is proved by the development of blood-sounds during its continuance, which were not heard previously,—a circumstance not observed in true inflammations, as the term is generally understood. To apply depletory measures when an anæmic murmur is heard, is surely what no experience would justify or recommend.

The most trustworthy indications of the liability to inflammation, or of its actual existence, are to be found in altered rhythm and persistent excitement, if by this term we understand something different from increased action. It is that which is found in its simplest form in nervous palpitation; and the student should make himself familiar as soon as possible with the difference, which is by no means difficult to recognise, between the character of the sounds as they are heard in the excitement of nervous palpitation, the increased action of hypertrophy, and the quickened movement of fevers and inflammations of other organs.

Not less important are pain and dyspnœa; but they are often absent, and may be both dependent simply on rheumatism of the intercostal muscles, or even perhaps of the diaphragm. Tenderness between the ribs, pain aggravated by movement, or felt over an extensive surface, and the absence of signs of cardiac inflammation, are the evidences on which we base our conclusion that intercostal rheumatism is the cause of the difficult or painful respiration. On the other hand, we must be careful to ascertain that the tenderness is not really in the pericardium, when it is increased by pressure.

It may seem scarcely possible that enlargement of the heart should be mistaken for pericardial effusion; but there is a certain similarity when the cavities are greatly dilated without thickening of the walls. The simulation of undulatory movement has been already mentioned, and the error has been due to this circumstance, attended as it necessarily is with increased dulness on percussion. The difficulty can only arise when along with the dilatation the sounds are obscured by the existence of valvular murmur, and especially when heard both at base and apex: in such a case, when pain is complained of, or dyspnœa has been recently increased, and any of those conditions are present which may act as causes of pericarditis, the doubt will occur to every observant mind. The quasi-undulatory movement, however, will not long deceive any one of much experience,—though analogous, it is in reality different: but, in addition to this, a very safe guide is to be found in the circumstance that the presence of fluid diminishes the distinctness with

which sounds are transmitted to the ear, and that above the region of the dulness the sounds of the heart, whether marked by bruit or not, are heard with much greater distinctness than anywhere in the præcordial space; and this is something quite distinct from the difference between the intensity of a bruit as ordinarily made out in the one or in the other situation. For it is to be remembered that we are supposing an advanced stage of pericarditis, and that if there be not much fluid, there must be friction: if there be much effusion, the bruit or the natural sound can only be heard as distant and obscure.

§ 3. *Valvular Lesion.*—It is scarcely possible to separate the indications of valvular disease from those of endo-carditis. It is that form of disease which is essentially associated with endocardial murmur; but as, in speaking of the murmur, it has been shown how it may be produced without alteration of the structure of the valves, so here it is to be remembered that valvular lesion may be found after death, which has not been revealed by the presence of a bruit during life. Our inquiry must, therefore, not be limited to the use of the stethoscope; we must ascertain the previous existence of rheumatism, or the coincidence of ailments with which we know that disease of the heart is more or less constantly associated: among these one of the most frequent is dropsy, and, as a general rule, it may be said that, when not produced by albuminuria it is seldom found with any disease of the heart of which valvular imperfection is not a prominent feature. Probably, in the first instance, valvular lesion always gives rise to bruit: it is when the circulation becomes laborious and irregular that the murmur is lost or indistinct, and then the evidence of disease is so clear that it is quite unnecessary as a confirmation, and its value only consists in its giving an explanation of the circumstances which have led to the advanced changes of which other indications have rendered us cognisant.

In diagnosis we have, therefore, to do with imperfect closure of the valves under two aspects. In its first appearance, prior to other changes, when we may be called upon to determine how it is likely to affect

duration of life or the enjoyment of health, when the presence of the bruit is the only evidence of disease; and, at a later period, when very considerable alteration of muscular structure has taken place, and the imperfection of the valve, though in truth the cause of these changes, may or may not be revealed by any actual murmur: in the latter, as in the former, there are many important questions with reference to the prognosis and treatment, with which diagnosis has not anything further to do than in establishing the fact.

With reference to the first class of cases, the student has to remember the three forms of endocardial murmur which we found to afford the most trustworthy evidence of disease; (1) a diastolic bruit; (2) a systolic bruit at the apex, of very local character; (3) a systolic bruit at the base, heard loudest below the third rib, and relatively louder towards the right side of the sternum than towards the left shoulder. If sufficient care be taken in the investigation of such cases, the conclusion may be fully arrived at that valvular imperfection exists.

With reference to the second class the alteration of dimensions is itself part of the proof of valvular lesion. If a bruit exist it is pretty certain evidence of valvular imperfection; but this may be due not so much to change in the structure of the valve as to enlargement of the cavities of the heart, which has altered the relation between the size and position of the aperture and that of the valve which is designed to close it. When no bruit is present, we must be guided by the general symptoms of the case: venous congestion and a weak pulse, while the heart is acting powerfully, must, for example, be taken as conclusive proof of valvular lesion whether we hear a bruit or not. This subject will again occupy our attention.

At the risk of some repetition, let us for a moment consider the progress of the blood through the central organ. It passes onward through the mitral valve during the diastole, beginning

its movement directly after the shock of the apex against the rib; it is performed slowly and silently, with but little force; and for a diastolic bruit to be produced, there must be very considerable roughness or change in the form of the orifice, to throw the blood into vibration at this stage. An anæmic condition is never sufficient to develop sonorous vibrations with a healthy mitral valve. As soon as the systole begins, the valve-flaps ought to come together, to prevent any blood from escaping in that direction; and a systolic bruit can only be produced by their imperfect closure: but as the force with which the ventricle contracts is considerable, a very slight defect is sufficient to produce this regurgitation, which as it encounters the opposing current very easily produces a bruit. It is not the roughness that occasions the murmur in this case, because it is just as distinct when the valves cannot close perfectly from any other cause, such as dilatation of the heart when the flaps are too small for the aperture, shortening or rupture of any of the chordæ tendineæ, &c. Its position is remarkably local, most commonly between the same ribs where the apex-beat is felt, and somewhat nearer the sternum; sometimes in the interspace above: and though localized to a certain extent, by the sound being more readily heard through the interspace, still it has a distinctness at one spot which no other endocardial murmur presents. From the same point we trace the diastolic murmur when it exists, but it passes onwards and inwards towards the centre of the heart so as to be sometimes confounded with a diastolic aortic murmur. Its point of origin is therefore very important in diagnosis.

Following the course of the blood, we find it passing through the ventricle; and now commence the vibrations in anæmic subjects which are heard in the præcordial space or in the aorta: next it passes the portal of the aorta, and if the valves be roughened or stiff, even healthy blood is thrown into vibration, and a bruit is developed which has for its point of greatest intensity the third interspace, commencing before the apex impinges against the thorax, and terminating after it: if the blood be at all altered by anæmia, this bruit crosses the sternum, and can be heard on its right side. As soon as the systole is completed, the aortic valves fall backwards and close in health: in disease the adaptation may still be perfect, and the second sound of the heart distinct, though a systolic aortic bruit be present; but their adaptation may be imperfect, or a perforation may exist; and then the blood, in place of being held back by the valves, repasses into the ventricle, in consequence of the pressure exerted by the resiliency or contractility of the aorta. It may have to pass over stiff and rough valves, and be thrown into vibration as it passes, or it may pass through a smooth opening and no bruit be developed at the valve; but it very soon encounters the cur-

rent entering in the opposite direction from the auricle, and vibration must result, and a bruit be formed. A diastolic aortic murmur is therefore always audible at the centre, and even onwards to near the apex of the heart, increasing in distinctness as we descend; but it may also be traced from the third interspace.

The blood on its return from the veins next presents exactly similar relations to the tricuspid valve on entering the right ventricle and the pulmonic valve as it leaves it: but bruits are very seldom developed on this side of the heart, except when caused by blood-change; and then they are heard much more loudly in the pulmonary artery than elsewhere, because at the second interspace is found the most superficial portion of the circuit. We know that tricuspid regurgitation often takes place, for we see the pulsation of the jugulars corresponding in time to the systole and apex-beat, but it occurs without bruit; and though this result be, no doubt, partly due to the more feeble contractions of the right side, it also depends, in all probability, on the construction of the valve being such as to permit this regurgitation for the relief of the circulation: bruits at the pulmonic valves, independent of blood-changes, are necessarily rare, from the comparative infrequency of disease at the root of the pulmonary artery.

We have learnt, then, that a diastolic murmur from the apex towards the centre of the heart, indicates very decided mitral disease; one from the base towards the centre, imperfect closure of the aortic valves. We have learnt, too, that a systolic murmur, of local character and distinctness towards the apex, may be presumed to be dependent on disease of the mitral valve in the majority of instances, and that a murmur heard between the third and fourth cartilages on the left, traceable over the sternum to the interspace between the second and third cartilages on the right side of the chest, may probably be dependent on disease about the root of the aorta, or the aortic valves; and the more defined and distinct it is, the more likely is this conclusion to be true; the more diffuse and indistinct, the more care must be taken before coming to any judgment on the subject.

For the purposes of diagnosis, the sound is only one element in the investigation, which has to be compared with all the others, and has to be reconciled with them

on rational principles, not by forced and overstrained hypotheses. The points to be considered are—

a. The pulse. (1) It is essentially weak, often irregular, and sometimes almost imperceptible in mitral insufficiency. (2) It is jerky, thrilling, and hammering in aortic insufficiency. (3) It is weak in cases of diastolic murmur produced at the mitral valve, because such a condition is necessarily connected with mitral insufficiency. (4) If it have a thrilling character, while also firm and resisting, with a systolic murmur at the base, the probability of aortic disease is much increased.

b. The existence of hypertrophy renders the diagnosis of valvular lesion more certain. But we sometimes find that dilatation, without corresponding increase in size of the valve-flaps, renders them inadequate to close the aperture. When regurgitation, therefore, occurs, it is more correct to speak of insufficiency than lesion of the valve, although practically that insufficiency depends in by far the larger number of instances on actual disease of the valve-structure, and is the result of the lesion, whether that have originated suddenly in rupture, more slowly in the changes consequent on inflammation, or still more slowly in chronic degeneration.

Shortening of the chordæ tendineæ sometimes seems to produce an insufficiency of the mitral valve, which may last only for a short time. This explanation has been offered of the mitral murmur of chorea, when it has disappeared as the spasmodic muscular movements have ceased. This hypothesis will not bear close investigation; but I have seen such a result follow on rheumatic pericarditis. An intense mitral murmur with evident regurgitation was heard, when the friction sound had ceased for some weeks, while the patient continued under observation; but at the end of three or four months, during which no treatment was pursued, it had entirely disappeared: the heart's sounds were then found perfectly normal, and only a suspicion of an adherent pericardium could be entertained.

c. The general aspect and history of the patient serve to indicate the probability of heart-disease on the

one hand by capillary congestion, or of blood-changes on the other, by an appearance of anæmia. The indications from the venous circulation are also not less valuable than the capillary—jugular pulsation as caused by the blood being thrown back at each systole into the veins—venous hum as proving the existence of blood-change.

When the systolic murmur is heard towards the apex, a weak pulse confirms the diagnosis of mitral disease: a well-filled pulse, though perhaps a very soft one, must lead to grave doubt as to whether the sound depend on mitral insufficiency; and if the bruit be diffuse, and the aspect anæmic, the rational explanation would seem to be that it is heard there, only because of some accidental relation between the chest and the organs of circulation, by which the sound of vibration of blood is conveyed to the ear better from the interior of one of the ventricles than from either of the great vessels. Again, if there be no anæmia, but, on the contrary, venous and capillary congestion, with jugular pulsation, indicating that the blood is thrown back from the right side of the heart, a full pulse might lead us to suspect that the bruit was not improbably due to disease of the tricuspid valve.

In the systolic murmur at the base, the history of previous rheumatic fever, or of nervous or hysterical symptoms; the complaint of palpitation, or of cough and dyspnœa; and the aspect, whether pallid or florid,—help in the determination of what is the value of the bruit. Only it must be remembered that, if begun by actual alteration of the valve, it may be exaggerated by changes in the condition of the blood. We should be mistaken in looking always for a thrill in the pulse, though this be not unfrequent; because, in place of its being firm, as it generally becomes, in consequence of hypertrophy in very marked aortic disease, it may be rendered weak by dilatation or fatty degeneration: the co-existence of arcus senilis, as already observed, affords some confirmation to such a suspicion.

In decided anæmia we are apt to overlook the actual co-existence of valvular lesion. In hypertrophy and dilatation we are apt to assume its presence when there is merely imperfect closure and no positive disease: but the latter is of much less moment as an error in diagnosis than the former.

The absence or presence of a hammering pulse may at once decide the question whether a diastolic murmur be produced in the mitral or in the aortic valves.

When a double sound is heard, the history, the pulse, and the aspect of the patient ought never to permit the existence of a

doubt whether it be endocardial or pericardial, even in cases in which the character of the sound is not sufficient to determine the question; and here, again, as between a double murmur produced in the aortic and a double murmur produced in the mitral aperture, the pulse is one of the best aids to forming a correct opinion.

When all has been done that can be done towards forming an accurate diagnosis, many cases will remain in which the judgment is perplexed and the decision uncertain, many in which the conclusion has been absolutely false; but the mind best trained to examining and weighing the facts of each case, and the ear most accustomed to discriminate and individualize the sounds, will be least frequently in error in obscure cases —will also be most often right in those of every-day experience, which even in their simplest form present to the careful physician so perplexing a problem. We need only here allude to some of those loud musical sounds heard at times some distance from the patient, which from their very intensity cannot be localized at all; for them the stethoscope need not exist—they must be judged of solely by general symptoms. Cases, on the other hand, occasionally present themselves which are too few to be made the basis of any diagnostic rules, and yet too curious to be passed over; these are cases in which the arterial and venous currents get mixed through some congenital malformation, the circulation of the fœtus being to a certain extent continued after birth. The blueness of the skin, without appreciable obstruction to the respiration, and the long continuance of the symptom—its persistence, in fact, from birth, or at least childhood—serve sufficiently to mark them off as a set of cases standing alone.

Disease of the mitral valve may be traced in a large number of cases to rheumatic fever. This seems to be the point on which endocarditis, accompanying that disease, most readily fastens in the first instance; when the first seizure is severe, or subsequent attacks

occur, the aortic valves are usually also implicated. The systolic murmur is so readily produced, that very slight changes in the form of the mitral valve may be indicated, while the pulse is for a long time scarcely affected, and the circulation undisturbed: when the change is originally greater, or repeated attacks of inflammation have seriously damaged the valve, the circulation is impeded, because the whole contents of the ventricle are not propelled through the aorta; and the current is, consequently, both smaller and weaker; but, besides this, the blood which escapes through the mitral orifice is driven back upon the lungs, producing congestion, and giving rise to imperfect oxygenation: hence we have the two symptoms of feeble pulse and dusky complexion.

In the further progress of disease the left side of the heart becomes dilated, and its walls hypertrophied; sometimes the one, and sometimes the other condition prevailing, but, as a general rule, the dilatation exceeding the hypertrophy. The diastolic mitral murmur is usually developed when the hypertrophy is greater than the dilatation. The heart's action becomes irregular when the dilatation is in excess; and ultimately tumultuous action is brought on by some sudden strain, when the imperfect contractions of the ventricle, and the distended condition of the auricle, are such that no bruit is produced at all. In these cases the mitral disease may be entirely overlooked; and if the heart should happen to be much over-lapped by the lung, so that its increase in size is not observed, the irregular action and feeble pulse may be set down as the result of degeneration, and the imminent danger of the patient unforeseen.

Disease of the aortic valves is very frequently a slow process, analogous to the atheromatous disease of the root of the aorta; the two conditions being, in fact, very often found together: but it is also the result of endocardial inflammation, especially when associated with mitral disease. Simple roughening, or thicken-

ing of the valves, such as does not prevent tolerably perfect closure, without regurgitation, is not of itself a disease of much moment; but the bruit heard over these valves during the contraction of the heart is of much importance from its being an early index of the tendency to atheroma: by destroying the elasticity of the aorta, this form of degeneration produces hypertrophy, and, when affecting the arteries of the brain, leads to disturbed circulation within the cranium, and ultimately to apoplexy.

The valvular disease comes to be of real importance when regurgitation is permitted: a permanent obstacle to the completeness of the circulation is established by a portion of the blood propelled during each systole returning into the cavity; and to counteract this defect hypertrophy is soon established: but the constant and excessive distension during the diastole also produces dilatation, and it is in cases of double aortic murmur that the largest hearts are usually found. The effect of the afflux and reflux of the blood upon the character of the pulse in these cases is most striking. Patency of the valve, while very generally dependent on rigidity or irregular form of the flaps interfering with their mutual adaptation, is also known as a result of accident when one of the valves is torn, or of ulceration: the absence of systolic murmur might lead to a suspicion that these last were the causes of the diastolic murmur. It very seldom happens that we know that the heart was free from disease before some unusual strain, and it is dangerous to conclude from the patient's statement that rupture has taken place on such an occasion; for a patient may be utterly unconscious of the existence of even very severe disease till some such event call his attention to it. Imperfect closure of the aortic valves is not unfrequently caused by dilatation of the vessel, while the valves themselves are free from disease. The same dilatation at a more distant part of the vessel occurs as aneurism of the arch, which is invariably attended with hypertrophy,

and, to an inexperienced observer, may present many of the phenomena of valvular lesion.

§ 4. *Hypertrophy.*—Increased dulness on percussion, heaving impulse, sounds muffled and indistinct though usually loud, a full, firm pulse, and general throbbing of the arteries, indicate simple hypertrophy: the heart's action is not irregular. Such a condition, however, is one of comparative rarity: the increase of muscular power only results from the preservative action of nature, because some extraordinary demand has been made upon it; and the cause usually resolves itself into some obstruction to the circulation, and the evidence of this condition tends to obscure that of the hypertrophy: the sounds may be altered by the presence of a bruit, the pulse may be weak from mitral insufficiency, and the action may be irregular from accompanying dilatation. It is only when the heart has attained considerable size that this lesion becomes of much importance; and it is then chiefly to be regarded as an index, more or less distinct, of the severity of those conditions with which it is associated.

On the left side of the heart it is much more common than on the right, and this as a necessary result of the primary diseases from which it is derived. Its simplest form is produced by degeneration of the coats of the artery, and by Bright's disease of the kidney; and it is very constantly found after inflammation and atheromatous disease of the valves, or partial adhesions of the pericardium: all of these especially affect the left side. On the right, the chief cause of hypertrophy seems to be the impediment offered to the pulmonary circulation by an emphysematous condition of lung.

It must not be forgotten how the ordinary signs of hypertrophy are sometimes obscured by the circumstance that the enlarged heart sinks backwards into the chest, and becomes overlapped by the lungs. This is still more apt to occur when there is any emphysema present. Such cases are best recognised by a consideration of the general symptoms apart from the physical signs.

§ 5. *Dilatation.*—Increased dulness without heaving impulse, a quasi-undulatory movement, and irregular

action; sharp, shrill, or feeble, and flapping sounds; a soft, weak pulse, with general dyspnœa and depression, indicate a dilated heart. Its evidences are those of enfeebled power, and hence it has a close analogy with what used to be called a flabby, now very generally believed to be a fatty heart; the increased dulness and the undulatory movement are of course absent when there is no dilatation. These are the conditions most commonly associated with the pain and distress of angina pectoris, and its allied spasms.

The diagnosis of *fatty degeneration* derives much confirmation from observing a premature development of the arcus senilis, because the tendency to fatty degeneration in one tissue is not improbably associated with the same tendency in others; but it is rather to be inferred from the pathological fact that simple dilatation is exceedingly rare, and consequently when we cannot discover any cause for the symptoms of enfeebled power, we suspect fatty degeneration. Dilatation without degeneration belongs especially to aortic regurgitation, mitral insufficiency, and completely adherent pericardium. The valvular lesions have their own special indications; pericardial adhesion tends to increase the appearance of undulatory movement. In a large number of cases more or less hypertrophy accompanies the dilatation, and thus the physical signs become infinitely varied: I believe that irregularity of action, accompanying evidence of enlargement, may be almost always taken as an indication of the presence of some degree of dilatation.

Various other pathological conditions are enumerated as causes of enfeebled action, which it is impossible to make out during life: *accumulation of fat* round the heart without actual degeneration of tissue in persons who have a tendency to obesity, drunkards and others: *fibroid degeneration*, as a consequence, apparently of sub-inflammatory action: and *aneurism* of the heart, either in its acute or chronic form.

Inflammation of the muscular tissue, *myocarditis*, with *abscess* in the heart-walls as its occasional result, has not been referred to, as it can scarcely be diagnosed during life. As far as is at present known, it is a rare affection, and this is all the more remarkable when we remember how constantly medical men are watching at the bedside, and after death, the inflammations of the membranes lying on each side of the muscular structure.

The associations of cardiac disease are numerous and wide spread. Among them some may be traced to it as their cause, more or less remote: of these, dropsy is perhaps the most fre-

quent, both in its generic form as anasarca, and as passive effusion into various cavities. Bronchitis, or rather bronchorrhœa, results from the obstruction to the pulmonic circulation, giving rise to congestion and œdema of the lungs; and, for the same reason, simple bronchitis from exposure is more severe in persons with disease of the heart. Hæmoptysis occurs in consequence of more decided congestion or plethora of the pulmonary vessels. Epistaxis is perhaps also excited by cardiac disease. Disordered cerebral circulation produces those affections which we have denominated functional disturbance of the brain, or may lead to epileptic, and especially to apoplectic seizures. Congestion of the liver is often manifested in jaundice; the same condition of kidney leads to the transient presence of albumen in the urine.

Other associations are rather to be regarded as causes of disease of the heart; such as rheumatism, pleurisy, albuminuria, and that form of mal-nutrition which produces atheroma: in the former we expect to find inflammatory changes, in the latter, diseases of chronic form; the one more frequent in early life, the other found at later periods. Similarly all of the forms of cardiac disease tend mutually to develop each other. Not only does the valvular lesion lead to hypertrophy and dilatation, but these, in their turn, serve to increase the valvular imperfection. Partial adhesions of the pericardium become very often a cause of hypertrophy, while its complete adhesion is more commonly followed by dilatation or atrophy. Permanent albuminuria is associated alike with hypertrophy or dilatation, and with degeneration of the valves; but while it seems to be a direct cause of the hypertrophy, its association with the other forms is rather secondary and concomitant: it bears, however, some very close relations to the inflammatory lesions, pericarditis especially being frequently found in the course of Bright's disease. Inflammation of the pleura is liable to spread to the pericardium, but seldom affects the lining membrane or valves of the heart.

§ 6. *Angina Pectoris.*—Pretty nearly all that we know of this disease is that it is accompanied by intense pain, referred to the cardiac region, and doubtless experienced in the nerves of the heart itself; while it also sympathetically extends down the left arm, sometimes as far as the terminations of the ulnar nerve in the last two fingers. The circumstances which prove its cardiac origin, are its sudden and apparently causeless occurrence, its independence of feelings of dyspnœa, the sensation of extreme faintness, and, what is sometimes so well described by the

patient, a sensation as if the heart had stood still. These points are quite sufficient to establish its diagnosis; and as yet we must rest satisfied with the knowledge of its spasmodic character.

In most cases of angina, disease of the heart exists; sometimes such as may be detected by the stethoscope, frequently of such a character as escapes observation, or can only be inferred from general indications, such as fatty disease and ossific deposits, especially in the coronary arteries. There can be no question that such conditions predispose to it; but neither do they of necessity produce it, nor are they essential to it: patients with organic disease have no angina, others have angina in whom there is no reason to believe that the heart is diseased. This leads us to regard it as a neuralgia characterised by spasmodic pain, and leaving behind it after death no definite record of its existence.

It is liable to be confounded with the palpitation produced by dyspepsia, and especially that which in nervous persons accompanies flatulent distension of the stomach. Such a mistake can only occur with those who are hasty in their conclusions, and who do not inquire accurately into the mode of incursion of every disorder: the one almost always makes its first attack during exertion, or in consequence of sudden and violent emotion; the other most generally awakes the patient out of a troubled sleep, and has been preceded by a continuance of dyspeptic symptoms. The amount of anxiety and distress, and the duration of the attack do not correspond in the two affections; the one is momentary, and of such intensity that the patient feels he could not survive its duration, if prolonged for ever so short a time: the other is much less violent and more continuous.

The attack of angina is occasionally closely simulated by what is called masked gout, especially when the disease is retrocedent. The fact of its existence in the joints, perhaps only the day before, and its sudden

disappearance having been almost immediately followed by the spasmodic pain is too marked a coincidence to be overlooked; in other cases, the previous occurrence of extreme dyspeptic symptoms, and irregular pains, a gouty history and diathesis, as well as the slower incursion and longer duration of the seizure, lead us to the conviction that it is not angina, and will probably serve to point out its true nature. It seems almost unnecessary to add that, obscure as many of these cases of masked gout undoubtedly are, true diagnosis is most essential to correct treatment.

Angina stands first on the list as the most formidable of what are called functional diseases of the heart. Along with it we class *palpitation*, *irregular action*, and *syncope*. In all, the affection is simply the result of nervous influence, whether excited directly by the brain, or indirectly by disorder of stomach, anæmia, or debility. The province of diagnosis with reference to them consists of two parts; first, the ascertaining, so far as is possible, that there is no actual disease, that the palpitation and irregular action are not caused by valvular lesion, adherent pericardium, or muscular change; and that a fainting fit is not of an epileptic character. Secondly, it has to trace out the concomitant affections in other organs, which are the probable causes of the functional disturbance in the heart's action.

CHAPTER XXIV.

DISEASES OF THE BLOOD-VESSELS.

DIV. I.—*Diseases of Arteries—Aneurism.*—§ 1, *Superficial Aneurism*—§ 2, *Thoracic Aneurism*—§ 3, *Abdominal Aneurism*—§ 4, *Embolism—Thrombosis—Occlusion.*

DIV. II.—*Diseases of Veins.*—§ 1, *Adhesive Inflammation—Phlegmasia Dolens*—§ 2, *Capillary Phlebitis*—§ 3, *Suppurative Inflammation.*

DIVISION I.—DISEASES OF ARTERIES.

IN pathology we become acquainted with inflammation of the lining membrane of the arteries, but, as yet, it has received no clinical history: its occurrence is, indeed, so rare, that the observation which may associate the history with the *post-mortem* appearances, must be rather a matter of accident than one which can be fairly regarded as a subject of study. It is certainly very remarkable that the inflammatory action so often observed on the valves of the heart, and not unfrequently associated with patches of inflammation on the endocardial membrane, should so rarely extend to the arteries.

Aneurism is, in its early beginnings, also unknown to us in a clinical point of view; there is nothing in the history of its development characterising the disease in such a manner as to be of avail in diagnosis. There is little to be learned regarding it beyond the fact that a swelling has been, at some period, discovered by the patient, or that symptoms have occurred which might be explained by the hypothesis of aneurism, when no swelling has been observed.

Its diagnosis resolves itself into a consideration of the circumstances proving the existence of a tumour, of the evidence of its pulsation, and of the disturbances produced in the circulation, especially in the development of an arterial bruit. When these points can be made out distinctly there is no difficulty in forming a correct opinion of the case. In many instances, however, from the position of the diseased artery, the information is obtained with difficulty, or is very imperfect; and then careful examination and correct reasoning can alone conduct us to a trustworthy explanation of the phenomena: a hasty observer is liable either to overlook the disease altogether, or to misinterpret the meaning of the symptoms which he has discovered. The existence of anything like degeneration of arteries elsewhere would confirm the diagnosis of aneurism.

§ 1. *Superficial Aneurism.*—When occurring in a tolerably superficial artery, the disease commonly falls under the care of the surgeon. Mistakes are less likely to occur than when it is deep-seated: the pulsation and the bruit are both pretty readily made out; and when, by pressure on the artery, at the proximal side of the tumour, it collapses, and is rendered flaccid by the sac becoming partially emptied, the diagnosis is simple and distinct. In a more advanced stage, when from large deposits in its interior the sac has become hard and firm, it is especially important to note that the pulsation is felt when a finger is placed on each side, because an elastic tumour lying over an artery very generally pulsates outwards, but not so as to be felt transversely across the course of the vessel. The arterial bruit may also be simulated by the pressure of a tumour on a perfectly healthy vessel, especially in those conditions of blood which embarrass the diagnosis of diseases of the heart, by producing cardiac murmurs. A tumour lying over an artery must, from its very position, be, to a certain extent, moveable,

or at least its point of attachment to the deeper tissues does not correspond with the known course of the artery; and this serves as a further guide in diagnosis.

In superficial aneurism we may sometimes be guided by the history of sudden appearance after a strain, and the mode in which it first revealed itself to the patient's consciousness; but to these much importance cannot attach. It seems scarcely possible that cellular inflammation and abscess lying over an artery should be confounded with aneurism, and yet such mistakes have occurred.

§ 2. *Thoracic Aneurism.*—It is unnecessary to repeat the indications by which we may arrive at the conclusion that a tumour of some sort exists in the cavity of the chest (see Chapter XI, p. 382); we have only to consider here by what circumstances we may be led to believe that it is of the nature of aneurism. And in forming this judgment the pathological facts connected with the disease are not to be forgotten—such as its relative frequency at the commencement and arch of the aorta, and the consequent probability of its being found at the upper and front part of the chest; its tendency to cause absorption or erosion of tissues by pressure, and hence the frequency with which it is attended by pain; hence, too, its termination by hæmorrhage before it has attained any such dimensions as are seen in cases of malignant growth: nor may we forget the necessary disturbance of the circulation, and the constant accompaniment of hypertrophy of the heart.

In the dysphagia or dyspnœa caused by its pressure, which serves in many instances first to call our attention to its presence, it does not differ from other forms of tumour: but from the position of the aorta, they are perhaps more common and earlier in their appearance, the cough in particular having a remarkable metallic clang. Aneurism is much more liable to in-

terfere with the arterial circulation—morbid growth with the venous; in the one a difference can frequently be observed between the pulse at the two wrists, in the other we are more likely to find tortuous veins over the neck and thorax: but it may be worth mentioning that œdema of the arms, when the circulation is obstructed, sometimes renders the observation of the pulse fallacious. It would seem, too, that relief from the pressure, by change of posture, is more decided in the case of aneurism than of other thoracic tumours; but in all cases it is usually found at some period of their history that a prone position is preferred to any other.

The situation in which aneurism is commonly found, towards the upper and front part of the chest, may lead to its being detected by percussion and auscultation; the dulness is limited, and is not complete; and though greater on one side than the other, unlike the consolidation of tubercle, it is most distinct close to the sternum. Solid growth in the anterior mediastinum is not limited to the upper part of the sternum, but the dulness extends all the way down; it is also more complete. The earliest auscultatory phenomenon is a jogging sound, which can be heard, and seems to be felt, when listening over the site of the tumour: it is probably produced by its actually impinging on the parietes. In other instances an arterial bruit or whiz is heard there much more distinctly than elsewhere: it is not unfrequently audible also in the præcordial region; and hence, with the natural accompaniment of hypertrophy, may be wrongly attributed to valvular disease of the heart.

In its further progress the aneurism causes absorption of the intervening tissues, becoming gradually more superficial: the bony structures soften, and the pulsation is readily observed externally. Pain is necessarily excited by this action, and has a gnawing character: the whizzing sound is rarely wanting. It is not easy to determine what circumstances give rise

to the production of bruit in some cases and not in others; probably they are connected with the form of the tumour and the condition of its interior. An artery pretty evenly dilated will only give rise to the jogging sound already spoken of in consequence of its contact with the ribs; while one in which a distinct pouch has formed, or which is lined in its interior by uneven layers of lymph, will throw the blood into sonorous vibrations as it enters or leaves the enlarged portion.

§ 3. *Abdominal Aneurism.*—Abdominal pulsation has a very vague significance, and the student cannot be too careful to avoid the mistake of supposing it to be constantly or even frequently an evidence of aneurism. It is of common occurrence among nervous, hysterical, and dyspeptic patients, and means nothing generally, when unaccompanied by evidence of disturbed circulation derived from the existence of hypertrophy of the heart. On the other hand, simple hypertrophy very often communicates its pulsation through the diaphragm to the abdominal viscera, when there is no enlargement of the descending aorta: and in such cases if anæmia lead to the development of bellows-murmur, the mistake of supposing both pulsation and bruit to be dependent on aneurism is very likely to be made.

The decided indications of abdominal aneurism are the following:—The tumour corresponds in position and direction to the known course of the aorta or iliacs; its attachments are firm, and it is but slightly moveable; pulsation is felt in a lateral direction as the patient lies on his back, and this pulsation does not disappear on change of posture; a local bruit is audible, which cannot be heard over the præcordial region.

Any tumour lying upon arteries of the size of the aorta and iliacs must necessarily convey a sense of pulsation in an upward direction,—from the artery,

through the tumour, to the finger placed opposite to it; but it does not pulsate laterally, and when a finger is placed on each side the difference is unmistakeable. It is also to be remarked that in change of posture the altered relations of the tumour and the vessel will cause the pulsation to disappear in the one case, while it remains unaffected in the other. The arterial bruit cannot be much relied on, especially if there be concomitant anæmia.

§ 4. *Embolism.*—Marked by a sudden obstruction to the circulation in some arterial trunk and its branches, this condition is not very difficult to recognise. Its cause is usually the detachment of a mass of fibrin from the valves of the heart, and, consequently, the existence of valvular murmur is an important aid to diagnosis. In its progress through the circulation the clot passes from larger to smaller vessels, until one is reached through which its transit is arrested: the artery gets plugged up, and the flow of blood is stayed through the smaller branches. If this accident occur in the brain, it is attended by sudden hemiplegia without loss of consciousness; and if the nutrition cannot be maintained by some supplementary supply of blood, the tissue will degenerate and ultimately break up. In the limbs, the arrest of the fibrinous clot declares itself by sudden pain, coldness, and deadness of the parts beyond, where the absence of pulsation in the arteries generally points out, with sufficient distinctness, what has happened.

In speaking of the secondary deposits of pyæmia (p. 80) the contrast between embolism properly so called, and the transmission of a purulent coagulum, was pointed out both with reference to the course followed by each in its progress, and the different character of the inflammation excited at the point of arrest. The fibrinous mass causes plastic exudation around it, with obliteration of the artery; while the purulent coagulum breaks up, causing no necessary occlusion of the vessel, but exciting suppurative inflammation around.

There are, moreover, other circumstances which cause more or

less complete occlusion or obliteration of arteries. Simple arteritis will lead to thickening of the coats of the vessel and consequent narrowing of its caliber. *Thrombosis* is only a variety of this affection, in which a plug of fibrine fills the whole cavity of the vessel. But the same result follows when embolism has occurred—inflammation of the lining membrane, exudation of lymph, subsequent formation of fibrinous coagula. It seems to me highly probable that many cases of "thrombosis (local coagulation)" are really cases of unobserved "embolism (coagula conveyed from a distance)," and subsequent inflammation and adhesion.

II.—Diseases of Veins.

As in the diseases of arteries, we meet with inflammation and dilatation of the veins; but in this part of the vascular apparatus the inflammatory action is a very common and very serious disorder; the enlargement is of very secondary importance. Varicose veins, indeed, even if they were not entirely regarded as a surgical disease, could hardly claim any place in a treatise on diagnosis, and we shall therefore confine our attention to phlebitis.

The lining membrane of the veins would seem to take on inflammatory action in connexion with two very distinct conditions of the contained blood, and it cannot be doubted that the inflammation is itself of a different kind in each. In the one fibrinous clots are formed, which more or less plug up and obstruct the veins; in the other there is a tendency to the formation of pus. This subject has of late years been very closely investigated, and opinions are yet much divided on the sequence of events. With reference to diagnosis we have only to do with the conditions as seen at the bedside, and the facts elicited in the history of the case; the first is familiar to us in phlegmasia dolens, the second becomes known by the existence of a form of blood-poisoning.

§ 1. *Adhesive inflammation.* When occurring as *Phlegmasia dolens* in women after delivery it is marked

by pain and swelling of some portion of the leg, or even of the entire limb, which has a blanched, bloodless aspect; it is firm and elastic, and except in the absence of redness, much resembles the condition of erythema; it has not the hardness of erysipelas, nor the doughy feeling of anasarca. At the lower part of the limb, beyond the limits of tension and tenderness, œdema may be readily recognised by pitting on pressure; and indeed there is a certain amount of serous effusion throughout, which is caused by the obstruction offered to the return of the blood through the inflamed vein: this combination of inflammation and œdema is that which gives its peculiar features to the disease.

But it is not confined to such cases. Occurring in chlorotic and anæmic females, and occasionally in men after injury to a vein, its characters are much more local, only affecting for example the calf of the leg; and then the collateral circulation prevents the serous exudation from being so distinct. Above the seat of swelling, pain may be traced for some distance in the course of the emergent vein; and when superficial, as in the ham or the groin, a distinct hard knotted cord may be readily felt with the finger, which persists long after the acute symptoms have subsided. The seizure is always a sudden one, and it is by no means easy to account for its occurrence, still less to explain its occasional transference from one vein to another.

The vulgar name of "white leg" points to an essential character by which it is distinguished from erythema nodosum and diffuse cellular inflammation; its hardness and tension prevent the mistake of supposing it to be mere muscular rheumatism. In some instances œdema with much tension, especially when one leg only is affected, presents characters of superficial tenderness not unlike phlegmasia dolens; but it is always readily to be discriminated, by its commencing at the ankle, gradually extending upwards, and being always associated with venous congestion; while the swelling of phlebitis begins in

the fleshy part of the limb, and is never discoloured by turgid blood-vessels.

A condition precisely similar may be sometimes seen in the arm as a consequence of bloodletting when the lining membrane of the vein is irritated by the lancet, but it is usually associated with more or less of diffuse inflammation.

Phlebitis ending in occlusion of vessels will for a time interfere with the circulation through the organs in which the veins originate; but their anastomosis throughout the body is so extensive, that the obstacle is very soon overcome by the blood being conveyed through some other channel. Sometimes, however, the process is very tedious. One fatal case has come under my notice in which the inferior cava was obstructed, and nature was unable perfectly to establish the circulation through the tortuous vessels, which, however, carried a very large portion of the blood from the lower extremities into the superior cava.

§ 2. *Capillary Phlebitis.*—At post-mortem examinations some of the internal organs occasionally present appearances which have led to their being said to be the seat of capillary phlebitis. The name sufficiently indicates the nature of the lesion; an exudative inflammation attacking the interior of the capillary vessels, and plugging them up with fibrin. It seldom passes to vessels of large size. Its clinical history is unknown, and it is even difficult to conceive how, in the majority of instances, it could be discriminated by any signs during life from other inflammations of the same organs.

§ 3. *Suppurative inflammation.*—Pyæmia has been already spoken of. When occurring in a patient who had an open suppurating wound, it used to be alleged that the pus had actually entered into the open mouths of vessels: unphilosophical as this view must appear, it is evidently wholly inapplicable to those cases in which suppuration has been going on in a closed cavity, whether serous or synovial, or even in one formed by the artificial walls of an abscess; and it is equally untrue of pyæmia supervening upon diffuse cellular inflammation. In such cases we cannot doubt that the disease has commenced by inflammation of a

suppurative kind attacking the lining membrane of the vessel, whence the pus mingling with the blood is carried forward into the current of the circulation. With an open wound its advent is marked by shivering, followed by perspiration; and we may justly conclude that in the other instances the same phenomena do attend it, but here they are obscured by the previous existence of rigor, and the liability to its recurrence when suppuration has commenced: hence it is not till the prolonged sweating of pyæmia, and the secondary inflammation of internal organs have declared themselves, that we can have any certain evidence of suppurative phlebitis having taken place.

One point deserves attention, that the fact of empyema having followed pleurisy, of suppuration having occurred in synovitis, of a large suppurating abscess having formed, or of the existence of diffuse cellular inflammation, all alike point to a certain crasis in the blood which predisposes to suppurative phlebitis, and that this is only a further development of the same tendency to the transformation of effused plasma into pus.

CHAPTER XXV.

DISEASES OF THE MOUTH AND PHARYNX.

Relation to Disease of the Larynx.—§ 1. *Of the Mouth —Glossitis—Stomatitis—Ulcers and Aphthæ—Cancrum oris*—§ 2. *Of the Fauces—Quinsy—Enlarged Tonsils—Ulceration*—§ 3. *Of the Salivary Glands—Mumps.*

The diseases of the mouth and pharynx do not present many questions of interest in a diagnostic point of view. The parts are readily examined, and simple inspection is generally sufficient to determine the seat of the affection and the nature of the disease. It is not our object to give a history of pathological states; but merely to point out the distinctive signs and symptoms by which these states may be recognised.

The complaint of the patient is of soreness in the mouth or throat, and of difficulty in taking food. Conjoined with this there may or may not be symptoms referable to the entrance of the windpipe, hoarseness or aphonia, harsh sound or difficulty in breathing. The continuity of surface, as already mentioned in speaking of diseases of the respiratory organs, often leads to an extension of inflammatory action from the one set of organs to the other: and to this fact very often the affections of the pharynx owe their importance and significance.

In complex cases it is very desirable to make out, if possible, whether the difficulty in swallowing had been preceded, or accompanied from the very first, by cough or difficulty in breathing; as the disease is always of graver import, when commencing in the larynx, it produces a difficulty in swallowing, merely

as a subsidiary affection, than when it has its original seat in the pharynx. In simpler cases little is learnt from the history beyond its duration and the occurrence of a febrile attack in its commencement; points which may serve to correct a faulty diagnosis, but are rarely essential to its accuracy.

The difficulty in swallowing may be referred to a point below the inlet of the pharynx, and may be due to disease situated lower down, such as stricture of the œsophagus or pressure: but inspection of the fauces should never be omitted, as it may reveal deep-seated ulceration of the pharynx as the cause of this sensation. Thickness of speech will always result from obstruction about the fauces; but it is very different from the hoarseness or aphonia of laryngitis: the mistake is only important inasmuch as it gives rise to false alarm, and to treatment unnecessarily active and severe.

The appearances divide themselves into redness, swelling, ulceration, aphthæ, and false membrane; each of which may be recognised singly or in groups over different portions of the mouth and fauces.

§ 1. *As affecting the Mouth.*—Redness and swelling of the tongue constitute what is called glossitis; at all times a rare disease, and now almost unknown, since the absurdities of mercurial ptyalism have been abandoned. When such symptoms are present, this must not fail to be inquired into: but it is to be remembered that the quantity of mercury taken is no criterion of its effect, for, in peculiar constitutions and in certain conditions of the system, salivation is produced with great facility; and cases of spontaneous ptyalism are also on record. We find a pretty safe indication in the fetor of the breath accompanying mercurial salivation. Yet even such a point as this requires both experience and accuracy of observation. I have known the odour of sloughing ulceration mistaken for mercurial fetor.

The tongue is also often affected with simple ulceration, or covered with aphthæ. Both of these ought to be regarded as constitutional states: even when ulcera-

tion seems to be directly caused by the edge of a broken tooth, its real history is probably a condition of depraved nutrition; and this is confirmed by the occasional appearance of ulceration along the edge, when no such exciting cause is present. Aphthæ of the tongue are much more numerous than points of ulceration; they have an appearance of elevation rather than depression, look whiter and more solid, while ulcers are hollow, and filled with fluid secretion: spots of ulceration are apt to follow on aphthæ when the white crust is detached, but the general aphthous state is still sufficiently marked. Both occur much more commonly in childhood than in adult life: ulceration is evidently allied to that condition which gives rise to cutaneous disorders, especially impetigo; aphthæ, on the other hand, point more directly to disorders of the mucous membrane.

In adults ulceration of the tongue is sometimes associated with secondary syphilis; the aphthous condition is usually met with in the last stages of ulceration of the bowels, preceded by a red and glazed tongue; or in cases where diarrhœa shows itself only as one of the signs of general exhaustion. In infancy ulceration is rare, while aphthæ are constantly found in association with intestinal disorder, when it is usually known as "thrush." Some years ago the discovery of an öidium fungus in certain cases was expected to throw great light on their causation. At present there does not seem to be any difference between the two forms of disease beyond that which is shown to exist by the microscope, viz. the presence of the parasite in some cases and its absence in others.

Ulceration is at times met with on the lips and the gums, or the inside of the cheek; in which situations aphthæ are less common. On the gums it is important to distinguish simple ulceration from that which is produced by mercury; the correspondence of ulcers on the lips and cheeks would tend to prove that its origin was not of this specific character. One form

of ulceration of the cheek is seen in childhood, which in its milder form may be called sloughing ulcer, in its more severe form has obtained the name of *cancrum oris*. It is characterised by foul, unhealthy secretion, and rapid tendency to spread; in the worst cases destroying the cheek and side of the face, and, in all, producing a large unhealthy sore. There is no doubt that this, too, is constitutional.

§ 2. *At the Entrance of the Fauces.*—The morbid appearances which present themselves in this locality are those indicating inflammatory and ulcerative action: the redness and swelling occur under two very distinct forms—the acute and the chronic.

a. With some febrile disturbance, which rarely runs very high, we have general redness and swelling of all the adjacent structures; sometimes involving the root of the tongue, and not unfrequently the submaxillary region, accompanied by great difficulty of swallowing, especially when liquids are taken, nothing perhaps causing greater pain than the patient's own saliva, which for this reason he commonly spits out; the tongue is much coated, and acquires after a time a sodden buff-leather aspect. When we can get a view of the throat, its aperture seems encroached on from all sides, and the uvula is long and large; the mucous membrane is remarkably red and injected. These circumstances are quite sufficient to characterise *quinsy:* its course is usually rapid, ending in a few days by suppuration, and occasionally by resolution. The liability to its recurrence is so great, that any history of a similar attack is of value in considering the probable termination of sore-throat in any given case.

The occurrence of sore-throat is so common, while in certain circumstances it is an indication of such importance, that a few words must be said on its general bearings as a symptom of disease. In its simplest form, as a result of exposure to cold, it is the same affection which in one portion of the mucous membrane causes coryza, in another catarrh: in the pharynx slight

redness is seen on inspection, very little difficulty in swallowing is experienced, and the feeling of soreness soon subsides: there is from the first very little fever, and its severity is rather proportioned to the catarrhal symptoms than to those of sore-throat. A very different state of things exists when, instead of general irritation of the mucous membrane, inflammation attacks the larynx; the soreness of throat and difficulty of swallowing are very much more pronounced, pyrexia is distinct, and yet on inspection little redness is seen, and that redness has a livid aspect. In scarlatina, again, the fever generally runs high; but the cause of the soreness is at once discovered on inspection, in very extensive redness, spots of aphthous or ulcerated appearance, or even sloughing; in milder cases its true character is exhibited by the appearance of the cutaneous eruption; in severer cases, the existence of an epidemic coupled with the occurrence of intense fever, considerable prostration, great lividity of the throat and ulceration, without much swelling, enable us to assign to them their true character, even when redness of skin does not exist, or has receded.

From all of these quinsy is distinguished by its local nature, by the swelling which goes along with it, and by the fever being only in proportion to the local action going on. And although the name be commonly restricted to those cases in which matter forms, all are to be regarded as belonging to the same class, which present such symptoms, even if the inflammation end without suppuration.

b. In the chronic form the same structures may be implicated in a less degree, a general dusky redness prevailing with no great amount of swelling; or there may be chronic enlargement of the tonsils only, or a permanently elongated condition of the uvula, which are both by no means uncommon as sequelæ of acute attacks. Not only do these appearances differ greatly from those presented by quinsy, but the history is also totally dissimilar: if there have been some aggravation of the symptoms within a few days, to which the attention of the patient is especially directed, still the evidence of old standing disease is not wanting if the case have been properly investigated.

It can scarcely be necessary to add a caution against being deceived by the absence of any appearance of active congestion, into the belief that the sore-throat is of old standing and of small moment, when fever is present: such an error would show

entire ignorance of all right principles of diagnosis. Enlarged tonsils are very often the effect of the scrofulous taint, and occur in early life: symptoms of cough and dyspnœa, by which attention is first called to the case, may lead to a suspicion of phthisis, from the want of evidence of any other affection by which they might be accounted for, till an inspection of the throat at once explains the mystery. An elongated uvula is similarly a cause of cough; and both may tend to excite and keep up bronchial irritation to an unusual extent.

The observant practitioner will in all such cases notice peculiarities which serve to call his attention to the throat; thickness of speech, liability to sore-throat, occasional difficulty in deglutition, even when pain is not spoken of, such as fluids returning by the nose; deafness, and especially the sound of the cough which may be described as a throat cough: but whenever the symptoms are not fully explained by the stethoscope, an inspection of the throat is a wise precautionary measure before pronouncing a diagnosis.

c. Ulceration of the fauces occurs in three distinct forms: (1) As the residue of an acute attack; (2) as a primary disorder in scrofulous and cachectic states; (3) as a consequence of syphilitic poisoning. After quinsy the ulcer is generally pretty far forward, after scarlatina the tonsil is the usual site of ulceration; the scrofulous ulcer is very often in the velum, the syphilitic usually reaches towards the back of the pharynx. That resulting from an acute attack is generally superficial; the scrofulous is deep, but has flabby, perhaps jagged edges, which do not project; it often exists as a complete perforation of the velum: the syphilitic, again, is deep and rounded, with elevated serpiginous and defined borders.

So far as diagnosis is concerned, these conditions might be accurately determined by a correct history. In regard to treatment, the division of most importance is into the syphilitic and non-syphilitic ulceration. Both the other forms are, in great measure, constitutional, and must be met rather by such remedies as are suited to the general condition of the patient, than by those which have merely a local effect. In the female sex there is both greater difficulty in making out the previous existence of primary syphilis, and greater unwillingness to confess that such may have been its cause than in males; to say nothing of the reluctance felt by the medical man in even hinting such

a possibility. When the ulcer is rounded and excavated, with elevated margins, we must endeavour, by seeking in other directions for evidence of syphilitic poisoning, to obtain some indication that may aid in solving the doubt which such a condition will naturally raise in the mind.

The fauces are usually covered with false membrane in diphtheria, and this forms, as has been already explained, our chief means of diagnosis. Small white patches are sometimes seen, which may be due to a similar exudative process, though not belonging actually to diphtheria: or they may merely represent the follicles of the membrane filled with an inspissated secretion. The appearance is due to slight inflammatory action, and is very generally followed by small follicular ulcers. Aphthæ on this portion of the membrane are uncommon; when present they can scarcely be distinguished from these small ulcers.

§ 3. *Salivary Glands.*—The inflammation of the fauces sometimes extends to the submaxillary region, and subsequently excites inflammation of the salivary glands: but these glands are also liable to be primarily affected. The swelling, though accompanied with difficulty in swallowing, is chiefly external: the parotid, as the largest gland, gives the principal feature to the disease, which has hence been called parotitis —better known by its familiar epithet "mumps." It is chiefly a disease of childhood and youth, and is not characterised by much febrile disturbance: the swelling begins about the angle of the jaw and in severe cases extends quite across the front of the neck. It is sometimes of importance as causing the disfiguring abscesses which are apt to occur under the jaw in scrofulous subjects, when the surrounding textures become involved in the inflammation which primarily attacks the salivary glands. This disorder furnishes us with the most marked examples of metastasis; the testicle and the mamma being each liable to inflammation during its continuance.

Chronic enlargements of the cervical glands occur from a variety of causes in scrofulous constitutions; and these are ever apt, on the occasion of any little excitement or inflammatory action, to terminate in

abscess. In almost every case of suppurative cutaneous affection of the face or scalp, they exist in greater or less degree; but when the individual is free from constitutional taint, they are not of much moment; the cause being removed, the effect of necessity ceases in a healthy person. When these swellings attain a large size they are apt to degenerate, and in some instances appear to have become cancerous.

CHAPTER XXVI.

EXAMINATION OF THE ABDOMEN.

History of Abdominal Disease—General Symptoms—Effects upon the Health—Sensations often referred to other Regions—Actual Examination—of Outlets—of Excreta—of Abdomen itself—by Inspection—by Palpation—by Percussion.

Before entering upon the consideration of the various organs contained in the abdomen, and their special maladies, it may be well to advert to a few general facts connected with the diagnosis of diseases of nutrition. Regarding the brain as the centre of innervation, the thorax as that of the circulation, the abdomen is especially the region in which the processes of assimilation and excretion are performed. It is not meant that this definition is absolutely accurate; but as an approximation to the truth, it points out in what direction we are to look for the signs and symptoms of disease there, as connected with the ingestion of food, the preparation of proper elements for absorption, their transmission into the circulation, the rejection of useless materials, and the removal of waste or effete particles, as well as the necessity for the perfect integrity of the organs by which these processes are carried on. That the deviations from healthy action should manifest themselves in altered conditions of blood, in imperfect nourishment of tissues, and in functional disturbance of distant organs to which the blood is carried, can cause no surprise; and the difficulties of the diagnosis are only that while, on the one hand, the deteriorated condition of the blood may not be simply due to defective assimilation and excretion

by the abdominal viscera; on the other, important changes in the circulation and innervation must react upon the abdominal organs, as it is by these two great physiological functions that their integrity and power are supplied and sustained.

With reference to history, we must admit that it is often not reliable, nor perhaps very material: no one entirely escapes occasional derangement of stomach and bowels, and it is impossible to say where healthy reaction against improper food ceases, and unhealthy action begins; hence, in chronic diseases, there are always a number of antecedent phenomena, and it requires skill to select those which are really valuable as facts in the history, as well as greater impartiality than is possessed by most medical men, to avoid putting the necessary questions in such a form as to elicit the answers which we expect to receive, from the general tenor of the symptoms. In cases of acute disease there is less difficulty in obtaining correct information regarding the sensations and experiences of the patient since the severe symptoms arose; but here again we are encountered by the difficulty that the sensations in the abdomen are, at no time, very defined, and that some prior illness, the historical evidence of which is very defective, may have very considerably altered the organic constitution or functional power of the viscus.

The totality of the general symptoms marking inflammatory fever has the same value here as in other acute attacks: sometimes we derive secondary aids to diagnosis from the skin having a feeling of remarkable dryness, the pulse being small and wiry, or intermitting, &c.: the tongue always presents an unnatural appearance in derangements of digestion, and the bowels are seldom regular in their action, or the fæces healthy in character; besides this we find changes in the appetite, in the character of the urine, &c. Each of these symptoms has therefore a twofold meaning; first, as it forms one of a group which

proves whether the attack be acute and inflammatory, or chronic; second, as it stands for one of the signs of disorder in the particular organ: it is very important to bear in mind this double application, and to consider how far each is to be taken as evidence of the general condition which the whole group tends to prove, or derives its importance from mere local circumstances; *e. g.*, how far a coated tongue is to be taken as evidence of inflammatory action or of disordered bowels.

With reference to the appearance of the patient: any degree of emaciation points out a possible defect in assimilation; even if it amount to no more than that the usual degree of obesity observed at advancing periods of life is absent, we may still be not far wrong in assuming that the individual is the subject of weak or faulty digestion; but extreme emaciation is a very constant consequence of severe abdominal disease. The aspect of the face and the colour of the skin are each of them, again, valuable sources of information in specific forms of disease.

The sensations are not confined to the abdomen: very many of the functional disturbances of the brain are only to be accounted for as results of irregularity in the digestive processes; dyspnœa and palpitation, pains in the sternum or between the shoulders, that pain in the right shoulder stated to be sympathetic of disease of the liver especially, are all of them attributable in like manner to abdominal disturbance. In the abdomen itself uneasy sensations are produced by unusual enlargements of organs, by increased irritability in congestive states, or by some irritating property of the contents of the hollow viscera: as also by any unusual character of the secretions which prevents the normal changes, or excites others which are abnormal, or renders them unsuited to the membrane which they traverse in their passage.

As we proceed with the inquiry we shall find many of the symptoms thus cursorily alluded to come more distinctly forward as evidence of disease of the various

organs contained in the abdomen; but we must first consider what aid may be derived from the application of physical investigation to diagnosis.

First we obtain very certain information from the exploration of the outlets, the mouth, the rectum, and the vagina; but, with the exception of that derived from the state of the tongue, the extent of its application is extremely local and limited.

Secondly, the excretions, by their changes in appearance and characters, afford very valuable instruction. The aid of chemical analysis has been brought to bear very fully on the condition of the urine, and in fact our whole knowledge of diseases of the kidney may be said to rest upon the chemistry of the secretion; but the same progress has not yet been made in regard to the fæculent discharges, and any knowledge that has been gained is inapplicable for the purposes of diagnosis.

Thirdly, the most valuable physical signs are derived from (*a*) inspection, (*b*) palpation, (*c*) percussion, on each of which a few words must be said. Auscultation is rarely applicable: in health no regular sounds are heard, which by their irregularity might indicate disease; its employment in abdominal aneurism we have already noticed, and it is also useful in detecting the placental bruit and the pulsations of the fœtal heart in pregnancy.

a. Inspection indicates deviations from the natural contour produced by general fulness or local enlargements, serving both to suggest and to correct other modes of investigation.

We observe a uniform and equable distension in peritonitis, which contrasts alike with the shrunken and retracted condition sometimes seen in colic and during the pain accompanying the passage of gall-stones, and with the irregular forms of distension of an analogous kind which are noticed in enteritis and obstruction. Similarly the simple inspection of the abdomen points out in many cases a very marked difference between the distended peritoneal sac of ascites pushing out the ribs as well as the abdomen, and the prominent rounded belly of ovarian dropsy, which

very frequently evidently projects more on one side than the other. No less different is the aspect of general fulness in pregnancy from local swelling in disease. In the epigastrium the outline of a full stomach, and still more of an enlarged one, may be distinctly defined, and thus afford valuable assistance in the diagnosis of its actual condition. The uplifted ribs on the right side by enlarged liver, on the left by enlarged spleen, point out the direction in which investigation ought to proceed.

b. As a necessary adjunct to inspection, and as a means of ascertaining the cause of any deviation in form, palpation affords more information than any other means of exploring the abdominal cavity. It often indeed serves to detect deviations from health, which would otherwise escape observation altogether; and very many of the more important characters of disease in the abdominal viscera depend on its correct application. It embraces the sense of resistance or immobility of parts, their hardness and tenderness and their relative size; it determines the value of pulsation; it indicates fluctuation.

We might here go over almost all the important diseases of the abdomen, and point out the various lessons which palpation teaches; but they are so important, that they must be again mentioned in each particular case, and the reader is referred to the section on morbid growths for the details of the evidence which it affords in the varieties of abdominal tumour. In making the examination, the student has to consider whether what is felt as a deviation from natural form be simply an enlargement of parts or absolutely a new growth, in so far as this is indicated by outline; next its form, whether smooth and rounded, or nodulated and irregular; and then its attachments, natural and acquired.

c. Percussion may be said to be almost essential to a correct appreciation of the results of both the preceding sets of observations. It gives us the very valuable information whether any visible alteration in form be wholly caused by the presence of solid or fluid matter, or chiefly by the presence of the gaseous contents of the intestine; while the degree of dulness heard on percussion where a tumour is felt, determines

to a certain extent its depth and thickness; it is still more useful in tracing out the origin and connexion of tumours when distension prevents our being able to reach their attachments with the finger, or where they take their rise under the solid covering of the ribs. It is no less important as it aids in mapping out the extent and form of organs and tumours, as, for example, the shrunken liver, the enlarged uterus, or the distended bladder.

When considered in detail, there is no question of diagnosis which the percussion of the abdomen tends so much to elucidate as that of ascites and ovarian dropsy. Remarkable resonance forms the chief characteristic of tympanites. The absence of dulness on percussion serves to discriminate cases of chronic peritonitis without fluid, from those in which ascites is present; but the student must be reminded that when the patient is upon his back a considerable amount of fluid may accumulate in the lower and posterior parts of the cavity, without manifestly altering the resonance on percussion.

CHAPTER XXVII.

DISEASES OF THE ŒSOPHAGUS AND STOMACH.

Uncertainty of Symptoms—Sympathetic Affections of other Organs—Diagnosis a Process of Exclusion.— § 1. *The Œsophagus—Stricture—Spasm—* § 2. *Organic Lesions of the Stomach—Gastritis—Chronic Ulcer—Hæmatemesis—Perforation—Dilatation—Stricture—Scirrhus of Pylorus—* § 3. *Functional Disorders of the Stomach—Irritability—Distension—Faulty Secretion—Associations of Dyspepsia.*

No longer guided by the objective phenomena which serve for such clear indications in the affections of the mouth and pharynx, we now come to a class of diseases which for their complete investigation require, more than all others perhaps, the exercise of sound judgment and careful discrimination. Making up, as they do, the largest portion of the sum of minor ailments which medicine is called on to remedy, individually, their importance, with one or two exceptions, is not great; and consequently the opportunity of studying them in hospital practice is but small, while that little is too often neglected, from the necessity the student feels of giving his short period of study to the graver or more acute diseases presented to him.

The common disorders of the digestive canal may be said to be but three, dyspepsia, constipation, diarrhœa. And yet in each of these conditions how much remains behind—how much to guide our practice if we but knew it—how much that is as yet obscure if not quite inexplicable!

It is quite beyond the scope of our present plan to enter into all the details connected with so complex a

subject as dyspepsia; it must suffice to point out the leading features by which symptoms may be referred to the stomach, and the general characters by means of which one form may be discriminated from another, and so that class of remedies be selected which may reasonably be deemed most suitable. It will probably be advantageous to consider the more severe diseases before inquiring into those which are less important.

Much of the uncertainty that attends our knowledge of disorders of the stomach is caused by the necessity of relying so much on the sensations of the patient, since in many cases no anatomical lesions have been clearly associated with the symptoms detailed. The practitioner is consequently obliged to theorise as best he may on the *à priori* effects which he would expect from faulty secretion, deficient muscular action, and nervous irritability; and to contrast these inferences with sensations the real import of which he can only guess at, because the descriptions of the patient are generally so faulty that, in asking questions, he often suggests the very answers he receives. A dyspeptic physician is very likely thus to mislead both himself and his patient, by rendering their sensations into the language of his own ailments.

The information we derive is obtained from three distinct sources, the sympathetic affections of the head and those of the chest, and the symptoms more directly obtained from the stomach and abdomen. In the head, pain, vertigo, partial blindness, temporary derangement of function, &c. In the chest, cough, and especially palpitation, local pain, &c. For the grounds of distinction by which these functional disturbances may be recognised, reference must be made to the chapters on the diseases of those organs: here suffice it to say that the symptom generally stands alone; there is no other traceable to the same region, such as there certainly would be were the single symptoms a sign of disease there: more especially, it is transient, and generally of frequent recurrence, so that a patient perhaps complains of palpitation, when heart and pulse are alike quiet and normal at the time of examination, to be again excited by the same sympathy which had previously caused it.

But, in addition, some other symptom, or rather train of symptoms, will be found in connexion with the stomach; loss of appetite or vomiting, sense of weight, distension or pain, either referred directly to the stomach or distinctly aggravated by the opposite states of either fasting or repletion, combined generally with irregularity of the bowels, constipation, or relaxation, or an

alternation of both conditions. The seat of the pain or uneasiness varies a little within certain limits: but there will generally be no difficulty in assigning it to its proper source, by investigating the conditions and signs of disease in adjoining organs, which might by possibility give rise to similar symptoms.

In dyspepsia, as in hysteria, when the pathology of the disturbance is so little understood, the only safe principle of diagnosis is that of exclusion. The possible conditions of the brain, of the lungs, and of the heart must be duly weighed, and attention must also be paid to the condition of other abdominal viscera.

§ 1. *The Œsophagus* presents only one important form of disease—a certain degree of closure either from stricture or from spasm. The complaint of the patient is of difficulty in swallowing, a sensation of the food stopping somewhere in its course, and its being again brought up. The distinctive feature of this state is, that the return of the food is immediate; very few mouthfuls can be swallowed, perhaps no more than one, before the pain and discomfort become such that the patient cannot proceed till that has been rejected; and the difficulty is always proportioned to the solidity of the food, fluids continuing to pass when no solid matter is received into the stomach at all. The rejected matter is simply masticated food, and has no smell of acidity, nor does the patient perceive any taste of bile.

True stricture comes on very gradually and insidiously, is accompanied by marked emaciation, and generally attended with a sense of hunger which cannot be relieved in consequence of the impossibility of filling the stomach with food: if necessary, the diagnosis may be made still more clear by introducing the probang. The closure from spasm is generally more suddenly developed, and is not attended by the same constitutional effects. In stricture the condition is permanent, and the only perceptible difference in the power of swallowing is due to the quality of the food; in

spasm the difficulty varies in consequence of circumstances for the most part inappreciable. The remote cause of spasm would appear sometimes to be mere nervous irritability; in other cases it is due to local irritation of some portion of the mucous membrane, or to the pressure of a tumour on the œsophagus. In spasmodic stricture the probang can be passed, although it meets with some resistance, when any local cause of irritation exists. The circumstances here referred to apply equally to disease of the cardiac opening of the stomach, which produces an exactly analogous effect in regard to the introduction of food, as that of closure of the œsophagus, and therefore need not be considered separately.

The symptoms of stricture of the œsophagus are occasionally somewhat obscured by the existence of dilatation; the food collects in a pouch above the contraction, and may lodge in considerable quantity there before it is brought up. If the sensations of the patient can be relied on in any such case, they would point to the food never reaching the stomach. This would be further confirmed if it did not seem to have undergone stomach digestion before it was returned, when it had been retained for some time. Such cases most nearly resemble great irritability of stomach, and the diagnosis is perplexing—fortunately, they are not of frequent occurrence.

Among the characters by which we distinguish spasmodic closure from true stricture must be reckoned the existence of nervous irritability in other organs. If we learn that anything liable to irritate the membrane has been swallowed, or if we find any redness or spots of ulceration on the fauces, we suspect the co-existence of spasm with local irritation: if a tumour exist, we should have concomitant evidence of pressure on the trachea.

It further deserves notice, that occasionally ulceration of the epiglottis and imperfect closure of the entrance of the windpipe excite coughing so immediately upon the act of swallowing, that great part of each mouthful is returned before it can pass the irritable spot. Here there is not necessarily any spasm of the œsophagus; and, if along with the known existence of cough, and probably also of hoarseness or raucous breathing, the act of deglutition be watched, its cause will be at once revealed.

§ 2. *Organic Diseases of the Stomach.*—The two most important lesions found in the stomach are stric-

ture of the pylorus, which is very often cancerous, and simple ulceration of the mucous membrane. Gastritis is a disease of very rare occurrence in its acute form ; dilatation is most commonly the result of partial closure of the pylorus, but possibly also commences as an idiopathic disorder.

a. Gastritis.—The occurrence of idiopathic gastritis is so rare in clinical medicine that practically it need scarcely be referred to. It is, indeed, only known as the consequence of the ingestion of some irritant, probably of the nature of an acrid poison ; but in rare instances it has followed the taking a draught of cold water when the body was much heated by exercise, or has been caused by indigestible food.

Both the simple ulcer and the thickening of the pylorus without malignant growth have been referred by some pathologists to chronic gastritis; but they have been unable to point out any characters by which the gradual changes can be recognised, before they have reached the point at which we may attempt to make them subjects of diagnosis.

The symptoms of acute gastritis may be seen as part of more general inflammation of the peritoneum, when the stomach is intolerant of the least portion of food or drink ; these again may be closely simulated by sympathetic irritation of the stomach in inflammation of the brain.

b. Chronic Ulcer.—But little is known of this disease in its clinical history ; the symptoms seldom present any degree of uniformity in the cases which have been watched to a fatal termination ; they often fail to suggest the idea of ulceration at all, and at best the conclusion regarding its existence can only be hypothetical. Extreme pain commencing immediately after food is taken, and before digestion can possibly have begun, especially if excited by water or bland fluid, a pain which is localised in a particular spot, and always recurs at the same place, affords perhaps the most conclusive indications. Hæmate-

mesis in an otherwise healthy individual is often due to the same cause: but either may be wanting, and there is nothing to be recognised beyond ordinary dyspeptic symptoms. In some few instances the tongue looks red and raw, or spots of ulceration may be seen on it, or on the lips, indicating a generally depraved condition of the mucous membrane, one manifestation of which may be ulceration of the stomach: much more frequently, however, this state of the mouth is associated with ulceration, or irritation of the bowels.

It must not be overlooked that simple ulceration of the stomach is not a common pathological state in the bodies of persons dying of other diseases, and therefore we must not hastily predicate it of a person suffering from dyspeptic disorder. Besides the simple ulcer, with the origin of which we are unacquainted, we meet with ulceration associated with malignant disease, at parts distant from the pylorus. The same obscurity of symptoms attends this as the other forms of ulceration, unless grumous vomiting occur to point more directly to its cause, or a tumour be felt somewhere in the epigastrium; and we may then be puzzled to explain the absence of obstruction. We also find destruction of the mucous membrane, and consequent ulceration remaining as a permanent result of the corrosion and inflammation caused by irritant poisons, especially the mineral acids and alkalies. The history of recovery from the acute attack, with abiding tenderness of the stomach and inability to take food without great distress, would point out the true nature of such a case. When the ulceration heals in such cases, contraction of the stomach is apt to follow on the complete cicatrization of the wound.

c. Hæmatemesis.—In speaking of hæmatemesis, the different forms of hæmorrhage were enumerated; and it may be here added that, when preceded by local symptoms referable to the stomach, that which occurs early in life, and is abundant and more florid, is probably caused by simple ulceration; that which is seen in advanced life, and is small in quantity and grumous in appearance, is probably connected with malignant disease. If the blood have been brought up at some previous period, and the symptoms continue stationary,

we may feel considerable confidence that the disease is not cancerous.

d. Perforation.—Most commonly dependent on chronic ulcer, it sometimes also results from cancerous disease. It is only known as a pathological condition, as it is necessarily fatal in a few hours by peritonitis, if the external surface of the stomach be not glued to some other viscus. In a case in which there have been antecedent symptoms of aggravated dyspepsia, and after a fit of vomiting or any other unusual strain on the abdominal organs, peritonitis is suddenly excited with extreme collapse, we may venture to assume that perforation of the stomach has occurred. Cases are recorded, and one has fallen under my own observation, in which symptoms of cancer have partly subsided, and the vomiting has entirely ceased, in consequence of an opening having been formed into the duodenum by perforation, through which the food passed into the intestinal canal. Such a case is of course extremely obscure, though its main features are sufficiently striking.

e. Dilatation must be noticed, as it is found in cases in which, from the duration of the disease, there must always be some doubt as to the existence of organic lesion. It is probably connected, when of great extent, with some degree of obstruction to the pylorus, but may, likewise, be a consequence of habitual distension and loss of muscular power. In its minor form it gives rise to extraordinary tympanitic resonance over the whole of the lower part of the left side of the chest, as high as the axilla: in its more aggravated condition it forms a sac which almost fills the abdomen, and has even given rise to the idea that the patient was labouring under ascites. In the former case, the complaint of pain on the left side will naturally lead to percussing the chest; and the tympanitic sound extending below the edges of the ribs, as well as above, taken in conjunction with the slow progress of the ailment, can leave no doubt as to

its true character. In the latter there is generally a history of occasional vomiting, when very considerable quantities of fluid have been brought up; and if this has occurred recently, extensive tympanitic resonance will be observed extending over the epigastrium and left side generally; if for some days there has been no vomiting,we shall find distinct fulness below the epigastrium, of a rounded form, extending in the direction of the umbilicus, and passing thence towards the left hypogastric or lumbar region, superficially tympanitic, but accompanied by deep fluctuation, with gurgling noise on movement, which has been mistaken for succussion.

Latterly, a valuable aid to diagnosis has been obtained from the discovery of the microscopical *sarcina ventriculi* in the vomited matter, which always betrays a great tendency to ferment. This appears at present to indicate no more than a retardation of the food in the stomach, with a want of power completely to empty its contents; and we are consequently led to associate its existence with the probability of a condition of dilatation, especially that which acknowledges thickening of the pylorus as its cause.

f. Stricture of the Pylorus, in its earlier stage, cannot be distinguished from mere functional derangement; and when, as very commonly happens, dyspepsia is conjoined with it, the patient may appear to recover under treatment while yet the disease proceeds unchecked. The most constant symptom of stricture of the pylorus is vomiting: but, as just mentioned, the disease may run on to a fatal termination, although, during a long period, this symptom is absent in consequence of an ulcerated opening communicating with the duodenum. When accompanied by ulceration, there is usually, at some period or other, grumous vomiting, which owes its appearance to a small quantity of blood, altered by the secretion of the stomach; sometimes there is more copious hæmorrhage. The stomach may become enormously distended: indeed

dilatation probably always exists, more or less; but it is much greater in simple thickening than in scirrhus of the pylorus, when the stomach is more irritable, and its contents more speedily rejected. Several meals, or even the food of three or four days, may be, in great part, accumulated before it is rejected, or, on the other hand, the vomiting may occur after every meal: the longer interval proves the existence of dilatation, if anything like the whole quantity of food be rejected; the constant recurrence of the vomiting after food shows that there is a condition of irritability. The absence of signs of dilatation, when the vomiting occurs at longer intervals, and the return of the food after every meal, are each of them more favorable indications as being more likely to depend on dyspepsia than a certain degree of dilatation with vomiting at intervals of one or two days.

The progress of the case is usually rapid when the disease is of a malignant character; the symptoms are unrelieved, or recur with greater severity; the aspect of the patient becomes wan and sallow, with increasing emaciation; there is often lowness of spirits and despondency; and sooner or later, in most cases, the presence of a hard mass in the region of the epigastrium, towards the right side, leaves no doubt of the presence of scirrhus.

Though analogous in the fact of partial closure of the pylorus, the two diseases run a very different course; the difference being caused chiefly by two circumstances: the one, that along with the stricture there is a morbid condition of the mucous membrane in cancer, giving rise to irritability and more frequent evacuation, ulceration, grumous vomiting, &c.; the other, that when the disease is constitutional, the altered condition of blood, which attends its progress, necessarily renders it more rapidly fatal than mere thickening of the pylorus. The non-malignant form of stricture may be recognised by its frequent occurrence among spirit drinkers; by the accompanying dilatation, the absence of hæmorrhage, the circumstance that no tumour can be felt, and most especially by its slow progress: if the symptoms have existed for years, or even for many months, without

cachexia being established, the probabilities are greatly against cancer.

The occurrence of hæmorrhage in any large quantity in cancerous disease is the exception. At first, the blood only appears as small black or brownish flakes in the vomit, but, at a later period, assumes the character of what is called coffee-ground vomiting, the amount of blood in which may be considerable; distinct hæmorrhage is more probably the result of simple ulcer.

We look with great distrust upon symptoms of uneasiness after food, eructations, occasional vomiting, and depression occurring in persons of temperate habits, unrelieved by treatment, or progressively getting worse, and attended with any degree of emaciation and sallowness.

It does not seem possible generally to distinguish different forms of cancerous growth during life. It is only known that medullary cancer grows much more rapidly; that colloid, even if present in the stomach, is more abundant in its usual site, the mesentery; and that scirrhus is commonly the most painful of the three. Scirrhus is the most local; encephaloid and colloid spread more rapidly, the former usually co-existing in the liver; in cases in which scirrhus has spread, it has also been to the liver.

While we are taught much by the aspect of the patient, we learn little from the state of the pulse, tongue, bowels, &c.: there is generally constipation, in consequence of the small quantity of food which passes downward, and the tongue may be coated at the back; the pulse is for the most part weak, but seldom accelerated.

§ 3. *Functional Disorders of the Stomach.*—Dyspepsia proper, accompanied by its multifarious symptoms, can only be safely predicated when, after careful weighing of other possible states of system, we find a remaining amount of disturbance which we have failed to account for in any other way. And hence it is a rational conclusion that dyspepsia does coexist with different states which, while sufficient to account for some of the symptoms, leave others unexplained. It stands in close relation to most diseases of the abdominal viscera, either as their cause or their effect; and it may be associated with almost every chronic ailment, so as to make it difficult to determine, when we are satisfied of the coexistence, what their exact

relations are to one another. Such, for example, is its combination with anæmia and hysteria; in both quite as frequently the cause as the consequence of the general state; in both alike demanding distinct recognition and separate treatment.

It is very important to remember, with reference to the stomach and its disorders, that almost every patient, no matter how ignorant or ill-informed, frames to himself, according to his amount of knowledge or prejudice, a theory of his ailments: one attributes to indigestion all his sufferings, another constantly alleges that he is bilious, a third is not satisfied unless he is well purged, and a fourth, who relishes the pleasures of the table, is slow to admit that his stomach is over-taxed or unequal to the demands made upon it. No cause more frequently leads to wrong diagnosis than forgetting to separate between the true narration of symptoms and sensations, which are our only guide in this class of disorders, and the construction of a theory which no patient is able to form correctly in his own case. Social progress would stand still for ever if nothing were to pass current but bare description; yet, in the history of a case, everything else should be rigidly excluded; and it is better to trace out the disease as we do in childhood, by our unaided observation, than to admit into our conception the statement of the patient that he is "bilious." No more expressive term exists for a certain condition of body than this; it is as true, strictly and legitimately true, as "fever," "rheumatism," &c.: but it theorizes—it is a compendious expression of certain symptoms; and it is the duty of the physician, not of the patient, to determine whether this implied theory properly express the category of symptoms or not. In the present day, no organ is more hardly dealt with than the stomach; whether we consider the starvation and improper food of the poor, the irregular hours of the man of business, the pampering and overfeeding of the rich, or the still more pernicious disregard of the proper evacuation of the effete contents of the alimentary canal, which false delicacy, sedentary habits, and sheer inattention produce. The habits of the patient therefore afford a further help to diagnosis, as one of the elements in the history of the case.

The symptoms of dyspepsia may be referred to three distinct heads—pain, or nervous irritation, impaired muscular action, and faulty secretion. In their analysis, it is to be remembered that while pain is an evidence of irritability, and thus perhaps simply of

faulty innervation, it may also depend on the condition of the mucous membrane, and the character of its secretion, or on over-distension and spasmodic contraction of the muscular fibre. Similarly, though distension be essentially the fault of the muscular structure, which has become relaxed, weak, and ineffective, yet this very weakness may be a symptom of nervous debility, or may be simply caused by distension with gas, generated because the secretion is imperfect. In the same way, faulty secretion may be directly traceable to the condition of the mucous layer and follicles, but may also result from imperfect nervous or vascular action, or follow on the detention of food in the viscus from deficient muscular power. Nothing, indeed, can be more erroneous than the limitation of each of these effects to that particular structure which is directly concerned in their production. But we are not on this account to disregard the information thus conveyed; on the contrary, pretty nearly all the complex cases that come before us may be resolved into these three simpler elements—irritability, distension, and faulty secretion: caution is chiefly to be exercised in theorising that this or that particular function is the one primarily deranged.

a. Irritability presents a great variety of phases, which receive from patients as many different appellations. It is often manifested in extreme intolerance of food; beginning by slow degrees, it at length becomes such that every meal is rejected, and sometimes the quantity of food must be reduced to a mere spoonful, and its quality be the very simplest and blandest possible, to prevent its rejection. Such a form of irritability may be produced by ulceration, but is certainly not limited to it. Pain, referred so often by the hysterical to the left side, or described as passing through the chest and being felt between the shoulders, or perceived in the centre of the sternum as well as over the epigastric region; a feeling of emptiness or craving, which, relieved for a short time by food, returns in

its full extent before the stomach can by possibility be emptied; sensations of fulness, weight, dragging, &c.; gnawing, cutting, tearing pains, &c.,—must all be regarded as evidences of irritability. It is manifestly impossible to assign to all of these their true pathological import, or even to guess why they are so differently described; but it is of service to consider their relation to the ingestion of food, as tending to show in some measure their exciting cause. Thus, if the disagreeable or painful sensation be observed shortly after food is taken,—if some kinds of food produce it at once, and others not at all, especially if bland fluids do not excite pain, as they generally do in ulceration, we should have strong reason for believing that the symptom was chiefly nervous, that the irritability of the stomach was the primary affection. Whereas, if a longer interval must elapse before the sensation be aroused, if it be accompanied by acidity or eructation, or if it exist when the stomach is empty, being rather relieved by the presence of food, we shall probably be right in regarding it as symptomatic of faulty secretion. If a sense of weight or dragging be the form assumed, and it be experienced at a still later period, we may assume that there is some delay in the process of emptying the stomach, either as a consequence of torpidity of muscle, or more commonly as the effect of overdistension: still more, if the pain be of a spasmodic character, and very late in its occurrence, it may be referred to the ineffective contractions of the muscular fibre distended beyond its proper limits, and vainly attempting to expel crude and half-digested aliments to which the pylorus refuses egress.

b. Distension.—Dilatation, in its minor and less important signification—more properly distension or relaxation of muscle, indicated by the pain just referred to, and by the existence of unusual resonance—is more likely to be primary in persons of lax, flabby muscular structure, than in those who have firm resilient flesh. Such a condition is more probable if there be coexist-

ing constipation and want of intestinal peristaltic action, if the appetite be unaffected and the first stage of digestion easy; but it can scarcely persist without reacting on the mucous menbrane, through the delay of the food in the stomach: and hence it becomes complicated by evidence of faulty secretion. On the other hand, one of the most constant effects of imperfect digestion is the generation of flatulence, which must necessarily distend the stomach till it find an outlet; crude and ill-digested food must also necessarily be delayed in passing the pylorus, whether the muscular action be at fault or not; and it is therefore by no means easy to say how much is due to the imperfection of the muscle, and how much to the defect of the secretions. More easily recognised are those cases in which the distension, the discomfort, and the delay of the digestive process are all of them caused by overloading the stomach, which sooner or later rebels against the habitual overtaxing of its powers. It may still be capable of disposing readily of a moderate meal, but it refuses to propel a large mass of heterogeneous contents: in such cases, probably the actual overstretching of the fibre is a more efficient cause of the distension than the character or quantity of the secretion.

c. Faulty Secretion.—Manifestly combined with both the preceding conditions, this cause of dyspepsia is perhaps the most frequent and the most difficult to manage. It is related to various conditions of health, acting either through the vascular or nervous system, but seems to be also primary and independent of them.

(1.) Hyperæmia.—Passing by the form of acute gastritis, we come to the congestion characterising a fit of indigestion brought on by excess. Here the history of the case, if correctly given, leads at once to the true diagnosis: the attack is recent; all the symptoms severe; the tongue is generally foul and flabby; the bowels confined, or a good deal relaxed, but without febrile symptoms. A timely emetic, imitating the

relief which nature sometimes provides, might have prevented the subsequent congestion ; but when once excited, the irritation may not subside after the ingesta have passed into the bowels ; vomiting may come too late, and persist even for days ; the bowels, if unloaded by an aperient, become again confined, or are affected with diarrhœa. Congestion of the liver generally plays a prominent part in such conditions ; but congestion of the stomach is equally evident as the direct effect of a debauch ; and there is not only perverted secretion, but irritability dependent on the sort of erythematous condition of the mucous membrane which the very idea of congestion implies. Similar results are, no doubt, also traceable when the congestion of the stomach is of that passive form which, in its very marked examples, is accompanied by hæmatemesis, and is produced by obstructed hepatic circulation. General plethora evidently cannot be a cause of dyspepsia, because any interference with the action of the stomach would immediately reduce the quantity of material converted into blood, and of necessity diminish the plethora ; but probably a fit of indigestion would be more severe in the plethoric individual than in another.

(2.) Anæmia, on the other hand, is unknown as a local affection, but, as a general condition of system, evidently exercises great influence over the secretion of the stomach. When, therefore, we find dyspeptic symptoms associated with the aspect of thin and poor blood, the only question can be whether they are wholly dependent upon the anæmia, or have any separate cause ; and this is best known by ascertaining which class of symptoms, the dyspeptic or the anæmic, had the priority in commencement. And if the complex disorder began by the imperfect action of the stomach withholding the due supply of pabulum to the blood, we must still admit that the consequent anæmia will aggravate the dyspeptic symptoms ; just as we know that imperfect digestion, though caused by

anæmia, necessarily tends to increase that state. It is probably in this way that bad food and chronic wasting diseases excite, as they occasionally do, persisting forms of dyspepsia, as they necessarily deteriorate the quality of the blood: bad food does not primarily excite permanent disorder.

(3.) In some forms of disease a specific blood-crasis seems to exist, which has a close relation to the secretion of the stomach. To this class we might legitimately refer the inaptitude for digestion produced by inflammatory and febrile diseases; but it must rather be restricted to indigestion arising in the gouty diathesis, the dyspepsia of drunkards, &c. In other cases the dyspepsia is more distinctly associated with disturbance of brain and mental excitement; when it becomes difficult to say whether the effect be produced through the medium of the blood or of the nerves.

(4.) There yet remain very numerous instances of dyspepsia, in which faulty secretion seems to be the principal cause of the defect in the digestive power, where we cannot trace it back to any antecedent circumstances, and cannot explain the agency by which it has been established. Among them we include cases characterized by heartburn, pyrosis, flatulence, nausea, loathing of food, vomiting, disagreeable tastes in the mouth, &c., which occasionally occur in persons in comparative health, and are found to yield to the simplest treatment, but which, in their habitual persistence, become so rebellious and intractable.

Under any of these circumstances the secretion of the stomach may be very variously modified. Thus, it may be deficient in the special principle (pepsine), which acts as a solvent of the albuminous substances; all animal food whatever will be found by the patient difficult of digestion; and as a consequence of its imperfect solution, fetid gases will be evolved, and unaltered fibres will be seen in the evacuations: or, again, the secretion may be of such a character as to set up a

process of fermentation rather than digestion, with the development of acid and flatus, which is very constantly associated with diarrhœa: or there may be excessive secretion, of feeble power, rising up and filling the mouth with tasteless fluid when the stomach is empty. The first of these is the condition most frequently resulting from strain of mind; the second is the common precursor of gout; the third is the usual result of bad and insufficient nutriment: but each of them may be met with casually, or even persisting for a considerable period, without any such definite causes.

This short sketch would be incomplete if no allusion were made to the spasmodic pain which attacks persons subject to gouty dyspepsia, and commonly known as gout in the stomach. Its place would seem to be in that class of cases in which irritability is a prominent symptom, as it is especially marked by violent pain in the epigastric region; it is generally, however, preceded by symptoms of faulty secretion, and passes off with a discharge of flatus from the stomach.

It has been already stated that dyspepsia is frequently associated with other chronic diseases: we especially look for anæmia and emaciation in its slighter forms; and in females for hysteria and functional derangements of the uterine organs. Among its causes we must not forget the possible effect of deleterious agents; not only those which are distinctly recognised as poisons, but those also which bear the name of luxuries, such as tobacco and fermented liquors. Tubercular diseases may give rise to symptoms of dyspepsia, and they are occasionally also first betrayed by them. The condition of the liver and the functions of the brain must be each inquired into, both as causes and complications of disordered stomach. Changes in the character of the urine will be found sometimes dependent solely on the malassimilation of nutriment; and sometimes, while affording evidence of disorders especially referable to the kidney, are still very much influenced by the condition of the digestion. Skin diseases, in like manner, have a very close relation to dyspepsia.

CHAPTER XXVIII.

DISEASES OF THE INTESTINAL CANAL.

Primary Division—General Relations of Inflammation.

Div. I.—*Diseases attended with Constipation.*—§ 1, *Constipation — Colic* — § 2, *Enteritis — Typhlitis* — § 3, *Ileus*—§ 4, *Obstruction—Hernia.*

Div. II.—*Diseases attended with Relaxation.*—§ 1, *Diarrhœa*—§ 2, *Dysentery*—§ 3, *Ulceration—Melæna—Perforation.*

Div. III.—*Diseases attended with altered Secretion.*—§ 1, *Disordered Bowels*—§ 2, *Tympanites.*

Div. IV.—*Diseases of Rectum and Anus.*

All diseases of the intestinal canal have one feature in common, that they are accompanied either by constipation or relaxation, or by an alternation of these two states. This is detailed as part of the necessary history of the case; and it again comes before us in the inquiry which we have supposed it necessary to make into the evidences of the general state of the patient before commencing the investigation of individual organs: it will therefore, perhaps, best serve our present purpose to adopt this common feature as the basis of classification, and so follow out the symptoms which are available in discriminating the various conditions which these circumstances serve primarily to indicate.

It is necessary, before proceeding further, to make a few remarks on the subject of inflammation, to point out more clearly its relation to the action of the bowels. Idiopathic gastritis is almost unknown: peritonitis, as we shall see, is more common: inflammation of the stomach is sometimes conjoined with that of

the peritoneum; inflammation of the bowels is so more frequently, in consequence of their greater extent of surface.

Enteritis, as a primary affection, holds a position in regard to frequency between gastritis and peritonitis; but even when the inflammation seems to have begun in the bowel, it is almost always found to have affected the peritoneum; so that in general it is not easy to say which disease has been first in the order of succession. The cases of enteritis without peritoneal inflammation are among the curiosities of medical literature; and possibly the highly susceptible membrane of the peritoneum is the first to take on inflammatory action, whether the irritation have been conveyed to it from within or from without. The disease known as enteritis consists of inflammation involving *all* the structures and especially the muscular coat of the canal; and by common consent inflammation of the mucous membrane alone is not meant, when the name enteritis is employed. A knowledge of these relations is of great importance in symptomatology; because, first, the inflammation involving the peritoneum produces great tenderness on pressure; secondly, the inflammation of muscle produces paralysis, with interruption of peristaltic action and constipation; and thirdly, the inflammation of other mucous membranes teaches us that the primary effect may be suppressed secretion, but that this is soon replaced by increased and altered secretion, perhaps by effusion of blood—active hæmorrhage.

Div. I.—Diseases attended with Constipation.

§ 1. *Constipation.*—Let us assume that the other indications of the general state of health do not point to any febrile disorder. The tongue, indeed, may be coated, and the appetite bad; but thirst is not urgent, the skin has no unnatural heat, and the pulse is quiet: any speciality of the urine must be considered separately. In this simple form the patient merely seeks a remedy for constipation of the bowels. We inquire into the condition of the stomach, and most commonly find some indication of dyspepsia; and it may be a question which of the two is primary: we seek also for evidence of biliary derangement, knowing this secretion to be of paramount importance in aiding the expulsion of the fæces.

In such a case we derive much information from its

history: the progress of the disorder has been gradual; the patient has had costive bowels for years probably before he has consulted any one on the subject; he has taken aperients, and then again has tried to do without. His habits next serve to point out the nature of the evil: he has perhaps led a sedentary or irregular life; and in addition to this, his food may have been either luxurious and over-stimulant, inducing plethora; or it may have been the reverse, and he has become anæmic. Patients, too, as they consider themselves competent to manage their own bowels, have something else to complain of when they seek advice—headache, occasional colic, or congestion of the lower abdominal viscera, resulting in hæmorrhoids, or in uterine hæmorrhage or leucorrhœa.

The two principal causes of constipation seem to be deficient secretion and want of peristaltic action: plethora rather points to the former, general anæmia or atony to the latter. But in the end, as accumulation of fæculent matter proceeds, the muscular fibres are necessarily stretched, and become incapable of contracting efficiently; the fluid portion is absorbed, and masses of hard impacted fæces remain in the bowels. Just as in other involuntary muscles, the constant result of over-tension and imperfect power, is spasmodic and irregular action—colic, of which a very important variety is that due to the effect of lead poisoning: the symptom is the same, whether there be lead in the system or not; but the blue line indicating its presence ought in such circumstances always to be sought for. A very important result of this imperfect action is that the fæces get impacted and indurated in the colon and rectum: this is followed by thin watery secretions, which find their way past the hardened mass, and lead the patient to imagine that he is suffering from diarrhœa, and to use astringents, which increase the disorder. The abdomen becomes tumid; dull percussion sound on the left side and over the brim of the pelvis indicates the

existence of accumulation; and when purgatives fail to act, it may be suspected that there is some physical impediment to its egress, and the case puts on the characters of obstruction.

§ 2. *Enteritis.*—This disease is only distinguished from other forms of obstruction by the presence of fever; it is accompanied by inaction of the bowels after the administration of purgative medicine, pain of every variety of intensity, and vomiting, which is apt to become fæculent or stercoraceous.

A broad line of distinction can be traced between cases commencing suddenly without previous constipation, and those in which the attack is a mere aggravation of a pre-existing state. Colic has been mentioned as one of the results of habitual costiveness; but it is still more common when constipation is caused by some error in diet, or by some hardened mass unexpectedly interrupting the progress of the excrementitious matters, when the bowels had been acting regularly; it occurs as a spasmodic and grinding or twisting pain, which is not at first accompanied by tenderness, but, on the contrary, is relieved by pressure. This circumstance serves at once to distinguish it from that of peritoneal inflammation: it is more liable to be confounded with the pain caused by the passage of a gall-stone. Drastic purgatives are very apt in such circumstances to increase the evils they are intended to relieve. If the cause of the affection be recognised, judicious treatment may still avail to arrest the disease. But if the remedies fail, the pain is soon accompanied by tenderness, the spasmodic action ceases, and is followed by paralysis, in consequence of inflammation; febrile symptoms are developed, medicines are rejected by vomiting, and no action of the bowel takes place; the pain is more permanent, its exacerbations and intermissions are less marked; in short, enteritis has fairly set in, and there is more or less accompanying peritonitis; in the worst

cases the abdomen becomes tense and tympanitic, the pulse small and thready, vomiting, which is partly stercoraceous, is followed by hiccup, and collapse, and death.

These symptoms, however, may be developed without the previous existence of anything resembling colic; tenderness may exist from the first, and the inflammation may have arisen without the intervention of any obstructing cause; and then it has probably travelled from without, beginning in partial, local peritonitis, and obstruction only occurring as a consequence of the inflammation of the bowel. In both classes the existence of the inflammation is shown by the permanence of pain, the presence of tenderness, and the febrile action; the question as to what was the exciting cause is one of minor importance. Indeed, any history which seems to point to obstruction, and the prominent symptom of inaction of the bowels, are both very apt to lead us away from the important fact of enteritis being really present.

The term *typhlitis* is applied to inflammation limited to the cæcum, a purely local affection which can scarcely be confounded with any other form of inflammation. Dependent on some accumulation which has not improbably penetrated, and irritated the vermiform appendix; it is indicated by pain in the right iliac fossa, which is more or less acute according to the extent to which the peritoneum is involved. The peritonitis excited is usually like the primary affection, very local in character and not unfrequently terminates in abscess. Typhlitis is most likely to be confounded with enteric fever, the situation of the bowel affection being the same in each form of disease. The great difference between them consists in the presence of constant diarrhœa, with peculiar ochry stools in fever, and a tendency to constipation in typhlitis, which may perhaps alternate with occasional looseness of the bowels, but forms a striking contrast to the ordinary condition of relaxation seen in fever.

§ 3. *Ileus and Intus-susception.*—Physicians of the largest experience and most comprehensive judgment have failed to deduce from the symptoms, indications which can be regarded wholly trustworthy as to the

nature of this disease. Its commencement is very analogous to the first form of enteritis just spoken of: the colic is more severe; there is usually complete remission of pain for a while, which again returns with increased violence. In contrast to simple colic, the spasm is more regular in its occurrence, there is less sensation of twisting and grinding, and more of a continued paroxysm, caused by the violent and energetic action of the muscular fibre to overcome the obstruction: the large coils of intestine may sometimes be felt rolling and turning over in the abdomen during its continuance. In the progress of the disease when the bowel is inverted, paralysis of fibre induced by inflammation, acts as a further impediment, but primarily the obstacle is mechanical.

As in enteritis, the cause of its occurrence may be the presence of some solid mass in the intestine: the symptoms of the two affections are therefore often intermingled together, and the success of treatment may depend on a discrimination of their coexistence. In the first-mentioned form of enteritis, for example, a very limited amount of inflammation in the immediate proximity of the solid substance may give rise to manifest and characteristic evidence of some form of obstruction; and yet, on the fact of the practitioner recognising and obviating the slighter and less-marked condition of local inflammation, may entirely rest the safety of his patient.

Closely resembling intus-susception are those cases in which the bowel is enclosed in a band of adhesion when at first there is no inflammation: the history may be simply that the bowels have not acted, that medicine has been taken without effect, that sickness has come on, and finally, that paroxysms of pain have recurred at intervals: or the order may be inverted, violent pain having first occurred, accompanied by vomiting from the commencement; and it is only discovered at a later period that the bowels will not act; or, again, the vomiting may be absent in either case

for a considerable period. In all of them there is ultimately more or less of inflammation set up; and if the patient be not seen till then, hope may for a short time linger over the possibility of relief following on the use of antiphlogistic measures, which is only dissipated by the utter futility of the most judicious treatment.

§ 4. *Obstruction.*—The rules of diagnosis are so obscure, that a large number of cases must be classed under this head, of which the only fact known is that the bowels obstinately refuse to act: but as in enteritis we found that very generally the attack commenced either with colic or tenderness on pressure, in ileus that the stoppage occurred suddenly without previous derangement of bowels, so we find in this class that long-continued constipation has usually preceded the obstruction. Here we have clearly two possible states—a gradually diminishing calibre of the bowel, or a condition of extreme distension from long-standing accumulation and impaction, which are both quite different from those already referred to; but the mere fact of habitual constipation, although of great importance, does not necessarily indicate either condition; the habit may exist without the evil effect. In cases of obstruction we have the additional fact of the bowels being loaded with feculent matter: when no organic disease exists, this always occupies the lower end of the colon: when pressure from without is the cause of obstruction, the accumulation will also generally be found where the bowel is fixed near its outlet: stricture usually affects the rectum or the lower part of the colon. In some rare cases it happens that the narrowed portion is found high up, and then large accumulation cannot take place: in such instances there is a great resemblance to ileus.

In cases of obstruction we derive much help from physical diagnosis. Having first learned the fact of constipation, we endeavour, by palpation, to discover

the position of the distended bowel; the pelvis must be explored in search of a tumour which might press on the canal from without; and, lastly, the rectum itself must be examined to determine the presence of impacted fæces, or discover the position of stricture by digital examination, and the introduction of instruments. This exploration ought never to be omitted when the bowels are obstructed; and much light is always to be obtained from the simple, and it may be said necessary employment of injections. When carefully performed, the amount of liquid that can be slowly injected into the canal may be said to be a direct measure of the extent of permeable intestine situated below the obstruction. In all cases in which it is towards the lower part of the bowels, vomiting, if prolonged or repeated, is apt to present a stercoraceous character.

It seems scarcely necessary to insist on the possibility of obstruction being due to *hernia*. This would naturally form the first inquiry in any case of sudden arrest of bowel action. Still it is not only possible that some preconceived idea of the cause of the obstruction may lead to its being overlooked, but there are also cases in which the rupture is very difficult of detection. In some of the more obscure forms, indeed, a knowledge of their existence during life is impossible: this is especially true of *diaphragmatic hernia; obturator* and *ischiatic hernia* are more liable to be overlooked, but they, too, may occasionally be beyond reach of discovery. *Perineal* and *pudendal* hernia are, perhaps, never the cause of obstruction of the bowels, and when sought for are easily detected, but from their comparative rarity are often forgotten.

One or two points may aid in determining the character and position of the obstruction, to which short reference must be made. If the point at which pain is felt be also that at which we can trace the transition from a distended to a collapsed and empty state of the canal, we may feel pretty sure that this is the point of obstruction: the condition of the colon, which

through its whole extent is comparatively fixed and immovable, especially demands examination with this view. Both symptoms, however, are apt to be indefinite—the pain extending over the whole abdomen—the relation of the distended portion to the rest of the intestine not to be recognised; and this is especially true when the small intestine is affected.

A less trustworthy sign is derived from the urinary secretion, which is generally scanty when the obstruction is high up, and more abundant when it is situated lower down. This is very liable to be interfered with by other circumstances, such as the existence of fever. Still less reliance is to be placed on the allegation that vomiting comes on earlier, and is more distressing when the obstruction is high up.

Of the cases of sudden stoppage, it may be said in general terms, that about one third are due to intus-susception, one third to some form of internal strangulation, and scarcely one third to all other causes together. We incline to believe the cause of the obstruction to be invagination, if a little bloody mucus be passed by stool, if a sudden pain were felt before vomiting had been experienced, and when constipation had not been known to exist; we more readily assume that the gut is strangulated by a band of adhesion, if we can make out from the patient's history that he has had an attack of abdominal inflammation at any previous period; in their subsequent progress the former is more frequently associated with inflammatory fever than the latter.

By far the greater number of cases of gradual obstruction depend on stricture, too frequently cancerous: it is scarcely necessary to allude to an appearance occasionally observed, that the fæces have been for some time previously of small diameter, because in such a case the constriction of the bowel must be quite within the reach of physical examination. But, it may be observed, that a previous history of long-continued diarrhœa, with unhealthy discharges of pus, blood, &c., may suggest the probability of contraction as a sequence of the ulcerative process at a higher portion of the canal.

Enteritis has to be distinguished from peritonitis, with which in some cases it stands in very close relation: it is very apt to be simulated by calculus or gouty nephralgia. The other forms of obstructive disease are more nearly allied to hernia: it is, indeed, sometimes an internal hernia, which is only irremediable in so far as it is removed from manual interference: great blame is justly due to the practitioner who omits examining every part where a hernia may possibly come within reach of relief in a case of insuperable constipation.

Division II.—Diseases attended with Relaxation.

§ 1. *Diarrhœa.*—We now come to those conditions of the intestinal canal which are marked by excessive action of the bowels: they are chiefly dependent on the state of the mucous membrane, including in that term the whole secreting apparatus. The disorders of this class may be formed into several distinct groups, from the consideration of their history and attendant phenomena.

a. With no heat of skin or quickness of pulse, we have (1) a history of previous constipation, when slight watery discharges are taking place, in consequence of the irritation of the mucous membrane by the accumulation: (2) the ingestion of some unhealthy aliment, or of a larger quantity of food than the stomach can digest, which passes into the intestine in a crude condition. In both of these cases there is usually pain and a foul tongue; the action is a preservative one, by which nature seeks to expel the offending material, and, if opposed, dangerous inflammation and obstruction may result. (3) This reaction may have served to remove the cause of disturbance, and yet the diarrhœa may persist merely as an excessive secretion set up by the irritation and congestion of the membrane. (4) It may result from exposure to changes of temperature, producing states analogous to the more common effects of cold on the bronchial membrane. Of this kind seems to be that form of diarrhœa which is often prevalent in summer when the tongue is coated, the stools dark, and there are griping pains in the abdomen. (5) The genuine summer cholera, on the other hand, is marked by copious, pale, watery evacuations, with a clean tongue, a cold skin, and no abdominal pain; it is exactly like the choleraic diarrhœa, which attends the spread of epidemic cholera. (6) There is also a very well-

marked form dependent on disorder of the liver and excessive secretion of bile, to which the name of bilious diarrhœa is not inappropriate; it is most commonly, however, associated with excesses in eating and drinking, and is consequently allied with the class of cases caused by indigestion.

b. When general symptoms are present they belong, in a large number of cases, to some other disease, of which diarrhœa is also only symptomatic.

To determine this point we must refer to the modes of investigation and sources of information enumerated in treating of these diseases themselves; as the most common we may mention continued fever with bowel-symptoms, tubercular diseases, and albuminuria. In the first two it is always accompanied by ulceration, in the latter the secretion may be vicarious of that of the kidney, or due to disease of bowel.

c. Diarrhœa, with febrile symptoms which are not referable to any other disease, is more frequently seen in this country in childhood than in adult life. Inflammation of the mucous membrane, with a tendency to ulceration, is the pathological condition which, in its fullest development, is only met with in dysentery. The tongue is coated, the pulse quick, the skin hot, with much thirst; the bowels continue for some days to act very many times, and the stools soon become slimy and mixed with blood: among children there is very often prolapsus ani; then follow the appearances of putrid flesh and fetid puriform matter, corresponding to the analogous appearances in true dysentery. But the symptoms may stop short of this extreme condition, and then it is often hard to distinguish them from those of dental irritation; there is nothing indeed to show that the latter may not pass into inflammation, and in infantile life it is a very frequent source of febrile diarrhœa.

Again, we more frequently see the condition of membrane which is characterised by aphthæ of the mouth and fauces in childhood, than we do in adult

life, and among them the occasional presence of a similar condition at the anus, affords still further proof that the malady is not a local one.

d. Chronic diarrhœa is very often dependent on ulceration; but we have abundant proof that it also sometimes persists for long periods without any indication of such a condition from the character of the stools. Many persons are subject to it from the most trivial causes. In childhood the complaint is often very obstinate, and yet ultimately complete recovery proves that no structural change has occurred: in other instances it depends on disease of the mesenteric glands, and is only one form of its association with tubercles in early life.

§ 2. *Dysentery.*—This disease, which was at one time much more common in our own country than it now is, still continues to be one of the most serious affections of tropical climates. It presents to us the most severe form of inflammation of the mucous membrane, tending to very extensive ulceration.

In its pathological relations it is probably allied to acute diarrhœa with great irritation: the instances are perhaps more numerous than we are aware of in which the local action predominates, and the fever is only symptomatic, though they be at present regarded as fever with bowel complication, except when symptoms arise which are more distinctly dysenteric. Such appearances can only be seen when the large intestine is the principal site of the diseased action, because, if it were confined to the upper part of the bowel while the colon remained healthy, the secretions would be so changed in their passage that the peculiar characters could not be observed; and indeed this is in part true of dysentery itself as affecting different portions of the colon. On the other hand, there are good reasons for regarding true dysentery as something quite distinct from affections of the small intestine in which febrile symptoms are present; and perhaps as we have ceased to regard the ulceration of the ileum as anything more than a symptom of common bowel-fever, we ought to regard the ulceration of the colon only as a symptom of another "fever;" at all events, we find that, as in the one the ulceration seldom affects the colon, and then only in its upper end, so in the other, the ulceration seldom extends any distance from the colon into the small intestine.

The chief symptom relied on in dysentery is the passing of bloody mucus with hardened scybalous masses of fæculent matter; but this is really the evidence of a mild attack, in which the lower part of the colon is alone involved. In the severer cases diarrhœa first comes on, emptying the whole of the large intestine; and only subsequently do bloody and mucous discharges, with tenesmus, occur. Its commencement is generally sudden, with pain in the abdomen, in the hypogastrium, and perhaps especially on the left side: if the lower end of the colon only suffer, the fæces from above are passed as scybala; glairy bloody mucus is discharged, which in a short time becomes purulent and offensive, and as ulceration proceeds a greater amount of hæmorrhage generally continues: tenesmus is always a distressing symptom, and is sometimes conjoined with irritation of the bladder and the urethra. When the pyrexia is not very evident, it is of importance to ascertain that the blood does not come from the rectum, where local disease may exist, either in the form of hæmorrhoids, or as cancerous or fungoid growth.

Chronic dysentery might almost be classed under ulceration, for under no other circumstance does ulceration proceed so far; but we have reason to regard it as a specific disease, as it generally follows on an acute attack: the patient has probably been in a tropical climate, the bowels have since been always irregular, the motions unhealthy, commonly mingled with pus or muco-purulent secretion, and often with blood. The disease, however, remains quiescent until something arouses it to fresh activity; some disorder of stomach, or exposure to cold or wet brings on a partially acute attack: or else, from the extensive disorganization which has occurred, enormous accumulations arise in the colon, which it is unable to propel: these cannot be effectually got rid of by the aid of remedies; low, wasting, suppurative fever supervenes, with gradual exhaustion, or the diseased structure is

attacked by low inflammation, terminating in a condition allied to sphacelus.

§ 3. *Ulceration.*—Little can be said to elucidate this form of bowel-ailment. We know it to exist in phthisis, and in continued fever: and in either case when there is irritability of the canal, with watery, unhealthy, and frequently fetid stools, and the tongue is glazed or aphthous, we have good grounds for concluding that ulceration is going on. We may, perhaps, also be justified in predicating it, when in other instances similar conditions persist, in spite of treatment, and we are unable to discover any other disorder of the abdominal viscera to account for their presence. It is not common as an idiopathic disease, and it may exist for long periods without giving rise to any distinct symptoms at all.

Hæmorrhage is perhaps one of the most certain indications when it occurs spontaneously and in considerable quantity; the appearance of the blood, in some measure, aids in determining from what portion of the canal it comes, because its colouring matter is very readily acted on by the secretion of the bowels, and can only present a florid aspect when the point of its discharge is situated near the anus: the colour is otherwise black, and hence the name of "melæna" has been given to this form of hæmorrhage. Evacuations of similar character occur when the blood comes from the stomach, and the blackest and most pitchy evacuations are seen when this is their source. Hæmatemesis would of course determine that blood had been effused into the stomach itself, but, though a common consequence of its presence, it is by no means essential, and must not be made the basis of an absolute rule in diagnosis.

The presence of pus in the stools can only indicate ulceration low down in the canal: its quantity cannot be large, unless the ulcerated surface be such as is seen in dysentery, and its admixture with fæculent matter must necessarily alter its characters and prevent its recognition if it pass through any great length of the intestine. A red and glazed tongue, with a tendency to the formation of aphthous crusts, has been before alluded to as indicating a general state of the mucous membrane which is disposed to ulceration; it is seldom noticed, however, except in cases of phthisis or bowel-fever.

Ulceration of the bowel is sometimes followed by *perforation*, when the symptoms are only those of sudden pain and extreme collapse, due to the extravasation of the contents of the bowel into the peritoneal cavity. There is nothing usually to point out the exact part of the bowel which has given way, and any opinion of its cause must rest simply on the antecedent history and symptoms.

Division III.—Diseases attended with altered Secretion.

It might very fairly be argued that many cases of which constipation is a prominent symptom, and all of those attended with diarrhœa, should be classed under this division. Our object, however, is not pathological accuracy, but simplicity of arrangement, and we have now to do with cases in which either diarrhœa is continually alternating with constipation, or the evacuations exhibit special characters which show that some form of secretion is wanting or perverted.

§ 1. *Disordered Bowels.*—This first subdivision must include by far the larger number of cases; we are yet far too ignorant of the special actions going on to attempt to classify them more accurately, and the only reason for their enumeration is, that the question of classification leads to investigating symptoms more closely, and thinking more clearly of the morbid actions present, and therefore tends to a more judicious selection of remedies.

a. In childhood we often find a condition of malnutrition and anæmia, with a ravenous appetite and unhealthy secretions, when the rectum is very generally loaded with ascarides: in such cases it used to be imagined that the worms were the cause of all the symptoms; it seems more probable that the true explanation is to be found in the faulty secretion of the canal affording a nidus for the development of the

parasite. Whether the condition of the bowels be primary or secondary, it is of no importance to inquire, because it is invariably accompanied by symptoms of more general disorder, and these demand our attention and care quite as much as the local ailment. It is also quite a matter of accident whether there be diarrhœa or constipation at the time of examination, because as a general rule we shall find that neither condition is persistent, but that the child has been subject to one or other for some time. The chief difficulty presented is the close analogy of such cases to those of mesenteric disease: so little is known of the scrofulous element that we can scarcely form any correct diagnosis until the dry shrivelled skin and prominent belly leave us in no doubt; and our prognosis must be always guarded when any symptoms of scrofula have been marked in the child's history.

b. In other cases the evacuations present appearances more or less definitely indicating the secretion that is at fault. Thus we have the "chopped spinach" appearance of the stools in infancy, their excessively dark colour, or the opposite, in adult life, each pointing out that the biliary secretion is that to which attention should be paid: in other instances, undigested aliment, mixed with fæculent matter, shows that the gastric juice is defective in quality, or insufficient in quantity: the lodgment of dark, offensive fæces, again, which are got rid of by nature or art, from time to time, rather leads to the belief that the secretion in the bowels themselves is defective.

We must not forget in this enumeration the frothy, yeast-like motions which are occasionally passed, and seem to show that fermentation has taken the place of intestinal digestion, just as we found the same circumstance when occurring in the stomach indicated by vomiting of a similar character. Nor must we omit that rare condition which has been, with some reason, attributed to disease of the pancreas—viz., the passage of fatty matter in a liquid state along with the fæces,

which floats on the surface of water, and consolidates with cold.

Much may undoubtedly be learned from an inspection of the stools; and no careful practitioner will omit it when treating a case in which there is a possibility of disease of the abdominal viscera. In almost any of the cases just mentioned, the first complaint is very likely to be of a transient diarrhœa, in consequence of the irritation which these matters excite; or, passing by the repeated alternations of constipation, the patient may only speak of being subject to diarrhœa, and, until the excreta be seen, we may be ignorant of his real state. It seems pretty certain that, when we find irregular action lasting for a considerable period, we may regard it as due to a fault in some of those secretions which serve to prepare the alimentary substances for the uses of the economy, and our chief object must be to detect and correct that fault: in the majority of instances this can only be done by ascertaining the character of the stools.

§ 2. *Tympanites.*—The presence of flatus in the abdomen, as it always results from any disorder of the bowels, would not deserve mention except that cases are occasionally seen in which this is the principal ailment. We search in vain for other direct evidence of faulty secretion; and, except that the bowels are usually sluggish, and the patient suffers much inconvenience from the distension, the circumstance might be disregarded altogether. The cases do not present any great difficulty in diagnosis, but they are very troublesome to manage: the only point which we have to ascertain with care is, that the enlargement of the abdomen is not produced by some other cause, while the resonance is no more than that usually heard on percussing over the intestines when thus pushed forward. Such a combination of distension and resonance, for example, may be observed when a small quantity of fluid exists low down in the peritoneum; and mistakes of this kind have been made when the distension was produced by enlargement of some of the pelvic viscera; *e. g.*, the uterus or the bladder.

A tympanitic condition exists, very generally, in peritonitis, both in its acute and chronic forms: it is also very common in

bowel-fever. Each of these diseases presents symptoms which ought not to be overlooked and cannot be misunderstood: in them the distension is not caused so much by any abnormal condition of the secretions as by the loss of muscular power, which allows the flatus to accumulate. It is possible that a similar condition may have to do with the production of genuine tympanites, and that it may be in part due to muscular paralysis: it seems, however, scarcely possible that it should exist to any great extent from this cause alone, and I think there can be no doubt, whether any other disorder of the bowel mark its presence or not, that faulty secretion is an essential element. The diagnosis of this condition of things rests, indeed, rather on negative than positive evidence; the tympanitic distension may be proved, but, in the further analysis of the case, we have to make out rather the absence of actual disease than the presence of any morbid condition of which pathology can lay hold: hence, it is one in which we are very liable to error, and one which increasing knowledge may at some future period enable us to discard altogether from our nosology. The difficulties are certainly not lessened by the circumstance that it is very often associated with hysteria.

Division IV.—Diseases of Rectum and Anus.

A mere enumeration of the affections of the lower end of the canal must suffice. They are usually regarded as matters requiring surgical aid, and scarcely fall under the province of medical diagnosis. In discharges of blood from the bowel, as has been already pointed out (p. 152), the more florid its colour the nearer the anus its source may be assumed to be; that which is caused by the presence of hæmorrhoids being quite florid. This fact, taken in connexion with the circumstance that the flow of blood follows the evacuation of the bowel, is generally sufficient for diagnosis. The further question, as to the actual extent of the hæmorrhoidal tumour and the best means of obtaining relief, can only be determined by physical exploration.

These tumours are sometimes painless even when they cause considerable hæmorrhage; sometimes they give rise to more or less constant irritation, and occasionally they become inflamed and exquisitely tender. Those placed on the outside of the sphincter—external piles—are most liable to inflammation, and never give rise to hæmorrhage: internal piles, perhaps, in consequence of the relief afforded by hæmorrhage, are less likely to inflame. As a frequent result of this inflammation we meet with suppuration and abscess: this rarely heals until the sphincter

is divided, generally leaving a fistulous opening which may or may not communicate with the bowel.

Not unfrequently a large mass of internal piles gives rise to more or less constant prolapsus ani. In infancy the same thing occurs from mere straining at stool, and the inverted bowel occasionally protrudes several inches from the anus. It is sometimes difficult to make out from mere description whether in the adult the protrusion involves only the hæmorrhoidal mass, or includes the whole circumference of the canal. The question is not an important one, and can readily be determined by examination.

A very painful affection is that which is known as fissure of the anus. It requires careful examination to distinguish it from neuralgia. Both are constantly associated with spasm of the sphincter, which greatly aggravates their painfulness. Pruritus is another affection which may be dependent on local cause, or may be a mere nervous sensation. It is very often excited by irritation of the follicles around the anus and excessive secretion; in children it usually points to the presence of thread-worms in the rectum: in neither state is there any visible change, but eczema is by no means uncommon both as a cause and a consequence of its existence. The purely neuralgic form is exceedingly rare.

In the rectum we especially meet with the various forms of stricture by which the bowel is partially closed and its action more or less arrested. The history of such cases is always very much alike: gradually supervening constipation has been latterly only relieved when the stools have become liquid, and no formed fæces have passed for some time before the actual obstruction arises. It has been alleged that in such cases the fæces passed during the earlier progress of the disease have been of very small calibre: this can only happen when the stricture is very close to the anus, and any change in shape must have more reference to the size of the final aperture than to the dimensions of the passage higher up. In all cases of obstruction the use of a long tube in connection with the syringe as a means of treatment, is calculated to throw great light on diagnosis.

CHAPTER XXIX.

DISEASES OF THE LIVER, SPLEEN, AND PANCREAS.

Div. I.—*Diseases of the Liver—Obscurity of Symptoms* —§ 1, *Inflammation — Congestion — Abscess*—§ 2, *Enlargement—Non-malignant—from Morbid Growth* —§ 3, *Cirrhosis*—§ 4, *Jaundice—Functional Disorder*—§ 5, *Gall-stones.*

Div. II.—*Diseases of the Pancreas—Scirrhus.*

Div. III.—*Diseases of the Spleen—Change of Structure—Enlargement.*

Division I.—Diseases of the Liver.

This subject is as yet beset with difficulties; we are only now beginning to learn from pathological research the meaning of terms which have been in common use, such as "nutmeg-liver," "cirrhosis," &c.; we have but little knowledge of what changes are due to inflammation, what to depraved nutrition; and therefore cannot speak with certainty of the indications which might show that such a change was going forward: as a necessary consequence, we are in great ignorance regarding its functional disorders, because we cannot discriminate the symptoms which portend the commencement of some grave malady from those of transient disorder.

Another difficulty meets us on the very threshold of our inquiry into the diagnosis of its diseases, viz., that it is exceedingly difficult to separate the symptoms due to disorder of the liver from those of other portions of the digestive apparatus. Covered in great measure by the ribs, there are no auscultatory phenomena to aid our investigation, except on the single question of its size; and placed at the very summit of the intestinal canal, and yet below the valve of the pylorus, the state of its secretion cannot be accurately ascertained either by examining the fæces, or by exciting the act of vomiting. Half the minor ailments of life are attributed by persons unacquainted with medicine to "biliousness," while the accomplished physician is almost unable to say what it is to be "bilious." Let us hope that the progress of analytical chemistry may ere long throw

some light upon this obscurity, and discover some ready means to indicate at least the more marked changes, which we are quite sure the secretion must undergo.

A patient says that he is "bilious;" what does he mean? It is quite true that he often applies the term to a variety of states which we know have nothing in common; but there must be some general type to which they all, more or less, approximate—there is something which we may rationally call by that name. The symptoms are analogous to those which we have mentioned as characterising a fit of indigestion, but they are more marked and persistent; and though in many cases first excited by an indiscretion in eating or drinking, yet this antecedent may be wanting, and the lasting headache and discomfort cannot be merely the effect of sympathy with disordered stomach: there must be some material in the circulating medium which ought not to be there; and its frequent association with sense of weight in the right hypochondrium and pain in the right shoulder, warrant the idea that the fault is in the eliminating process of the liver. The stools are often disordered, sometimes paler than natural, sometimes darker, leading to the belief that the bile is deficient, or perverted. The general notion of biliousness seems to be nausea, loss of appetite, headache, foul tongue, probably thirst, and disordered bowels: hence we find patients in the early stage of fever, in certain conditions of phthisis, in erratic gout, and very often in the simple functional disorders of stomach and bowels, imagining that this is the explanation of their sensations. In another form of disease the analogy is much more real; we know that delirium tremens, and disorder of the liver, are both brought on by habits of dissipation; and it may be admitted that a patient is not far wrong who calls himself "bilious:" while his white, moist, tremulous tongue, shaky hand, and sleepless eye point him out as being on the verge of an attack of delirium à potu. It is more especially that form of the disease which

has been designated delirium ebriosorum, the delirium following on a debauch, that is ushered in by a fit of biliousness.

The statement, therefore, of the patient, that he is bilious, or subject to bilious attacks, must first be analysed so far as possible to ascertain what are his actual sensations: and from these we attempt to form a judgment whether the liver be really at fault or not. In the history of the case we can seldom trace, with any distinctness, the duration of the illness; because, in this country at least, attacks of a really acute type are seldom seen, and the sensations in others are not very definite in their relation to this organ. Under all circumstances, the period during which the patient has been conscious of derangement of health, while it may point to some change occurring at the time, cannot be regarded as the necessary commencement of the disease under which he may be labouring.

§ 1. *Inflammation —Congestion.—Abscess.*—Hepatitis, which occurs with such frequency in tropical climates, is usually associated among ourselves with injury to the side, or with circumstances giving rise to secondary suppuration; very rarely, indeed, does any case present itself in which some such antecedent cannot be traced, for its association with chronic dysentery or intestinal ulceration is, no doubt, a phenomenon of the same kind. The sensations of the patient refer to pain or sense of weight on the right side—perhaps with coincident pain in the right shoulder: we observe some indications of febrile disturbance, the tongue especially being thickly coated, and the urine loaded with pink or lateritious sediments: perhaps a faint bronzing of the skin, with yellowness of the eyes, exists as a condition of partial jaundice. By means of palpation and percussion, fulness, tension, and tenderness in the right hypochondrium can be made out, along with dulness extending some way below the ribs. The patient usually lies on his back, and complains of a sense of dragging,

or of actual pain, in the right side, if he turn on the left: vomiting, hiccup, or cough may be caused by the extension of the inflammation to adjoining organs; and frequently pain is excited on deep inspiration, by the pressure of the diaphragm on the liver and the partial movement of its inflamed surface, which is its most sensitive part, against adjoining viscera. It is almost unnecessary to remind the student that an examination of the chest must always be made in such cases, because the whole of these symptoms, even the jaundice itself, may be caused by an attack of pleuro-pneumonia on the right side.

In congestion, the symptoms by which our attention is called to the liver as the seat of disorder, are not unlike those present in inflammation; the chief difference is the absence of pyrexia: in the hypochondriac region there may be uneasiness, but seldom anything more; pain is more constant in the right shoulder, and not unfrequent in the right iliac region: tenderness is only rendered perceptible by passing the fingers deeply under the ribs; and as there is no peritoneal inflammation, there can be comparatively no irritation of adjoining organs. They are still more distinguished by their causes, those exciting hepatitis being comparatively few, while congestion may be produced either as a passive state by obstructed circulation, or as an active one by excesses in eating, and especially in drinking, exposure to cold, or inflammation of the lungs and pleura.

Abscess of the liver is acknowledged as a very frequent result of true hepatitis. It appears either as a single cavity filled with pus, or as a number of smaller abscesses: the former is the case chiefly when the inflammation is caused by injury, the latter is the form always presented when the liver has been the seat of secondary suppuration; but it also occurs when no such explanation of the hepatitis can be offered. Obscure as are the early symptoms, it is still more difficult to say with any degree of certainty

that suppuration has taken place, except when the matter is in a large cyst and comes near the surface. We have in general only the two facts clearly before us of tenderness and enlargement of the liver, and of the recurrence of rigor; but there are so many other circumstances which might occasion these two symptoms, and the whole phenomena of the case are so complex, that any definite conclusion is not easily arrived at. One point is perhaps deserving of especial notice, that the general disturbance may be very much less than could have been anticipated while such a condition existed: the tongue may be tolerably clean, the skin clear and free from jaundice, and the stools may be tolerably healthy, which is not what we should have expected *à priori*, in suppuration of the liver.

Another form in which a similar train of symptoms is presented is when suppuration occurs within an hydatid cyst, which is one of the common causes of enlargement of the organ: its existence is sometimes made out without difficulty; in other instances we cannot feel any confidence in the diagnosis. The recurrence of rigor and the symptoms of hectic are among the circumstances most distinctly pointing to suppuration; and these must be weighed with the signs of the presence of a cyst, or in a still more general manner, with the evidence of enlargement: in all such cases an opinion must be pronounced with much hesitation.

Diagnosis must depend in great measure on a knowledge of the antecedent circumstances, and a readiness in perceiving the relation which they have to the condition of the liver. This knowledge will preserve us from overlooking symptoms more directly traceable to that viscus, among the complex group which some of the cases present, and it will also prevent our assuming congestion or inflammation of the liver as an explanation of an obscure case, when its exciting causes cannot be traced: such an assumption is not warranted, unless manifest enlargement can also be made out; but yet enlargement is not of itself to be taken as evidence of inflammation. Under all circumstances,

such cases require careful analysis of symptoms, and cautious exercise of judgment, before venturing to pronounce a diagnosis; and the opinion must always be liable to modification by subsequent events.

§ 2. *Enlargement.*—Besides the association in which we have already traced congestion as allied to inflammation, it presents itself as the cause of what is called *simple enlargement.* This condition is less transitory than the more acute inflammatory attacks, and does not exhibit the same amount of tenderness or febrile disturbance. It has much more the character of a chronic than an acute disorder, and is quite as often excited by passive as by active congestion. It is impossible to assign a reason why disorder of the circulation should excite jaundice in one patient, cause enlargement of the liver in a second, and in a third should not affect the organ at all; but so far as we know there is very little difference between enlargement due to this cause, and that form of congestion produced by over stimulation. To these states the name of "nutmeg" liver used to be applied. We also find enlargement due to fatty disease, fibroid deposit, waxy degeneration, and growths of various kinds, cancerous, non-malignant, and parasitic. To us the only question of importance is, are there any diagnostic signs by which these conditions may be discovered during life?

The history of the case is necessarily entirely silent as to their origin; it is impossible that any date can be assigned for their commencement; very generally, too, there is scarcely any account of symptoms particularly calling attention to the liver until the disease has reached a pretty advanced stage; there may have been jaundice, but much more frequently this sign is wanting. Persisting disorder of stomach and bowels, attended with any sensation of discomfort, should lead to a physical examination of the abdomen: by percussion it is not difficult to detect any extension of dulness below the edges of the ribs. By examination of the chest, it may be ascertained that the liver is

not pushed down by fluid from above; and careful palpation determines whether its edge be even or irregular, its surface smooth, projecting, or knobbed. The co-existence of phthisis or scrofula would suggest its being possibly fatty or lardaceous; a condition occasionally brought about in childhood, also, as is alleged, by over-feeding: luxurious living and over stimulation of the organ might lead us to conceive that it would have the "nutmeg" aspect from hypertrophy of the secreting apparatus: the existence elsewhere of medullary cancer would cause a suspicion of this form of disease; in scirrhus the actual size of the liver is sometimes diminished, the natural structure which is destroyed by disease not being replaced, as in medullary cancer, by morbid growth in greater amount: disease of the heart would render it probable that enlargement was due to a condition of passive congestion.

By careful examination we can generally say whether the disease have the character of enlargement or of morbid growth, just in so far as the organ retains its normal shape and is simply hypertrophied, or has acquired any unnatural form. Exceptions to this rule will be found in cases where the foreign growth is limited to the upper and back part of the liver, when the lower edge is pushed forward and downward, very much as if it were displaced by pressure above the diaphragm: in such a case we may possibly obtain some clue to the true explanation from the pleura or lung-structure being irritated by pressure; but, as a general rule, this does not occur unless there be a tendency to suppuration and ulcerative action, when it seems to be provided as a means of protection against extravasation into the peritoneum.

The enlargement of interstitial deposit, whether merely the consequence of constant and repeated congestion, active or passive, or of some more distinctly morbid action, as seen in fatty and lardaceous degeneration, has a tendency to cause a thickening and rounding of the edge of the liver, while its general contour is unaltered; and when this can be made out, it also affords direct evidence that the organ is not simply displaced down-

wards. In the existence of morbid growth, if the surface or the edge of the organ be at all irregular,—if several prominences be perceptible, there can be no doubt of its cancerous nature; but if, as sometimes happens, only one rounded eminence be felt, or the impression be that one lobe only is enlarged, the question will naturally arise whether it may not be a serous cyst, which we know to be a common form of morbid growth in this organ. Occasionally, the sense of fluctuation is so distinct, that there can be no doubt of the presence of fluid; but very often, owing to the thickness of the parietes and the depth from the surface, it is almost impossible to distinguish the elasticity of soft medullary cancer from the fluctuation of a cyst embedded in such a solid structure as the liver: in cases of doubt, an exploratory puncture may be made with a grooved needle. It is well to bear in mind, however, that an enlarged gall-bladder has been mistaken for a serous cyst: its relation to the edge of the liver which can be felt, if felt at all, unaltered in form and above the fluctuating tumour, should prevent such an error.

The occurrence of jaundice in any of these cases is in great measure accidental: it is not the destruction of the tissue of the gland which causes the discoloration of the skin in cases in which it occurs, but the obstruction of a duct proceeding from a still healthy secreting structure.

§ 3. *Cirrhosis.*—As in enlargement, the history fails in pointing out when cirrhosis commenced, and there is little to be remarked in the antecedent circumstances, except when along with an account of dyspeptic attacks we are informed of previous habits of dissipation: gin-drinking is known to be one of the most common causes of hob-nail liver. There may have been jaundice at an earlier period, and even in the advanced stages there is often a degree of yellowness of the sclerotic;—perhaps some illness is reported which may seem to have had the characters of an attack of inflammation, but this is not common. Our attention is very often not called to it until peritoneal effusion has caused the abdomen to swell; and in a large proportion of instances in which ascites has been gradually developed, and there has been no illness to arrest the patient's attention, until the feeling of tightness round the stomach or shortness of breathing leads him to complain, the direct cause of the effusion

is the presence of cirrhosis. In his general aspect the patient usually presents a certain degree of sallowness of the skin, and he is always more or less emaciated: the face especially becomes thinner in this disease than in phthisis or cancer, and sometimes the bones stand out with frightful distinctness.

On examining the right hypochondrium, the liver is found to be entirely beyond the reach of the fingers, and percussion shows that while on the one hand the ordinary extent of liver dulness has been diminished in the direction of the umbilicus and ilium, it also does not ascend so high as usual in the chest; in short, that the organ has shrunk in every direction. The shrinking of the liver in scirrhus is chiefly distinguished by the constant pain which usually attends it, and by the occurrence of jaundice from the blocking up of some of the ducts—a circumstance which is never seen in genuine cirrhosis.

§ 4. *Jaundice.*

In the present state of pathology we must be content to admit this name into our classification, although it be but a symptom; for it is one not only known to be dependent on various forms of lesion, but it is also one of which very frequently during life, and occasionally even after death, we cannot determine the exact cause. It is probable that in all cases of jaundice some change has really occurred in the liver, the gall-bladder, or the ducts; but even this has been denied: progressive knowledge may ultimately enable us to assign its true cause, but at present the name is a convenient one for grouping together cases which cannot be included in any other class from our ignorance of their true nature, while they present this common feature. To adopt the name of functional disturbance without advancing in any way our real knowledge, would only deprive us of the advantage which the prominence of the symptom affords.

Distinct and unmistakeable, however, as it would seem to be, an inexperienced person may be deceived. A patient who has it only in slight degree is quite surprised when told that he has jaundice; the greenish hue of chlorosis, or the sallow earthy aspect of malignant disease, or the yellowness of the skin in pyæmia, are all apt to be called jaundice. Its clearest indication is to be found in the sclerotic coat of the eye, which presents in

the chlorotic or malignant condition a pearly or bluish lustre; in pyæmia it is unchanged, unless jaundice be present. However slight the tinge of the skin generally—and in dark persons it very often has only an appearance of bronzing,—in the sclerotic the yellow tinge is invariably seen.

The circumstances which have preceded its occurrence chiefly indicate whether it has been brought on by mental emotion, fright, &c., or whether there has been any paroxysm of pain, possibly indicating the presence of a gall-stone obstructing the duct; pain, however, is not essential to the diagnosis of gall-stone. The examination of the liver may prove it to be associated with congestion, enlargement, or contraction: and as an aid to diagnosis it has been remarked that the very deep shades of colour, tending to a greenish brown, are usually associated with malignant disease, that the yellower shades are more commonly functional, while slight bronzing is often seen in its inflammatory or congestive states. Such general inferences must not be too much relied upon.

Acute atrophy of the liver is only known by its attendant jaundice, which is usually of a very bright or golden hue. I am not aware that there is any direct evidence by which it can be proved: it presents little difference from the jaundice dependent on functional causes, except in the severity of its symptoms; the skin becomes intensely yellow, the brain is affected by blood-poisoning, and the disease is rapidly fatal from this cause: it is usually classed among the acute diseases of the liver, although the fact of its being a form of atrophy would seem opposed to such an idea. Cirrhosis never of itself gives rise to severe jaundice: cancer, with shrinking of the organ, very commonly leads to obliteration of some duct, and the effect of this will be the existence of jaundice of very dark or green colour. These indications are generally sufficient to distinguish it from the only other organic diseases in which there is any diminution of bulk in the organ.

When it is enlarged merely by congestion, the

slighter shades of jaundice are occasionally seen: when it has become absolutely increased in bulk by interstitial deposit, the occurrence of jaundice must be due to some extraneous circumstance: when it is enlarged by morbid growth, the presence of jaundice must depend on the position of the abnormal structure being such as to obstruct any of the ducts. In the jaundice of malignant disease the irregular form of the organ sufficiently explains its origin.

With the causes of the emotional and functional forms of jaundice we are very little acquainted, except when it is produced by the displacement of a gall-stone: still we cannot withhold our belief that such causes act in some unexplained manner; and the difficulty of the explanation is all the greater in that it does not appear that mere suppression of the function can account for the presence of the yellow colour.

The condition of the heart, and of the right side of the chest, must each be ascertained in cases of jaundice, because of their association with congestion of the liver. The fæces in the early stage almost always indicate by their paleness a deficiency of bile, while the urine receives a dark porter-colour from the bile passing out of the system by this channel. It is generally to be regarded as a favorable sign when the clay-colour of the stools passes off, and bile begins again to be seen in the evacuations; but this is not always followed by a cessation of the jaundice: and there are also cases in which, while the colour of the skin has been gradually developed, the motions have been at no time clay-coloured or remarkably deficient in bile. In such circumstances, part of the bile finds its way into the intestine, while part is obstructed and absorbed into the blood; and this might happen when a gall-stone only partially closed the duct: but the more common cause is when one of its main branches is closed by the pressure of a morbid growth, leaving the remainder free, and then the jaundice continues to increase in intensity.

In addition to these, the more palpable diseases of the liver, there can be no doubt that the secretion must be variously modified under conditions of functional disorder with which we are yet very imperfectly conversant; but, beyond a very few broad principles of diagnosis, there are no rules which can be laid down with sufficient distinctness to form any basis for the classification and arrangement of the symptoms to which they give rise.

The liver, acting as one of the great emunctories of the system,

secretes from the blood a large proportion of excrementitious matters, but along with this the secretion is made subservient to the purposes of intestinal digestion: hence it can readily be understood that in all derangements of function, whether connected with organic disease or not, its effects may be traceable either in the one set of actions or in the other. The excrementitious matters may not be properly separated while the elements necessary to digestion continue of proper quality and amount; or these may be either such as to retard the passage of the fæces or to accelerate it—to produce constipation or diarrhœa, and so might be spoken of as deficient or in excess. Further, this imperfect elimination may depend either on the blood being surcharged with materials which the liver cannot separate with sufficient rapidity, in consequence of the habits of the individual, or the fault may be in the liver itself: in the one case he may be sallow and bilious, while yet the stools are dark and relaxed; in the other the sallow hue will be accompanied by costive and rather pale-coloured evacuations. These terms of excess and deficiency of bile can only be admitted as relative, because of our present ignorance of the actual changes which the secretion undergoes; and in forming a diagnosis we must consider quite as much the habits of the patient, and the probability that the bile-forming elements of the food, and consequently of the blood, are in excess or defective, as the actual symptoms under which he is labouring. For example, we know that excessive discharges of bile give rise to diarrhœa: and therefore in disorders of the alimentary canal, when this symptom is present, and is associated with other conditions (headache, sallow complexion, &c.) which we call bilious, we conclude very naturally, and in the majority of instances very rightly, that a state of system exists which is characterised by an excess of bile or bile-forming elements: but it is to be remembered that one of the purposes of the bile is to neutralise the acid of the stomach, and if the food continue acid in the alimentary canal, it will excite diarrhœa; and therefore, the true explanation of the case may be that the liver is inactive, and the excrementitious matters exist in the blood, not because of their excess, but because the liver fails to remove them.

In attempting to form any opinion on this subject we have therefore to take into consideration the history of the individual, as that may tend to show that the organ has been over-stimulated in past times, and may now be in a state of chronic disease; his present habits, as informing us whether the bile-forming elements are supplied in too great or in too small quantity; the appearance of the tongue, as that is very apt to present a dry fur in disorder of the liver: and the colour, as well as the consistence of the evacuations from the bowels: we also derive instruction

from the urine, which is more prone to deposit red sediments in bilious disorders than most others. It is only when its due weight has been given to each of these considerations that we can interpret aright the sallow dingy complexion, the headaches, the disagreeable tastes in the mouth, the pains in the side and shoulder, and all the anomalous symptoms which such cases present.

§ 5. *Gall-stones.*—The gall-bladder may be full of these concretions without giving rise to any symptoms; sometimes they are so placed as to act as a kind of valve, allowing a great accumulation of bile in the gall-bladder, and preventing its proper evacuation: sometimes they pass out unperceived; but more commonly, when disturbed, their passage is attended with great pain, and occasionally they are arrested in their progress, become impacted in the duct, and can only make their escape by ulceration.

The pain which usually attends their passage is not difficult to recognise; it is severe, tearing, or grinding, without tenderness; referred to the pit of the stomach, and accompanied by a sense of constriction round the waist; it is not accompanied by fever; the pulse is often slower than natural—the skin, during the severity of the paroxsym, being generally cold; sometimes there is distinct rigor, almost always flatulence, nausea, or vomiting: then comes a lull, and after a longer or shorter interval the paroxysm of pain again and again recurs, until the concretion passes, or becomes fairly impacted. The more frequently it comes on, the greater is the probability of its being accompanied by tenderness; but yet if we contrast the amount of tenderness with the severity of the pain, and consider that no febrile symptoms are excited, there is little chance of its being mistaken for inflammation. When jaundice supervenes it gives great confidence to the correctness of our diagnosis; but it is by no means a constant occurrence, because it is only when the stone is in the common duct of the liver and gall-bladder that it can prevent the passage of bile into the intestine, and so give rise to the discoloration of the skin.

The disorders which are apt to be mistaken for the passage of a gall-stone are chiefly two—in one the diagnosis is of much importance, in the other it is not very material; the one is local peritonitis excited by ulceration of the stomach, the other mere functional disturbance attended with flatulence, especially in nervous or hysterical persons. In one or two points peritonitis, occurring in connexion with ulcer of the stomach when the possibility of extensive extravasation is limited by local adhesions, is very analogous to the passage of a gall-stone; its sudden incursion, its severity, its position and limitation, perhaps the rigor at its first occurrence, are much the same in both cases: but they are manifestly distinct in the constancy of pain, in the tenderness from the very first, and the acceleration of pulse which invariably accompany peritonitis. Functional disorder of the stomach, again, is so commonly accompanied by flatulence, and by pain as a consequence of distension, that were these the only symptoms, we should be constantly deceived by persons who exaggerate their sensations. We have to remember, however, that up to the moment of pain being produced by the entrance of the calculus into the duct, the patient has had no dyspeptic symptoms, no discomfort after meals, no flatulence; it begins instantaneously: the pain of dyspeptic flatulence, on the other hand, has been gradually increasing in intensity for days or weeks, and it is only after some indiscretion in food, or along with some mental anxiety or cause of depression, that it attains the severity which can at all be mistaken for anything else; and, again, the general symptoms, the coldness of skin and depression of the circulation, produced by the reality of pain, in the one case, cannot be simulated by the exaggerated expression of it in the other, nor can the paroxysms be readily imitated. Gout in the stomach, on the other hand, may chiefly be distinguished by its being a single seizure,—not alternating in relief and exacerbation,—by the diffuse character of the pain, and the absence of the sense of constriction so generally felt in the passage of a gall-stone.

Division II.—Disease of the Pancreas.

The only known disease of the pancreas which can be made the subject of diagnosis is its cancerous degeneration. It never stands alone, but is always conjoined with cancer of the stomach or duodenum: its position is such that it is not possible to determine whether the hardened mass, which can sometimes be felt during life, belongs to the pancreas or to the stomach. Our only reason for mentioning it is, that it has been sometimes found after death in cases of *diarrhœa adiposa*, and theory rather gives countenance to the idea that the one event may be de-

pendent on the other. Cancer of the pancreas, however, has been seen much more frequently than *diarrhœa adiposa;* and we cannot at present assign any satisfactory reasons why the association, if really standing in the relation of cause and effect, should be occasionally broken through. A suspicion may be reasonably entertained that there is cancer of the pancreas when a hard mass can be detected, as it occasionally may be when the stomach is empty, more to the left than is usually met with in cancer of the stomach, and when among the symptoms of disordered digestion and nutrition we do not find frequent vomiting, and the matters ejected are never grumous or mixed with blood.

Division III.—Diseases of the Spleen.

Of the diseases of the spleen we have still fewer means of diagnosis than of those of the liver. We know that it is often involved in blood diseases, that especially in fevers it becomes almost disintegrated, that "blocks" are found in it due to capillary phlebitis, and that in pyæmia it is sometimes the seat of secondary deposits and suppuration; but we know nothing of the indications which mark these conditions, as they are wholly obscured by the more general symptoms of disease.

Its enlargement alone becomes cognizable to us by percussion dulness and by its position in the abdominal cavity. And if percussion and palpation be properly employed, there can be no difficulty, when a tumour is recognised, in tracing it upwards towards the left hypochondrium, and so making sure that it is the spleen, even when it is first discovered, as in cases of very great enlargement, in the right iliac region. The two essential characters by which it is known are these: its oval form, with a smooth rounded surface; and its point of attachment under the false ribs on the left side; the only possible excuse for a mistake can be when the abdominal cavity is distended with fluid.

In its history it will sometimes be found to be a sequel of intermittent fever, commonly known as ague-

cake. Very often no precursory phenomena are discovered, and its cause is quite unknown; occasionally it is associated with enlargement of the liver, and probably then both are lardaceous. It is intimately connected with an anæmic state of blood; and as its functions in reference to the elaboration of this fluid become better understood, we shall probably obtain more direct indications of the changes which it undergoes in disease: at present we can only affirm that there seems to be some close relation between one of the forms of enlargement and the condition already referred to as white-cell blood. In consequence of this circumstance it may be also associated with general dropsy; with ascites it would seem to be connected only through the medium of concomitant disease of the liver.

CHAPTER XXX.

DISEASES OF THE PERITONEUM.

§ 1, *Acute Peritonitis*—(*a*) *Traumatic*—(*b*) *Puerperal*—(*c*) *Idiopathic*—(*d*) *Partial*—§ 2, *Chronic Peritonitis*—*Simple*—*Tubercular or Cancerous*—§ 3, *Morbid Growths in the Peritoneum.*

In speaking in general terms of the diseases of the peritoneum we might include all those occasions on which it bears a part in disease of the viscera which it encloses. It seems better, however, to limit our attention to those conditions in which the membrane is principally or alone involved—the acute and chronic forms of inflammation ; along with the latter the non-inflammatory exudations must be noticed, and the occasional association of ascites : a few remarks must also be made upon those tumours which, as they are unconnected with any particular organ, will not find a place in the succeeding pages of this volume.

§ 1. *Acute Peritonitis.*—The extent of the serous membrane lining the abdominal cavity is such that, when the inflammation pervades its whole surface, the symptoms are more severe than are met with in any other organ of the body ; and at the same time its folds are so numerous that the spread of the inflammatory action is liable to be checked by the adhesion of two contiguous portions in a way that is not met with in other serous membranes. We might, therefore, divide the cases into general and partial peritonitis ; but for the purposes of diagnosis the former must be again subdivided, as the history, the progress, and the symptoms are so dissimilar in the different

forms, that they might almost be regarded as distinct diseases.

a. Traumatic peritonitis.—I can find no better name for that which arises suddenly, after rupture of some organ and escape of its contents into the abdomen; and this whether occurring from external violence or not: it differs in no respect from the inflammation excited by a penetrating wound of the abdomen. It generally results from previous thinning of the membrane by disease; but on this point the history of the case is perhaps silent. Sometimes, indeed, we may learn that the individual has had hæmatemesis, or other symptoms of ulceration of the stomach, or the persistence of diarrhœa in phthisis, or in convalescence from fever, points to a similar condition of the small intestine. Without any previous warning, the patient is suddenly seized with severe pain on making some unusual strain; we find great tenderness and tension over the abdomen, extreme prostration, probably sickness and painful efforts at vomiting; the pulse is feeble, quick, and labouring; the skin becomes cold, and covered with perspiration; and he sinks rapidly. The state of collapse resembles cholera, but there is no evacuation from the bowels; the mental faculties are clear, and therefore narcotic poisoning is excluded, while both suppositions are opposed by the existence of extreme pain all over the abdomen; and, on the other hand, there is no irritation about the mouth and fauces to suggest the possibility of irritant poisoning.

Perhaps we may obtain a history of a blow or a fall which may have ruptured the stomach or the liver, &c.; death has been even known to result from a blow on the stomach without rupture, in which from its suddenness, peritonitis can have had no share. Occasionally we meet with suppression of urine; and when the catheter is introduced, only a few drops of blood are evacuated, and then it is probable that the bladder has been ruptured by the accident.

The symptoms are occasionally not quite so severe, because the effusion of the visceral contents has been, to a certain extent, limited by adhesions, and then the attack cannot be distinguished from idiopathic general, or partial peritonitis.

b. Puerperal peritonitis presents the same features as the third form, of which we have yet to speak; it is only distinguished by its history in connexion with childbirth, and demands separate notice, from the peculiar condition of the blood with which it is associated, and the different treatment which it consequently demands.

On this point practical medicine has made great advances in late years: inflammation, which post-mortem examination reveals to have been of great extent and intensity, does not of necessity suggest the use of the lancet; the correlative symptoms must be taken into account, both with reference to the previous exhaustion of labour and the special characteristics of the disease in the individual case. It seems highly probable that two forms of puerperal peritonitis exist, of which the one corresponds to ordinary inflammation, being only modified by the previous exhaustion of a labour perhaps unusually severe; the other, by far the most common, is the result of suppurative changes in the blood, and presents analogies to erysipelas. It is worth remembering that, as erysipelas and its allied diseases occasionally put on an epidemic character, so also does puerperal fever; and its frequent occurrence at any given time would tend to confirm a diagnosis drawn from the character of the symptoms, which are asthenic, and approximate those of suppurative fever. The pulse is very frequent and feeble, there is often diarrhœa, the tongue is not much coated, and more frequently raw and chapped, and even an aphthous state of the mouth and of the anus are recorded. The question of its propagation by contagion, which is now pretty generally acknowledged, may also serve to guide our opinion, because, if in the hands of the same practitioner another case of puerperal fever have recently occurred, there is good ground for suspecting that, through some means or other, the same blood-poison has been introduced.

In a few cases the inflammation becomes limited to the uterus and its appendages, when the disease does not differ from cases occurring in the non-parturient state, which we class as local peritonitis.

c. Idiopathic peritonitis will give a very different history, according to the circumstances in which it occurs and the causes on which it depends. It may arise in a stout, healthy person from exposure, or from injury; or, in the very opposite condition, in one worn by fever or phthisis, when excited by extensive ulceration of the coats of the bowel, even when no rupture occurs. Its close connexion with enteritis has been already mentioned; it is similarly allied to inflammation on the upper side of the diaphragm, sometimes preceding sometimes following diaphragmatic pleurisy; it is often met with in uterine derangements apart from pregnancy, although then it is more generally local and limited.

The best examples of its pure type will be found in cases which are believed to have been excited by exposure, when at least no other cause can be assigned, or those which have followed some mechanical violence without rupture of any viscus. The leading symptom is pain and tenderness, which we know to be characteristic of inflammation of all serous membranes. Enough has been already said to show the necessity for caution in taking this symptom as our chief indication; but with due care we cannot be deceived in a case of general peritonitis. There is not only the complaint of pain, but the posture of pain; the patient shrinks from pressure, and we learn more from the expression of pain by feature than by exclamation; but the evidence is still more trustworthy which is obtained from the bending of the limbs, the motionless diaphragm, and the fixedness of the body. We must not rudely press on the abdomen; but its distended outline and its tympanitic tension and tenderness show clearly that inflammation is going on beneath the surface. Besides this, there is the presence of fever, a quick pulse, a coated tongue, and a hot skin; often sickness, sometimes dysuria, and, if the mucous membrane be affected, the bowels may be relaxed; but more commonly there is constipation from a sort of

paralysis of the muscular fibre, which also produces the tympanitic distension: even if the stools be watery, there is always a certain impediment to the free action of the bowels.

Such may be regarded perhaps as an extreme case, and it may be alleged that there are others of a much milder form: at all events, in common parlance many cases are spoken of as "inflammation" which do not come up to this type. The majority of these, when inflammation really exists, belong to the next division; in a few perhaps, from constitutional apathy, the evidence of suffering is less distinct; but in a large number I think we must admit that errors in diagnosis are committed from taking a contracted view of the symptoms, and being contented with the observation of one or two, while the rest are forgotten or overlooked. Genuine cases of idiopathic peritonitis are certainly rare; and when there has been no injury, when there is no evidence of antecedent affection of the intestines, and the case does not belong to the puerperal form, the practitioner ought not hastily to come to the conclusion that he has so formidable a disease to deal with; at the same time, when the patient is in fair health, the error of over-activity is perhaps the least dangerous.

d. Partial peritonitis.—During the incursion of an ordinary attack of peritonitis, the pain is frequently confined to one spot, where it may linger for a considerable period; and this is very generally the lower part of the abdomen: for a time the pulse is not particularly accelerated. These are cases in which it is due to some local cause, and from thence it may spread to the whole membrane, or may remain fixed at the spot where it originated, putting on a subacute type, and preserving a local character. Partial peritonitis is no doubt very often overlooked, and leaves traces of its existence in bands of adhesion, when no account of its history is obtained. The chief indication upon which we must rely is the existence of tenderness on pressure, accompanied by slight pyrexia. This serves to distinguish it from colic, and from the passage of a calculus, whether biliary or renal, the latter more especially imitating it in site: in them the pain greatly exceeds the tenderness, and, indeed, is often relieved

by pressure, while the pulse is slower than natural—slower at all events than we could imagine possible if the same amount of pain were due to inflammatory action.

Partial peritonitis may be excited by ulceration of the bowels which does not proceed to an extreme degree, and has a conservative tendency to prevent perforation: this constantly happens in phthisis, when it may pass altogether unobserved. It is very often produced by some unusual irritation within the bowel, such, for example, as the lodgment of undigested substances about the cæcum; and these cases very frequently pass into suppuration. Sometimes the puerperal inflammation is thus limited to the neighbourhood of the uterus, and pus may be ultimately discharged by the rectum or vagina, or the uterus and its appendages may become matted together and adherent to surrounding parts. It is not uncommon in women who are subject to irregular menstruation, especially when attended by uterine irritation; but with them the disease seldom terminates in suppuration.

When the inflammation is of any notable extent, or when the rest of the membrane is in any degree irritated by the persistence of the local action, we generally find some expression of tenderness in the posture of the patient besides what is observed on pressure; dysuria, too, is a very common symptom in those attacks which are seated in the pelvis. As the disease advances, considerable infiltration of the surrounding tissues takes place, and local swelling may be observed, at first deep-seated, but very soon involving the parietes, which become hard and painful over the seat of inflammation, in preparation, as it were, for the occurrence of suppuration.

In enteritis we have a set of symptoms which, without reaching the same intensity as general peritonitis, have a character very similar to those of partial peritonitis, only with more decided constipation, more constant vomiting; and it is really

of no consequence whether we can discriminate between the two, or can say, when both exist together, which is the more prominent.

In fever, again, it is of importance that the existence of the blood-disease should not be lost sight of in regard to treatment, and if in the early stage there be pain of the bowels, with tympanites and tenderness, the diagnosis requires care. Two facts we may remember, first, that in fever the symptoms which are called febrile, the hot skin, quick pulse, &c., preponderate, and are out of proportion to the local signs of tenderness; second, that the bowels are relaxed, with borborygmi or meteorismus in fever, while such a circumstance is much less common in peritonitis, and is always attended with aggravation of the pain: fever spots on the abdomen would of course remove any doubt. In advanced fever genuine peritonitis very often comes on either with or without rupture of the intestine: in its treatment regard must be had to the previous existence of blood-disease.

§ 2. *Chronic Peritonitis.*—Two forms of this disease are recognised. *a.* The acute attack runs on into a chronic form. *b.* An insidious disease arises without acute symptoms, which is most commonly associated with a tubercular or a cancerous diathesis.

a. The suppurative stage of partial peritonitis, as it may continue for a lengthened period, might be regarded as an instance of chronic disease: the condition, however, which we wish to distinguish by this name, is one in which the acute symptoms have entirely subsided. The patient perhaps continues liable to uneasiness in some particular part of the abdomen, which, on examination, is found to be harder than natural; occasional exacerbations occur, and after a long interval, during one of these accessions of fever, the case terminates in suppuration, the matter either finding vent outwards, or exciting general peritonitis and blood-poisoning. In other cases the inflammation has been more general, the bowels have contracted adhesions, and the patient is subject to constant irritation, both in the interior of the canal and in the peritoneum itself; there is almost constant tenderness, and at length suppurative inflammation supervenes, or ascites

is developed, or the action of the bowels is so seriously interrupted that the patient sinks from mere inanition.

If the history of such cases be sufficiently distinct, the difficulty of diagnosis is not great; but there is generally little trustworthy information to be obtained beyond the fact that there has been at no very great distance of time a severe illness with much pain in the abdomen: and when with this there is abiding tenderness, with some acceleration of pulse, and some tendency to constipation; when the general outline of the abdomen is full and rather tense and tympanitic; if there be, on the one hand, hardness felt in a particular spot, or on the other, serous effusion found in the cavity of the peritoneum,—the diagnosis may be regarded as pretty certain. The greatest chance of error is when hardness is felt, because such a circumstance might be caused by fæcal accumulation. But when neither hardness is felt nor fluid detected, there will be a considerable resemblance to cases of ulceration of the bowels: in them, however, diarrhœa is generally present, while in chronic peritonitis the bowels are irregular, and rather incline to constipation.

In speaking of ascites, reference was made to its occasionally resulting from chronic peritonitis; but it was then observed that really this is not by any means its common cause. It is true that along with the thickened capsule of the liver there is often found a certain thickening of the peritoneal membrane, and possibly this condition may have a clinical history of inflammation which we have overlooked; but, except there be the evidence of adhesions, it seems a misappropriation of language to call this pathological state by a name which implies the existence of a disease of which during life we have no proof whatever. Chronic peritonitis, in so far as it can be traced at the bed-side, always gives rise to adhesions; and for this reason the ascites which occasionally supervenes very generally presents characters of much interest, which tend more or less to obscure its diagnosis. The relations of the fluid to the intestine are changed, they no longer obey the laws of gravitation, but either a portion of intestine, which is specifically lighter, is tied down, so that it cannot rise to the surface of the fluid, or the whole of the

fluid is so hemmed in by adhesions that it cannot reach the most depending situation, although itself specifically heavier. In using the term ascites in this way it must be understood that such an accumulation of fluid is meant as really becomes of itself a source of inconvenience or of danger to the patient: for, though the peritoneal membrane in its inflammations contrasts very remarkably with the pleura in regard to effusion, yet a small quantity of turbid serum, mixed with flakes of lymph, or of fluid closely resembling pus, may be found in most cases both of acute and chronic peritonitis. Ascites never occurs as the immediate effect of acute peritonitis.

b. In the second form the symptoms come on so insidiously that there is generally no complaint of illness till the disease is fully developed; and were it otherwise, the indications of what is going on are not sufficiently distinct to be relied on. When the patient is first seen there is generally a persistent acceleration of the pulse, with a certain amount of emaciation and loss of strength; the bowels act irregularly, and the motions are often unhealthy and offensive: sometimes, however, this symptom is wanting; he complains of deep-seated pain or uneasiness, with a feeling of tension or fulness of the abdomen. Placed on his back in bed, the abdomen is still full; and though the extreme tension and tenderness of acute peritonitis be wanting, yet pressure causes uneasiness, and the parietes have a feeling of hardness which is extremely different from the elasticity of health: when the disease is much advanced, the fulness of the belly contrasts very strikingly with the emaciation over the ribs and pelvis. This fulness, it must be remembered, is not like that produced by ascites, for it scarcely exceeds in the erect posture that which is constantly found in health, and it is only when the patient is lying down that the difference strikes the eye: any doubt as to whether it be dependent on an accumulation of fluid is immediately set at rest by percussion; the abdomen is universally resonant, and any indications of fluid are scanty and limited. The pathological condition in these cases sufficiently accounts for the

symptoms to which we have just referred. The peritoneal membrane is studded with morbid growths, tubercular, scrofulous, or cancerous, and the intestines are glued together by adhesions; they are consequently distended with gas which they are unable to expel, and they cannot glide on each other in change of position, so that the parietes do not retract as the patient lies on his back.

In further attempting to analyse these forms of peritonitis, we may be guided by the following general considerations. The tubercular occurs especially in the period of youth; it is associated with a particular diathesis, and, like tubercular attacks in general, is apt to supervene upon measles or other diseases of infancy, as well as upon exposure, bad living, &c. It is attended with emaciation, quick pulse, irregular bowels, and the signs of hectic rather than of inflammatory fever: the skin of the abdomen has a remarkably harsh, dry feeling, and some reliance may be placed upon a sensation as if the muscles could be moved over the hardened peritoneum beneath. But, however distinct in its full development, its earlier stages can only be guessed at.

The cancerous form, again, occurs chiefly after middle age. Perhaps the face has acquired the sallow hue of malignant disease, and there is generally considerable emaciation: with care, some indication of fluid may be found. The tenderness is not so great as in other cases, and the distinctive character of the disease may sometimes be made out, when, by gentle and yet firm pressure, the rounded nodules of cancer are felt under the muscles of the parietes.

§ 3. *Morbid Growths in the Cavity of the Peritoneum.*—In the two forms of chronic peritonitis just detailed, the peritoneum itself is the seat of the tubercle and the cancer: we have now to speak of the same morbid material when deposited in the glands, the mesentery, and the omentum. Early diagnosis seems almost impossible: until the tumour has become sensible to the touch, or has excited inflammation, we are in great measure ignorant of its existence; we have not even the indication of uneasiness or tenderness to guide us, before the appearance of the concomitant inflammation. It is true that they occasionally interfere with, or press upon, some nervous trunk, and anomalous

neuralgic pains may be complained of in the scrotum or in the leg; but this can hardly rank as a symptom.

The patient presents a cachectic and emaciated appearance, while his appetite continues good, and the process of digestion seems little interfered with; the pulse is more apt to be accelerated when the disease is scrofulous than when malignant, and is always small and weak; the stools are very often unhealthy, especially when the morbid deposit is situated in the mesentery; but no distinct characters can be assigned to them. The complaint may be simply of weakness and emaciation, or of sensations of uneasiness or pain in the abdomen, or of anomalous neuralgia. We search for evidence of the existence of any wasting disease, and by the process of exclusion we are convinced it must be situated in the abdomen; in scrofulous children we suspect the presence of tabes mesenterica; in adults we may be quite unable to form an opinion of its nature. After a time the belly is either tumid and hard, with nodules of greater or less size, perceptible on thrusting the points of the fingers deeply among the bowels; or it is shrivelled and shrunken, and hard masses are readily to be felt quite superficially. In the former there is probably some peritoneal inflammation and effusion, and it requires some care in making the examination to discriminate enlargements of the liver or spleen in the altered positions they sometimes assume. In the latter there may be some difficulty in distinguishing morbid growths from masses of hardened fæces.

Greater mistakes, however, are much more likely to be made on the other side, when complaints of what seem to be only functional derangements of the stomach and bowels lead us away from considering the possibility of such a serious malady; or when, if the idea be suggested, and an examination instituted, the discovery of nothing to confirm the suspicion throws us back again on the idea of functional disturbance, till progressive emaciation and final exhaustion of the

powers of life prove that there was something real in the hypothesis.

The largest growths of the kind referred to are those which take place in the omentum when occupied by encephaloid cancer, and still more by colloid: they are more likely to be mistaken for enlargement of the liver or spleen than any others. Next in size are encephaloid masses in the mesentery: those which are most apt to escape detection are such as take their rise in the glands close to the spine. Mesenteric disease tends more than any other to excite inflammation and exudation into the peritoneum. It seems scarcely necessary to add that scrofulous deposits are more common during the period of growth, and that malignant diseases usually occur after middle life.

CHAPTER XXXI.

EXAMINATION OF THE URINE.

General Considerations—Analysis of Urine—§ 1, *Acidity.*—§ 2, *Specific Gravity.*—§ 3, *General Appearance—Colour—Transparency.*—§ 4, *Sediments*—(*a*) *Chemical Constitution*—(*b*) *Microscopic Appearances—Organic Substances—Crystalline Bodies.*—§ 5, *The Urine free from Sediment*—(*a*) *Albumen*—(*b*) *Sugar*—(*c*) *Urea.*

We next proceed to the diagnosis of diseases of the urinary organs: our knowledge of them is in great measure derived directly from the condition of the urine, and we must therefore inquire with some minuteness into the changes which it undergoes. In doing so we shall find that in very many instances its abnormal states are dependent on diseases of distant organs, by which the function of the kidney merely is interfered with, while there is no actual change of structure; but as our object is to ascertain the bearing of symptoms upon the condition of the patient, no apology need be offered for bringing together here all such conditions of urine, whether belonging to diabetes, to the lithic acid diathesis, as it is called, or even simply to dyspepsia: but it must be understood that they do not rank in a pathological sense as diseases of the urinary organs.

Probably a large field of observation remains open which may at some future period be made available for the discrimination of disease, and the treatment of the patient, in ascertaining the relative amount of the various normal ingredients of the urine; but at present the variations to which they are subject must be

left to those who have made chemistry their special study: our attention must be limited to changes which are easily appreciated and readily recognised. Let me only caution the student against what may be called rough-and-ready tests, and deductions based upon inaccurate investigations: it would be well if he knew how to make a quantitative analysis of the different products, because mistakes are continually being made in practice, from ignorance on this point, as when, for example, an unusual manifestation of the presence of any ingredient, by precipitation or otherwise, is taken as evidence of its being present in excess,—a conclusion which may be true, or may be utterly false. Unfortunately quantitative analysis is exceedingly difficult, but we may at least secure accuracy in the qualitative analysis, and this must never be overlooked; it is exceedingly unwise to attempt to decide on the characters of the urine by boiling it in a spoon over a candle, when we can always carry away a portion and examine it with a test-tube and a spirit-lamp. Most especially in commencing the study is it important to attain accurate results; if this be attended to in the first instance, it will give a much greater readiness in subsequent investigations; and no opportunity of making observations should be lost, until this accuracy and readiness are attained. However definite the rules laid down, fallacies can only be avoided by frequent practice.

In proceeding with the analysis of the urine we will direct our attention (1) to its degree of acidity, (2) its specific gravity, (3) its general appearance, (4) the chemical constitution and microscopical appearance of its sediments, (5) to the effects produced on the clear fluid by various reagents.

§ 1. *Acidity and Alkalescence.*—The degree of acidity can only be guessed at by the change of colour which test-paper undergoes: it differs in health at various periods of the day, and has been ascertained

to become even alkalescent during digestion in persons who appeared to be perfectly healthy. Excessive acidity, whether occurring only at certain periods in the twenty-four hours, or characterising the whole quantity passed, indicates faulty assimilation; it may be due either to the formation of an unusual quantity of lithic acid, or to acid generated in the stomach during digestion, which subsequently passes into the circulation, and then appears in the urine: acidity due to the former case is more constant, that produced by the latter more marked after any excess in eating or drinking.

Alkalescence depends upon two very distinct causes —deficiency of acid, and decomposition; the former indicated by an excess of fixed alkali, the latter by the presence of free ammonia. The smell is generally sufficient to discriminate these two conditions, and any doubt may be removed by heating the test-paper after use. Deficiency of acid when it exists as a permanent condition, either characterising the whole of the urine voided throughout the day, or at least recurring very frequently, is that to which the name of the phosphatic diathesis was once applied, because it is generally accompanied by a deposit of the earthy phosphates which are insoluble in alkaline solutions; it generally implies a low state of vitality, and more particularly nervous depression, resulting from exhaustion of the nervous system by mental anxiety, spermatorrhœa, &c. Similar results are occasionally met with from transient circumstances: a person whose urine is usually neutral or slightly acid will pass very alkaline urine for a short time at the commencement of digestion, when suffering from acid dyspepsia; most remarkable examples of this may be seen during the fermentation of the food in cases of sarcina ventriculi. Another accidental cause is the ingestion of a large quantity of any of the vegetable salts which are decomposed in the system, *e.g.*, the tartrate or citrate of potash or soda.

The presence of volatile alkali depends chiefly on

decomposition; and in by far the larger number of cases is due to imperfect emptying of the bladder, which causes the secretion of unhealthy mucus or pus from its lining membrane: the idea that deficient nervous energy in paraplegia was the direct cause of decomposition is now abandoned. In certain states the urine passes more rapidly into decomposition than in others; and it would appear that deficiency of acid, amounting only to its being slightly below the ordinary standard, along with excessive secretion of mucus from the bladder, though not actually morbid, may excite this change very soon after the urine is evacuated; and the same effect may be produced by impurities in the vessel in which it is contained—a very small quantity of animal matter in a state of change speedily rendering the urine fetid. This condition is very different from that just adverted to, when inflammation of the bladder exists: in the one decomposition takes place after the urine has left the bladder, in the other the urine is ammoniacal when passed: the one occurs in states closely analogous to those in which fixed alkali is commonly present, the other is restricted to the cases of local disease.

The urine is naturally acid under ordinary circumstances, and care must be taken in pronouncing it unusually so from the effect produced on the test-paper, because all test-papers are not alike; one becomes very much reddened by acidity which only slightly alters another. In conditions of alkalescence it is important to have the test-paper as delicate as possible, because the reaction is frequently very weak. Alkalescence due to ammonia, if not distinguished by the smell, may be readily recognised by the action of heat, which dissipates the volatile alkali, and restores the colour of the paper.

No great importance attaches to the fact of any specimen of urine being either acid or alkaline. Changes in this respect are so easily produced by the ingesta, whether food or medicine. Even in those cases in which unhealthy bladder secretion sets up a sort of fermentation with the development of free ammonia, the urine may very generally be maintained in an acid state by the administration of mineral acid; and the presence of free alkali is not alone sufficient to point out the source whence the pus is derived.

§ 2. *Specific Gravity.*—By means of the urinometer we ascertain how far urine differs in specific gravity from pure water: and it is of great importance to bear in mind that the instrument does no more. It shows how much soluble matter heavier than water is contained in a given quantity of fluid, but it does not teach what that solid matter is. It may consist of salts, of urea, or of sugar, and we can only determine its nature by chemical analysis. A generally high or low specific gravity, as ascertained by testing a portion of the mixed secretion of the whole day, and especially when found persistently so by repeated examination from day to day, is of more importance than any one evacuation of the bladder being above or below the average. In estimating the importance of specific gravity as an indication of disease, we have to take into account the quantity passed during the twenty-four hours. Any deviation from the normal standard is important when the average quantity of urine is secreted, but it may be taken as certain evidence of disease if a high specific gravity accompany excessive secretion, or a low specific gravity be noted when the urine is scanty. The observation that at any one period of the day the specific gravity is much above the standard may lead to the detection of some disorder in the assimilating processes which would otherwise escape notice; its being casually below the standard is of little moment; it is not uncommon in hysteria; it may happen in consequence of the person having imbibed an unnecessary quantity of liquid, or having taken some aliment or stimulant which has accidently acted as a diuretic. The circumstances under which the more important variations occur must be again adverted to: it need only be stated here, that when persistent, the minimum is observable in albuminuria, the maximum in diabetes.

The urine taken for the purpose of determining the specific gravity should be, if possible, obtained from a large quantity; each time that urine is passed in the twenty-four hours it varies

somewhat in specific gravity, and, as an isolated fact, its increase or decrease is of little value unless it be found persistent on repeated trials. This circumstance does not generally receive the attention it deserves, and has led to less respect being paid to specific gravity than to the other facts connected with the analysis of the urine. A persistently high specific gravity in Bright's disease is one of the most valuable and important aids to classification which we possess.

§ 3. *General Appearance.*—The urine, after standing some time in the vessel, may be perfectly transparent throughout, or a sediment may rest at the bottom, leaving the supernatant fluid quite clear: in other cases the whole is more or less opaque; and this opacity may increase towards its lower part, or in addition there may be a distinct deposit.

a. Transparent urine varies in colour from a pale yellow, hardly perceptible, to a deep amber, in conditions of health: and within certain limits these variations are proportional to the amount of animal matters present. When the colour is deep, the relative amount of water is usually small, and the specific gravity high, and very generally the salts as well as the extractive matters are in excess, and are deposited when the urine is cold, unless they be held in solution by some unusual circumstance. In all cases of diuresis the urine is pale and limpid from an excess of water, and perhaps the absence of colour is most striking after an hysterical paroxysm.

Deep-coloured, transparent urine may be taken generally as indicating excessive metamorphosis of tissue; it has perhaps a more intimate relation to the secretion of colouring matter by the liver than to any other circumstance. When the blood becomes saturated with bile in jaundice, the urine acquires the colour of porter; and it is only by pouring a small quantity into a white porringer or into a test-tube that we can satisfy ourselves that it is not opaque. This condition is essentially different from that in which the secretion is dark-coloured and of high specific

gravity, although the shade of colour in slight jaundice may be exactly the same. It may be added here, as we shall not have again occasion to refer to it, that the addition of nitric acid, converting the colour into green, is the readiest test of the actual presence of biliary colouring matter in the urine.

b. When the whole of the urine is opaque, it presents either an appearance of unusual whiteness, in consequence of the minute opaque particles being colourless; or it is unnaturally dark from the adventitious presence of colouring matter, and this is most commonly derived from an admixture of blood.

The white varieties are chiefly of two kinds—an admixture of mucus or pus, and turbidity caused by chemical decomposition; the two being very often found together. Healthy mucus floats as a cloud, which may leave the edges nearly transparent as it accumulates towards the bottom of the vessel: pus renders the whole of the urine more or less opaque, but forms a distinct sediment when allowed to stand, very often carrying down with it some portion of earthy salts: altered pus, or ropy mucus as it used to be called, collects into a stringy mass at the lower part of the vessel, the whole urine being turbid from decomposition: urine mixed with leucorrhœal discharge, and that which is altered by decomposition, are both wholly opaque; if there be any sediment it is quite independent of the opacity, which has no tendency to form a deposit.

Opaque urine of deep colour may be produced by a combination of one of the white varieties with colouring matter of bile, which is of itself really transparent; in such cases the existence of jaundice would explain its meaning: it is much more commonly produced by a certain admixture of blood, when the colour varies from a pinkish hue to a deep brown. These varieties depend more upon the alkalescence or acidity of the urine itself than upon the causes which give rise to the effusion of blood; but as a general rule the passive

hæmorrhage occurring in organic disease of the kidney is far more frequently brownish than pink. It sometimes gives merely a slight smokiness to the urine, which is then rather hazy than opaque. When more severe and more active hæmorrhage occurs, coagula are often found of such a size as to be readily recognised by the naked eye, and in all cases a sediment of blood globules may usually be seen.

§ 4. *Sediments.*—In a very large number of instances, by allowing the urine to stand for some hours after it has cooled, a sediment is deposited, which sometimes can only be discovered by placing a drop from the bottom of the vessel under the microscope, but is most commonly visible to the naked eye. These sediments are partly formed of substances which are merely intermixed with the urine, and not dissolved in it; partly of soluble materials, some of which are more freely dissolved in urine at the temperature of the body than at the temperature of the air, the excess being deposited as it cools ; and partly of elements which are more soluble in one form of combination than another, and after the lapse of a few hours are slowly precipitated in consequence of spontaneous chemical change.

They vary much in their general character and appearance, so that an experienced observer frequently can pronounce with accuracy as to their nature from mere inspection ; but it seems to me better to classify them according to their chemical relations and their microscopical characters ; and as we proceed, their general appearance will be mentioned. The supernatant fluid should be first carefully decanted off for separate analysis ; and if any part of it be perfectly transparent, this should be placed by itself, as the evidence of the presence of albumen in small quantity is so much more satisfactory in a transparent fluid.

a. Chemical relations.—A portion of the sedimentary urine is to be poured into a test-tube, taking care not to fill it to more than an inch in depth (stu-

dents often puzzle themselves by using too large a quantity), heat is then applied, and as the temperature rises we observe the following effects.

1. The deposit is entirely dissolved. It is wholly composed of the urates and chiefly of the urate of ammonia. This sediment presents a flocculent appearance, is sometimes white, but more generally it is coloured of a brown, yellow, orange, or pinkish hue, and when the red tinge is distinct, it is scarcely necessary to use any test to ascertain its character; no other red-coloured deposit has the same flocculent appearance: the urine is always acid.

2. It does not disappear with heat. One or two drops of acid are then to be added to the heated fluid: if it now dissolves, we know that it consisted of earthy salts, probably in combination with phosphoric acid. These are always white, but do not present any appearance sufficient at once to distinguish them; they generally abound in alkaline urine.

3. It is unaffected by hydrochloric acid, but dissolves on the free addition of nitric acid; and it is also soluble in alkali. This deposit consists of uncombined uric acid: its general characters are very marked; it is heavy, readily falling to the bottom of the tube after agitation, and presents to the naked eye the appearance of red sand; it can only be confounded with blood-globules, which sometimes have a similar sand-like character, but are not nearly so heavy, and are only found in urine partly opaque; they are quite insoluble.

4. It does not disappear with heat and acid. To a fresh portion add freely liquor potassæ, and boil; the greater part is dissolved, and by gently prolonging the heat the undissolved portion collects into a mass, which floats in perfectly transparent fluid. Such a sediment is probably composed chiefly of pus, the undissolved portion being earthy salts, which are precipitated either in part or wholly after the alkali was added. When the amount of pus is considerable we shall find, on

pouring the fluid out of the test-tube, that it has acquired an adhesive property: it is called ropy because it clings in lengthened strings to the lip of the tube in place of dropping freely. This sediment cannot be distinguished by the naked eye from white lithates or phosphates; the urine is seldom strongly acid, and does not become transparent when the deposit has fallen; it shows a great tendency to become alkaline, and then the pus becomes adhesive, and is gradually converted into a ropy mass.

When the sediment consists chiefly of blood-globules it will also be insoluble in heat and acid; but in this case the examination need not generally be carried further as its character is proved by the blood tinge of the urine, and the relation of the precipitate to the rest of the fluid. This is best seen when after the greater part of the supernatant fluid has been poured away, the porringer is tilted gently first to one side and then to the other. The previously invisible sediment follows the edge of the urine as it recedes from the side of the porringer and is left behind as a semicircular dark coloured cloud, when it returns and flows in the opposite direction. The degree of lightness with which it floats distinguishes it clearly from uric acid sand which clings to the edge of the urine in a similar manner, but when left behind lies immovable at the bottom.

5. When part of the sediment dissolves with heat, the remainder must be tested in the same manner both with nitric acid and with liquor potassæ; and we may thus determine that there exists along with the urates an admixture either of earthy salt which is very often oxalate of lime, or of crystalline uric acid, of pus, or of blood.

Such are the general answers which chemistry affords as to the nature of sediments; and they have been stated in broad outline because the more delicate and intricate results are really unnecessary when we have the microscope to appeal to in all cases of doubt; and the few facts above referred to are the only ones of real importance in treatment. In a very large proportion of cases the sediment is composed of urates: and according to the present belief of chemists, the form of combination in which the uric acid exists is that of urate of ammonia. This class of salts is at once recognised by their ready solution by heat: and when

the urine becomes perfectly transparent there can be no doubt as to their true character.

Not unfrequently when the earthy salts are present, some portion of the sediment dissolves by heat: this is due to an admixture of the urates; as soon as the temperature has reached the boiling-point there can be no further solution by heat, and we add one or two drops of acid; the phosphates are dissolved with the utmost facility. Any acid may suffice, but it is well to remember that, of those in common use as tests, the hydrochloric has no action on uric acid, while the nitric dissolves it as well as the earthy salt: at the same time it requires a much larger addition of acid to produce the one effect than the other. Oxalate of lime scarcely ever exists as a visible sediment, but it is also dissolved by the stronger acids. If it were desirable to determine by chemical reaction whether a scanty deposit, having the character of an earthy salt, were phosphate or oxalate, we should test one portion with acetic acid, which dissolves the former and not the latter.

The crystalline uric acid deposit is similarly often left after the salts are dissolved: its solubility on the addition of a considerable amount of nitric acid distinguishes it from blood, and from fine sand, which hysterical patients occasionally mix with their urine. Its general characters are so marked that there is no real difficulty in recognising it. Sometimes found in urine, which becomes perfectly transparent on standing, it is very frequently accompanied by a cloud of mucus; and it may be seen in other instances mixed with blood: in either case the urine will not become transparent when boiled with acid, although the uric acid itself may disappear.

Part of the sediment may be dissolved by heat or acid, but part may still remain, or it may have been wholly unaffected by either reagent. To a fresh portion of urine liquor potassæ is added, and heat applied: under all circumstances a precipitation of the earthy salts takes place, and by careful boiling these may be collected into a mass, which floats in the fluid, leaving the remainder perfectly transparent when the opacity has been caused by purulent deposit. If the quantity of pus be not sufficient to make the fluid ropy, a few drops of acid are allowed to fall on the aggregation of earthy salts, which are readily dissipated; and if the alkali have dissolved any pus or other albuminous principle, a very distinct cloud is formed in the urine in consequence of the coagulation of albumen by the acid. The circumstance of a whitish deposit, which was not wholly soluble in heat and nitric acid, being partly dissolved by liquor potassæ with heat, and the addition of nitric acid to this solution causing the remainder to disappear, and a cloud of albumen

to form, may be received as pretty satisfactory evidence of the admixture of pus.

Nothing has been said of cystine, although it has nearly similar relations to chemical tests, simply because it is so rare. The fact of its being a fawn-coloured deposit, and yet not dissolving by heat alone, as similarly coloured urates do, would necessarily lead to further inquiry; purulent deposits are invariably white. Uric acid sand is also dissolved by boiling with an alkali; but this can give rise to no confusion, because its characters are so striking.

While heating the urinary sediment we have also to observe whether, as the temperature rises, the fluid first becomes transparent, and then a fresh cloud subsequently forms; or whether, when the opacity is not removed in the first instance, it becomes more turbid as the application of heat is continued: and, further, what is the effect of one or two drops of acid upon this new precipitate.

b. Microscopical appearances.—It is especially important for the student to correct by the microscope the conclusions he has arrived at from chemical analysis: and in all cases of doubt its aid is most valuable. Almost any portion of urine placed in the field of the microscope will present some minute objects floating about; but it is better to let it rest some time, and then to take a drop from the bottom of the vessel: it will often happen that the microscope shows that there is a tolerably abundant sediment when it is scarcely observed with the naked eye, because it differs so little from the fluid in its power of refracting the rays of light. The student need never perplex himself trying to make out shapeless objects, but should confine his attention to a few of the more distinct organic and crystalline formations.

Among the organic bodies we observe,—

1. Blood-globules: these, it must be remembered, are not often found in their normal form, but variously altered by the fluid in which they float, being sometimes unusually flattened, but perhaps still more frequently ruptured, and unequally distended, so as to assume a crescentic or a somewhat globular form.

2. Pus and mucus-globules; which can scarcely be

distinguished from each other, and are most readily known by their relative numbers: a few solitary globules may be certainly regarded as mucus, a very large number as certainly pus: they are also in some measure distinguishable by the circumstance that pus globules are more decidedly granular, mucus smoother and more uniform.

The action of acetic acid, which causes a cleaving of the nucleus into three or five parts, is also cited as one of the evidences of pus.

3. Epithelium, when present, would determine any doubtful globules to be mucus rather than pus. One or two scales may be seen in almost any specimen of urine, and they are only of consequence when tolerably abundant, as indicating irritation of the bladder or urinary passages. Epithelium is generally found in large quantity in the urine of women, being derived from the uterus and vagina: the scales of this variety are much larger than those which come from the bladder. In rare instances epithelial scales of the columnar variety are thrown off from the ureters: and in association with tubular casts we sometimes meet with renal epithelium in small polygonal scales.

4. Tubular casts present several varieties. Transparent casts of large and small size as they are thrown off by the central or the cortical structures respectively; granular casts, usually of small size, which seem to be stuffed with the débris of epithelium, possibly mixed with blood-globules; casts containing fatty matters; or a few blood-globules only, or some entire scales of epithelium. The exact interpretation of these indications of disease is as yet somewhat uncertain. The fact that they are present is of value; but independently of the obscurity which sometimes attends the observations themselves (*e. g.* globular lithates having been unquestionably mistaken for fat), it does not appear that the student can derive any useful information from their discrimination; and their relations seem at present to be subjects of study rather

for men who are investigating the pathology of the kidney, than for those who wish to turn such knowledge to a practical account.

5. Vibriones may often be seen in active movement: their presence is not connected with any particular forms of disease, but merely with chemical change in the urine.

6. The presence of spermatozoa may sometimes throw light on an otherwise obscure case.

Among crystalline substances we observe—

1. Oxalate of lime.—This may be regarded as one of the most important; not so much from the intrinsic value of the observation, as from the circumstance that we have no other means of detecting its presence with certainty. It occurs generally in octohedral crystals: occasionally we meet with some very short square prisms of uric acid, which closely resemble the oxalate of lime; but with care this need never be any source of fallacy. The planes of refracted light crossing the square surface diagonally, and disappearing and reappearing as the focus is altered, are extremely characteristic, and never seen under other circumstances.

2. Uric acid.—In combination with alkali as urates this acid presents under the microscope the appearance of amorphous granular matter, or assumes a variety of irregular rounded shapes. The observation that along with this deposit there are some defined crystals of uric acid is of considerable value in treatment; and this the microscope can alone determine with certainty; the lozenge-shaped crystals and square prisms of the acid being quite distinctive. The same observation will immediately solve any doubt as to the true nature of the sabulous deposit, which, in its uncombined form, lithic acid usually presents.

3. Triple phosphate.—The chemical test is of itself quite sufficient to distinguish the presence of earthy salts; and the most common of these, the phosphate of lime, is rarely found in a crystallized form; like the urates, the phosphates are usually seen only as granu-

lar matter. The three-sided prisms with bevelled ends, which characterize the triple phosphate, are not liable to be confounded with any other crystals. They indicate the presence of an excess of free ammonia, and therefore the probability of partial decomposition of the urine ; but this rule must not be regarded as absolute, for cases occasionally occur in which they are caused by the secretion of alkaline urine.

These are the most important of the objects which microscopic examination reveals. The list might be considerably added to, and the student, in learning the microscope, may often usefully employ his time in unriddling some of the more complex or more rare phenomena, detailed in the various treatises on the subject, because by such means he acquires familiarity with the use of the instrument: those just described are necessary for the purposes of diagnosis. If the chemical tests be rightly applied, pretty nearly all the facts regarding the simpler forms of sediments may be ascertained without the use of the microscope. It is in the complex cases, where there is any admixture, that its value becomes so great in discriminating the different objects, and showing the true character of each, when several distinct sets of chemical experiments might have been needed to accomplish the same end. It is particularly useful when the urine is generally opaque, and the effect of chemical reagents on the sediment are less distinct. The presence or absence of blood-globules in the sediment, when the urine is dark coloured, a large amount of epithelium, or some pus-globules, when it is milky, and the absence of any abnormal deposit when heat, acid, and alkali have alike failed to remove the haze after partial decomposition has begun, are each of great value in confirmation of the chemical analysis. But, on the other hand, heat and acid will distinguish in a moment between the lithates and the phosphates in their amorphous condition—a conclusion which at best can only be guessed at by the employment of the microscope.

The microscope does not afford much assistance in determining the source of hæmorrhage when blood is present. Tubular casts, mixed with blood-globules, would show that passive congestion of the kidney accompanied the hæmaturia : and this would be coincident with an excess of albumen in the urine. Crystals of uric acid may lead to the suspicion of the existence of a calculus as the cause of the hæmorrhage ; but it must be remembered that they are constantly found in the hæmaturia of scarlatinal dropsy. In fungoid disease of the bladder, the compound cells of cancerous growth, and in chronic ulceration, pus-cells accompany the blood-

globules when the hæmorrhage is from the bladder. The changes in form which they undergo are dependent equally upon the chemical relations of the urine, and the period during which they have remained in the bladder.

Pus in small quantity, and mucus in excess, whether from the bladder, or, in females, from the vagina, are each of them sources of perplexity which the microscope readily explains. It is of very little consequence which name is applied, as there is evidently no clear line of demarcation between them: very large epithelium scales serve to show that the vagina is the source of the secretion; of a smaller size, their presence in unusual number might be taken as evidence that the accompanying globules came from the bladder, and not the kidney, and were rather mucus than pus. When the globules are very numerous, we cease to call them mucus under any circumstances; an irregular serrated edge seems to belong especially to scrofulous pus; little agglomerations of globules show that there is a tendency to fusion, the urine is scarcely acid, and the source of the secretion is very probably the bladder. Mucus and bladder-epithelium are chiefly found when crystals of uric acid or oxalate of lime are present in the urine, which no doubt act as irritants on the mucous membrane.

Tubular casts should always be looked for by the student, because they teach him when albumen is dependent on degeneration of the kidney, and thus give him clearer notions of its origin, and of the cases in which its presence is caused by other circumstances; but it would be very rash to say there was no renal disease simply because casts were not seen.

Vibriones and spermatozoa are both causes of opalescence which the microscope can alone clear up. Chemically, it may be determined that the condition is not one of much importance with reference to disease of the kidney; but spermatozoa are of considerable moment with reference to the general health of the patient.

Oxalate of lime as a discovery of late years, received at one time a greater share of attention than it deserved: its presence is by no means rare, and is not in any way connected with perverted function or diseased action of the kidney. It is not uncommonly found in a dumb-bell shaped crystal; but the student ought not to take this form as characteristic of oxalate of lime, unless the ordinary octohedra be also present.

Uric acid, when found in the urine in crystals, seems to show a different condition of health from that in which it is found only in combination with alkali, and hence the importance of the observation. Probably, when the urates appear as semi-crystalline rounded masses, they show an approach to the same diathesis; but at present we cannot assign any very satisfactory reason why this substance appears sometimes in the crystalline,

and sometimes in the amorphous form—uncombined, or as a compound body. It is worth remembering that the globular urates occasionally possess so high a reflective power as to have been mistaken for oil-globules.

It is equally difficult to say why the phosphate of lime is sometimes crystallized, sometimes amorphous: the form of its crystals is long and acicular, and when present, there can be no doubt that the urine was passed in an alkaline state, and that the alkalescence was not derived from excess of ammonia; but, on the other hand, such a condition of urine does not necessarily imply crystalline phosphate. Triple phosphate in a large proportion of cases, follows decomposition of the urine: but it is recorded as having occurred when there was no trace of decomposition, and the alkalescence of the urine depended only on conditions of depressed vitality. It is one of those objects which from its unmistakeable appearance is of great use to the learner, because it never occurs along with a deposit of urate, but always with the phosphate of lime.

§ 5. *Urine free from Deposit.*—We next proceed to apply our chemical tests to the urine which has been decanted off the sediment, or to urine which has not let fall any appreciable deposit. Two abnormal ingredients occupy the first place, because they are constantly found in certain conditions of disease, and, as they are freely soluble, they give no other direct indications of their presence: a few words must be added on excess of urea, which also never occurs as sediment.

a. Albumen.—The means resorted to for ascertaining the presence of albumen are heat and nitric acid, each of which has the property of coagulating it; and in certain cases the extraordinary amount of the precipitate formed by either, leaves no possible doubt as to the fact. It is only where the quantity is small that there is any difficulty in coming to a determination upon the subject, and especially when the urine is not quite transparent. In speaking of this opacity, it was shown to be often produced by an admixture of pus or mucus, or an effusion of blood; and if these circumstances can be traced to disease of the kidney, it is evident that the accompanying albumen will be

in considerable amount and the reaction decided. When therefore any doubt exists, the very inconclusiveness of the experiment may, to a certain extent, be regarded as a proof that the kidneys are not diseased.

The readiest method for the detection of albumen is certainly that of pouring from half a drachm to a drachm of nitric acid to the bottom of a precipitate glass containing the urine to be examined. This can easily be effected by allowing it to run down the side of the glass; and if the fluids do not intermingle, coagulation of the albumen takes place only at their line of junction, and may be observed even when exceedingly faint, by varying the position of the glass with reference to the light, and observing the effect of its transmission and reflection. The chief source of fallacy is the fact that nitric acid has the power of precipitating an excess of urate of ammonia when held in solution by any unusual circumstance. A few experiments will better teach the different appearance of the two precipitates than any description; but if a doubt remain, a small quantity of the urine may be boiled after only so much acid has been added as is necessary to produce the precipitation; the cloud will wholly disappear if it consist only of the lithates.

There is, perhaps, still greater liability to error when a patient suffering from gonorrhœa is employing some of the resinous remedies, which are eliminated by the kidney, and are decomposed by nitric acid in the urine. This precipitate is also insoluble by heat, but may be distinguished from albumen by its amount being considerable, and yet no coagulation occurring when heat alone is used, or used in conjunction with one of the weaker acids. The first hint of the possible fallacy is given by the urine being slightly opaque from the presence of urethral discharge.

In employing heat as a test of the presence of albumen it is to be borne in mind that heat develops chemical action, and may produce a precipitate of

phosphate of lime, and that the coagulation of the albumen may be prevented either by the urine being alkaline or by a single drop of strong acid being added to a neutral specimen. Both difficulties are best avoided by acidulating the urine first with acetic acid; and then, if the upper part of the urine in the test-tube be boiled, while the lower part is only gently heated, the contrast of opacity above and transparence below is often sufficient to indicate the presence of an exceedingly small quantity of albumen.

In the first of these two methods we have the advantage of being able to say with considerable confidence whether, when the urine is opaque, this is increased at the junction of the two fluids: in cases where there is only a trace of albumen, even if the urine be perfectly transparent, the haze produced by its coagulation is also more easily perceived in this experiment than when boiled in a test-tube. In either case it is difficult to apply the further test of heat, because the precipitate formed by the acid becomes less perceptible when transfused through the fluid, and it may, consequently, seem to disappear with heat; and we are uncertain whether it be soluble or insoluble—whether urate of ammonia or albumen had been thrown down by the acid. Other circumstances, however, serve to determine that the haze is not caused by precipitation of the urates: if the urine be decidedly acid with or without previous deposit, no addition of nitric acid will precipitate the urates from the clear urine: if the urine be pale, and of low specific gravity, it is impossible by such means to render these salts insoluble in the excess of water which exists: if again a double line of precipitation be seen, the one corresponding to the line of contact between the urine and the acid, and the other somewhat above this, we may be certain that one at least is caused by the presence of albumen. When any uncertainty remains I have found it a useful experiment to warm the urine to blood heat before adding the acid, a temperature which renders the precipitation of urates impossible. By this means I have proved that the two lines are sometimes both due to the precipitation of albumen.

Occasionally it may be of service, when the urine is opaque, to boil it with alkali, as mentioned in speaking of the chemical relations of pus (§ 4; *a*, 4); the whole of the fluid may thus be rendered transparent, with the exception of the mass of phosphate floating up and down, and an opportunity afforded of ascertaining, by the addition of acid, what amount of precipitation occurs. All pus has a certain quantity of albumen neces-

sarily associated with it; but it is very much greater when the discharge is from the kidney than when it comes only from the bladder.

The heat-test for albumen is most certain when the urine is perfectly limpid, and decidedly acid. Opacity can only be removed by filtering; and the process is just sufficiently troublesome never to be practised. The nearest approximation to truth, in applying heat in such cases, is to compare the urine in the test-tube, after being boiled with another portion of the same fluid in a second tube of the same size.

In using the stronger acids, as is commonly done when the urine is alkaline or neutral, we encounter some difficulties and sources of error. If only a drop of acid be added before the urine is boiled it may prevent the precipitation of the albumen altogether; if more be used, the albumen is apt to be coagulated, and it is no longer the heat-test, but the acid-test. If, again, the urine be boiled without acid, a precipitate of phosphate is likely to be formed if the urine be alkaline; and though this may be removed by a drop or two of acid, the further addition of acid may not afford such distinct evidence of the presence of albumen when the temperature is raised to the boiling point, and it may have to stand some time before the precipitation can be observed.

In the application of heat and nitric acid, the student will find it advantageous to manipulate with at least three distinct portions of urine. He should pour about an ounce into a precipitate glass, and then add cautiously nearly a drachm of strong acid; this will sink to the bottom of the glass if poured down its side, and if any reaction take place between the two fluids it will be distinctly seen at their line of junction. He should then pour a small quantity of urine alone (half a drachm is quite enough, and better than a larger quantity) into a test-tube, and boil over a spirit lamp, and then add one or two drops of acid. To a third quantity he should add a few drops of acid while cold, and then boil. In all cases in which heat is employed he should be careful to add neither too much nor too little acid; a large quantity produces chemical decomposition, which may be perplexing, and a single drop of acid sometimes prevents the precipitation of the albumen, which it is our great object to accomplish by these means.

When the results of the examination are at all unsatisfactory, very explicit directions should be given to the patient to preserve any portion of the urine that is transparent when passed, in a perfectly clean vessel: not uncommonly the difficulties are caused

solely by some accidental admixture, and in all circumstances, a second analysis may throw much light upon the previous one. In other instances, when the trace of albumen is but slight, it is very necessary for correct diagnosis to make a second or a third examination at intervals, because the casual occurrence of albumen in small quantity is generally not a matter of very great importance, and if urine passed at other times be distinctly free from it, there is every probability that it is not caused by organic change. Further, it may be added that, when any suspicion occurs to the mind of the possible existence of albuminuria, one examination alone, however exactly performed, and however explicit in its results, is not sufficient, because, as the casual presence of albumen is no certain proof of the existence of organic change, so the urine may be casually free from it, in any stage of disease of the kidney.

b. Sugar.—In considering the general symptoms of disease in their relation to the urinary organs, in the succeeding chapter, the aggregate of symptoms in a case of diabetes will be found of such a character as to mark out very clearly the nature of the disease; yet it is needful to be able to pronounce positively in any given case whether sugar be present in the urine. In the greater number of cases, the changes produced, when diabetic urine is boiled with an equal quantity of liquor potassæ, are quite sufficient for the purpose. The urine becomes gradually of a deep yellow, which passes into brown, and then assumes a crimson or ruby appearance by transmitted light, exhaling an odour of burnt sugar or caramel. This sequence of changes cannot be misinterpreted by any one who has performed the experiment two or three times; but it is open to fallacy if one who is not familiar with the test trusts to it alone, and it may fail to detect a very minute quantity of sugar.

Greater certainty can be attained by the action of sugar upon salts of copper, and students ought on all

occasions to familiarize themselves with it. A few drops of a strong solution of sulphate of copper are added to the urine, and then a considerable quantity of liquor potassæ: the first portion of the alkali causes precipitation, its further addition dissolves the precipitate so formed: heat is now applied; and, when the temperature rises to a certain point, a yellow precipitate is rapidly formed. The accuracy of the test depends upon the two circumstances coinciding, that the precipitate has an evident tinge of yellow, and that it is formed with rapidity. A variety of chemical changes may precipitate the copper on prolonged boiling, but its colour is usually tawny or brown; and practically it is found that the only condition which gives rise to the rapid formation of a yellow precipitate is the presence of diabetic or grape-sugar.

The specific gravity of diabetic urine is invariably high, although the quantity passed be much greater than in health: and while it is true that the absolute amount of the sugar dissolved in the fluid is one of the causes of its increased density, it is not the only one, and therefore the specific gravity cannot be taken as a measure of the saccharine matter present. In no other condition of disease is the density so great; and yet there is rarely any deposit, the urine being generally pale, straw-coloured, and very often having a sort of oiliness in being poured from one vessel to another.

The student is more liable to error in consequence of adding too little liquor potassæ than too much. When a sufficiency is added, and the urine in boiling passes through a succession of deepening shades, from a pale yellow to a dark claret or port wine colour, there can be no fallacy in asserting that glucose is present, especially if the smell of caramel be given off. In my own opinion, this test is quite as certain as the sulphate of copper; but it is very important for the learner to acquire familiarity with both. A sort of blackening, more or less intense, is seen after boiling with liquor potassæ if any albuminous material be present; a slight admixture of pus or even mucus will sometimes produce this effect; and it is seen in its most marked

form when the urine is loaded with albumen. It ought not to lead to any mistake in diagnosis.

c. Urea.—When the specific gravity of the clear urine is above the normal standard, whether there be any deposit or not, and we have ascertained that no sugar is present, the conclusion is unavoidable that it is impregnated with an unusually large amount of those soluble principles which give to urine its ordinary characteristic properties, derived from metamorphosis of tissue; the most important of which is urea. The uric acid salts we have seen may be held in solution by an excess of alkali, and are precipitated by nitric acid; urea is not so precipitated: if no change occur on the addition of a small quantity of acid, a test-tube may be half filled with urine, and about half its bulk of strong acid added, and the tube plunged into a vessel of cold water; if urea be present in excess, feathery crystals of nitrate of urea will form. To produce this effect its amount must be considerable, so that even when we do not obtain it, we are not justified in asserting that no excess of urea is present: when the urine is deep-coloured, its density great, and its peculiar odour well marked, there can be no doubt of the fact that those principles among which urea holds a first place are secreted in large quantity, and treatment must be guided by this assurance.

Occasionally the urea is converted into carbonate of ammonia by some catalytic action, which probably commences before the urine is passed, but is greatly promoted by the action of heat. When the urine is boiled in such a case, the amount of earthy salts thrown down is generally considerable, and on the addition of acid the precipitate is dissolved, while effervescence takes place from decomposition of the carbonate of ammonia. This action cannot be regarded as any evidence of an excess of urea.

The most constant cause of effervescence is the presence of an alkaline carbonate derived from the food or the medicine. There is nothing which more interferes with the chemical reaction of

heat and acid than this liability to effervescence, and it sometimes becomes absolutely impossible to determine whether a minute trace of albumen may or may not be present.

The following table represents most of the chemical relations explained in the preceding pages:

A. Deposits:—	
1. Soluble by heat	Urates.
2. Insoluble by heat:	
a. Soluble in acetic acid	Phosphates.
b. Soluble in nitric acid	Oxalates. Uric acid.
c. Soluble in alkali	Pus. Uric acid.
B. Clear urine:—	
1. Precipitate produced by heat:	
a. Soluble in acid	Earthy salts.
b. Insoluble in acid	Albumen.
2. Precipitate produced by acid:	
a. Soluble by heat	Urates.
b. Insoluble by heat	Albumen. Resins.
3. Precipitate produced by alkali	Earthy salts.
C. Urine effervescing with heat and acid	Carbonates of the alkalies.
D. Urine becoming reddish-brown with heat and liquor potassæ	Sugar.

CHAPTER XXXII.

DISEASES OF THE URINARY ORGANS.

§ 1, *Acute Bright's Disease—after Exposure—from Scarlatina—accompanied by Dropsy.*—§ 2, *Chronic Bright's Disease—Granular Degeneration—its Commencement — Associations — Absence of Dropsy—Fatty and Waxy Degenerations — Relations of Dropsy to Kidney Disease — Characters of the Urine—the Presence of Blood.*—§ 3, *Suppurative Nephritis — Abscess — Pyelitis.*—§ 4, *Cystitis—Causes—Means of Diagnosis.*—§ 5, *Other Chronic Diseases.*—§ 6, *Calculus—in the Kidney—in the Ureter—in the Bladder.*—§ 7, *Suppression and Retention.*—§ 8, *Diabetes.*—§ 9, *Diuresis.*—§ 10, *Disordered Function—Excess of Water—Deficiency of Water—Excess of Acid—Uric Acid Sand—Lithates—Excess of Alkali—Phosphates—Excess of Urea—Associations of Kidney Disease.*

In proceeding to apply the inferences deducible from the condition of the urine to the diagnosis of diseases of the urinary organs, reference must also be made to those changes which are due to disturbing influences acting through the general circulation, and are in no way connected with actual lesion of the kidney. It is almost impossible to get at the early history of the diseases of these organs, because it is only when some very remarkable change in the character of the secretion takes place, or when some secondary affection is developed, that the patient seeks for advice, or is even conscious that anything is wrong. This is not less true of the acute than of the chronic affections; but as the progress of the former is more

rapid, we are commonly able to trace the history backwards to what may be justly considered its starting-point.

§ 1. *Acute Bright's Disease.*—The secretion of urine is more or less suppressed, and as a consequence anasarca rapidly ensues; but the patient thinks nothing of the diminished flow of urine, and is perhaps greatly astonished when dropsy comes on. Frequently and very justly ascribed to having caught cold, it is very evidently associated with disturbed cutaneous action: it sometimes occurs in a perfectly healthy person after very severe exposure; more commonly the earlier stages are overlooked, except in cases in which it follows an attack of scarlatina. We can then, too, generally trace slight exposure, but it is alleged by some observers that it may be the direct effect of the scarlatinal poison without any such exciting cause.

It commences with febrile disturbance, and there is often deep, aching pain in the back; the urine is scanty, loaded, deep-coloured, of high specific gravity, and albuminous: blood is sometimes mixed with it, as a consequence of congestion, especially on the decline of the more inflammatory symptoms. Under the microscope we generally observe casts stuffed with granular matter, blood-globules, and renal epithelium. Throughout the progress of the disorder, the dropsy continues, the high specific gravity of the urine is unchanged, and the albumen is abundant: but after a time the tubular casts become clear and transparent. It is now generally believed that the large mottled kidney is only the advanced stage of such an attack as follows ordinarily on scarlatina.

§ 2. *Chronic Bright's Disease*—not uncommonly called *Albuminuria.*—We include under this head all the varieties of kidney disease which tend to run into a chronic state. Of these the most remarkable is the condition of granular degeneration,—the best

known of all the diseases of the kidney. The indication of its existence is not to be sought in the presence of dropsy, which is a comparatively rare event; when present it is due rather to the cachexia of the disease than to imperfect secretion, except when casual congestion of the kidney exists, as indicated by the appearance of a slight blood-tinge in the urine.

The commencement of the disease is rarely traceable. The patient gradually loses strength, becomes pale and anæmic, finds himself liable to catch cold, or suffers from headache, palpitation, and increased or irregular action of the heart, or from diarrhœa; or complains of anomalous gouty or rheumatic affections. When questioned, he will generally admit that he has suffered from pain in the loins of a dull, aching kind: but how many suffer in the same way from weakness only, who never have albuminous urine. The circumstances in the aspect of the patient which prepare us for the discovery of albumen in the urine are a waxy or an extremely pallid face, with pearly eyes, and puffiness round the eyelids, or œdema of the ankles, which the attendant may notice before the patient becomes conscious of it. Such indications are the more valuable, inasmuch as the albumen may for a time, in the progress of the case, be reduced to a mere trace; they are only to be regarded as hints of what may probably be discovered: they result from the cachexia of the disease, and may be seen in other cachectic states, of which anæmia is a prominent characteristic.

Our knowledge of the condition of the kidney is necessarily mainly derived from the condition of the urine. An abundant flow of pale, colourless, or smoky urine of low specific gravity, indicating on the addition of acid only a small amount of albumen, and exhibiting but a few slightly granular or perfectly transparent casts under the microscope, may be taken as very distinct evidence of granular degeneration. It is in this

variety that the albumen present is at its minimum; the trace being sometimes barely perceptible and often wholly overlooked. It is vain to expect any reaction from boiling the urine in a spoon when it can scarcely be seen in the test-tube, and it is in such cases especially that the persistence of a trace of albumen, so faint as only to be recognised by the careful addition of acid, is of the greatest importance in diagnosis.

The symptoms of *fatty* and *waxy degeneration* are not so distinctive as to lead to very clear diagnosis. In some respects they stand intermediate between the mottled and the granular kidney. Dropsy is not so early in its appearance as in the more acute form of disease, but is more certain to show itself than when the kidney is granular. The urine, too, is moderate in quantity, has a medium specific gravity, with a considerable amount of albumen; neither presents the heavy curdy precipitate of the one variety, nor the faint cloud of the other. The appearance of oil globules in connection with renal epithelium or tubular casts would determine in favour of fatty degeneration, and their absence might incline us to the belief that the disease was lardaceous, if it occurred in a constitution tainted with scrofula or syphilis, or broken down by long suppuration. It must not be supposed that the term "waxy," as applied to tubular casts, has any relation to the same term when employed to designate a form of disease.

Dropsy is so constantly associated with disease of the kidney, that a few words must be said of the relation subsisting between them. When anasarca exists it is of the first importance to have clear notions of its cause; and as has been already pointed out, the first question is whether, if there be coincident ascites, the effusion occurred first in the abdomen or in the areolar tissue; then, in following the order we have adopted, the condition of the heart must be carefully examined; next we inquire whether there be any circumstances which point to disease of the liver; and

lastly we examine the urine. But the existence of one form of disease does not exclude the possibility of another being conjoined with it; on the contrary, we know that there is a constant alliance between disease of the heart and disease of the kidney.

a. In all cases an abundance of pale, limpid urine, of low specific gravity, which persistently yields a distinct precipitate of albumen, however small, affords certain evidence of serious disease of the kidney.

b. A very abundant precipitate of albumen, whatever be the condition of the urine, can only be caused by disease of the kidney, usually of the congestive or acute form.

c. If the amount of albumen be small, the evidence of its presence doubtful, and the secretion scanty, the inference is less certain when disease of the heart exists, because passive congestion of various organs is one of its usual concomitants. When, therefore, there is evidence of valvular lesion traceable to rheumatic attacks, urine, which is scanty and loaded, may continue for a time to contain a trace of albumen, while no disease of the kidney exists: when, on the other hand, the heart-disease is of the form of hypertrophy, or dilatation, the continuance of a trace of albumen is a more suspicious sign, because it is not improbable that the changes in the heart's walls, as they are not caused by valvular lesion, may be the effects of renal disease. In either case the diagnosis can only be considered certain when, with an increase of the secretion, the albumen persists, and the specific gravity falls. Somewhat similar relations have been observed when, in cases of dropsy dependent on other causes, any special circumstance gives rise to congestion of the kidney: such, for example, as anasarca accompanying ascites or ovarian dropsy, when pressure opposes the return of the blood through the renal veins; an exactly analogous relation is said to exist very frequently in the dropsy of pregnancy.

When dropsy is not present the determination of

the presence and character of the disease of the kidney must be derived almost entirely from an examination of the urine.

1. When a trace of albumen is found. There are, no doubt, many circumstances which may give rise to such an occurrence; and when it is not constant, and the specific gravity is normal, great hope may be entertained that the condition of disease is only transient, and not altogether beyond the reach of art. In investigating these cases the microscope may be of much service in showing either the presence of a few blood-globules, or of pus, or what are called exudation-corpuscles, or mucus-globules in such numbers as to resemble pus rather than mucus, all of which are found in simple congestion of the kidney; or it may discover fibrinous casts of the tubuli, which can only be present in very active congestion, or in permanent disorganization. These casts present either a homogeneous appearance, smooth and transparent, or they are filled up with granular matter, and sometimes they contain blood-globules or particles of oil. The smooth or waxy casts, as they are called, serve to indicate the most advanced condition of disease, and those containing blood-globules generally result from congestion; but their appearance must not be made too absolutely a guide to diagnosis.

2. When the urine is tinged with blood, the indications are somewhat similar to those derived from the presence of albumen, and what is true of the one is in great part true of the other, with this difference, that blood may come from any part whatever of the urinary organs and passages. The first question when blood is present is, whether more albumen can be precipitated than is accounted for by the admixture of blood if it had been added after the urine was voided. This is a point which experience only can determine, and for which no rules can be laid down. When we conceive the amount of albumen to be greater than would be contained in urine coloured by blood to the

same extent, it must be regarded just as if the blood was not present, for we know that the excess of albumen must be secreted by the kidney: when the amount of albumen is small, the next question is as to the source of the hæmorrhage; and probably the only reliable evidence of its coming from the kidney is when the microscope discovers tubular casts.

The existence of small clots, visible to the naked eye, proves that the hæmorrhage has occurred in some part of the canal between the pelvis of the kidney and the end of the urethra, and not in the kidney itself: and then there are generally local symptoms to guide us in determining at what point it took place. Sometimes it is distinctly passed before the urine begins to flow, and it probably issues from the urethra; sometimes it only escapes with the last drops of urine, when its source is generally the bladder. In females, blood flowing from the uterus may be mixed with the urine as it is voided: hæmaturia is also one of the forms of hæmorrhage which occur without any special lesion, depending simply on a deficiency of plastic material in the blood itself. It is only when the blood retains somewhat of its natural colour, and the urine is red or pinkish, that doubts regarding the source of the hæmorrhage can be entertained: when dark-coloured or smoky, the blood almost certainly comes from the kidney.

We do not class the albuminous urine which accompanies the presence of pus-globules under the head of albuminuria, because we presume that, in the examination of the deposit, this fact has been observed, and it serves to characterise distinct conditions of the kidneys or urinary passages. It must, however, be remembered that one of the features by which we are enabled to distinguish pus coming from the substance of the kidney, is that the urine contains an excess of albumen beyond that which is accounted for by the admixture of liquor puris. In this respect it is very analogous to hæmaturia, and the question of whether the kidney be directly involved is to be determined simply by ascertaining whether it do or do not secrete albumen: the great difference between the two is that the blood is poured out in cases of chronic disease as an accidental admixture, while pus

indicates a special condition, and the albumen is only present because the kidney is altered in function and structure by the suppuration.

In both cases it is possible that the abnormal ingredients may have separate sources; the albumen coming from the kidney, and the blood or the pus from the bladder or urinary passages. Against such coincidences it is almost impossible to guard, and it would be vain to attempt to lay down rules for diagnosis: but they are in practice not of very frequent occurrence; the accidental hæmorrhage would not very greatly modify the treatment of the prominent disease of the kidney, and the presence of pus would lead to the adoption of similar measures, whether its source were the kidney or not, when it was found in a patient with albuminuria. The absolute diagnosis is therefore not very essential: and probably some other symptom would suggest the bladder as the seat of suppuration or hæmorrhage when not proceeding from the kidney.

In its results to the economy at large, permanent disorganisation of these glands is a disease of the greatest importance: the constant drain of albumen, which at times passes off in enormous quantity, establishes a state of anæmia which is more or less the cause of many of the secondary ailments which spring from it; and, at the same time, the retention of effete matters, which are usually evacuated by this channel, seems to produce a sort of blood-poisoning which increases the anæmia, and is the more immediate exciting cause of the diarrhœa, and the plastic exudations which so often appear during its progress.

§ 3. *Suppurative Nephritis—Abscess—Pyelitis.*—All characterised by the presence of pus in the urine in greater or smaller quantity. Suppuration is sometimes directly traceable to an attack of nephritis with a well-marked history, but it is also met with in practice without any definite precursory symptoms.

No doubt there must be some degree of inflammation before pus is formed, but it is to be remembered that the inflammation is often of the strumous kind, and then the evidence of its existence is necessarily obscure. In either case the pus may make its way externally, through the loins, or may be discharged by the bowels, or be voided in the urine. The first of these terminations is to be recognised by the position and size of the swelling which accompanies it: a small abscess in the loins leads us to inquire after previous

attacks of nephralgia, or to look for the presence of albumen in the urine: a larger one is much more probably connected with disease of bone; it is a mistake to suppose that the pus discharged by an abscess of the kidney has any urinous odour. In the second form, the diagnosis may be aided by calculi being passed by the rectum along with the pus: if the history of the case show that affection of the kidney had existed prior to the appearance of pus in the stools, and there be no indication of ulceration of the mucous membrane of the intestine, it is highly probable that it proceeds from abscess of the kidney. When pus forms in consequence of local peritonitis, there is very generally a history of pain somewhere or other to point out the locality in which the inflammation had been going on, and we are left to judge from probabilities only, when there is no such history obtained.

The third mode of discharge is the most common, especially in the strumous abscess. The attention of the patient is first arrested by the frequency of the calls to empty the bladder: the total quantity of the urine in the twenty-four hours is not increased, and it is turbid when passed, depositing a white sediment on standing. It is acid, and it remains slightly opaque; the sediment is not dissolved by heat or acid, but, on the contrary, both of these reagents increase the turbidity, and the decanted fluid gives a distinct precipitate of albumen. The sediment is in great part dissolved by boiling with alkali, and the fluid becomes ropy; under the microscope abundant globules of pus are seen. If these characters are permanent, we may be certain that we have to do either with suppuration of the kidney or inflammation of the calyx—pyelitis, as it is called. Some idea of the cause on which the purulent discharge depends, may in such cases be obtained from the relative amount of the pus present, and still more from the persistence of the disease.

§ 4. *Cystitis.*—It may be convenient to take this

disease into consideration here, because inflammation of the bladder is a frequent source of pus in the urine: the urgency to frequent evacuation which marks suppuration in the kidney, is not so great in cystitis, or it is of another kind. The history very often dates from some retention of urine in the first instance, as, for example, an unavoidable delay in emptying the bladder, followed by over distension and subsequent spasm, with fruitless efforts at micturition; perhaps the presence of stricture in males, or in females the pressure of an enlarged uterus, renders it impossible thoroughly to empty it. It is immaterial whether the first distension be the cause of the inflammatory action which ensues, or whether it is produced by the retention of a small portion of urine on each occasion, which by its decomposition acts as a ferment on what is subsequently secreted; the whole contents of the bladder becoming ammoniacal, irritating the mucous membrane, and giving rise to purulent secretion. The latter is evidently the mode in which cystitis is developed in paraplegia, accompanied by paralysis of the bladder, because, by carefully washing it out daily with warm water the inflammation may be averted.

In other cases cystitis occurs as the consequence of stone in the bladder, the symptoms of which form no part of medical diagnosis: it is only worthy of remark that the irritability of the bladder connected with calculus, while causing its frequent evacuation, is specially accompanied by pain over the arch of the pubis, at the glans penis, or in the perinæum; and that for a long time the urine continues to be clear and transparent after the irritation has been excited, not thick and opaque as when mixed with pus, because the purulent secretion is only a later event in the progress of the case. In inquiring into the origin of symptoms, a distinction must be made between the difficulty in passing the urine, when it is voided in a small stream in stricture, and the sudden stoppage of a full stream which occurs in cases of stone.

Sometimes cystitis comes on as a catarrh of the bladder propagated from the urethra, in cases of gonorrhœa: simple idiopathic catarrh is necessarily very rare.

The principal source of information is the condition of the urine itself: when pus is derived from the kidney, as a general rule the urine is acid, decidedly albuminous, and the pus falls as a sediment to the bottom; when derived from the bladder, the urine is alkaline, the amount of albumen not so great, and the pus more or less altered in character, becoming ropy and resembling stringy mucus. Phosphates are invariably deposited, and are seen especially as the triple phosphate, which can only be present when the urine has become ammoniacal. The amount of albumen present is necessarily much greater when suppuration of the kidney has occurred, than when the pus is formed in the bladder, and the albumen present is only derived from the *liquor puris* mixed with the urine after its secretion. It must, however, be borne in mind that when the urine is barely acid or even faintly alkaline at the time of its secretion, the admixture of pus derived from the bidney may cause fermentation while it rests in the bladder, even when no cystitis exists. Careful observation, and the result of treatment, will generally show whether the ammoniacal state of the urine be a constant one, or only the effect of casual circumstances, and then the evidence derived from this source may be regarded as a tolerably sure guide to the diagnosis of the nature of the disease.

§ 5. *Other Chronic Diseases.*—There are many other conditions of chronic disease in which the presence of albumen and blood or even of pus show that there is something wrong; and yet there is nothing in the symptoms sufficient to point out exactly the form of disease present. Nor is it of great importance that the actual pathological change should be known. To the patient the fact that a persistent drain of albumen is going on, while some of the waste material which ought to pass out of the body is retained, is all-important, and the pathological change

which affects the organ is merely a minor detail which cannot affect his health and well-being. To the physician, on the other hand, the only question of real importance is whether the presence of albumen, of pus, or of blood is due to removable causes or not—whether they merely indicate conditions of functional derangement, of active or passive congestion, or of permanent degeneration and disorganisation. Viewed in this light, it is of no importance whether after death the kidney be found to contain cysts due to the presence of parasites, or those which are produced by closure of the ducts in granular degeneration, or whether the organ be converted into a mere sacculated mass in consequence of closure of the ureter and distension of the calyx and the various tubes which lead into it. In some cases, it is true, a careful study of the history, and the various circumstances connected with the presence of albumen in the urine may give a hint of the true pathology; but after all, the conclusion is only a guess, more or less likely to prove correct. Thus in a case in which there is a history of calculus passing into the ureter, exciting inflammation there, and being subsequently discharged by stool, later symptoms associated with albuminuria might probably depend on hydro-nephrosis. Similarly the presence of cancerous growth in other organs would suggest at least the possibility of albuminuria being due to cancer of the kidney. In all such cases there is room for the exercise of skill and intelligence, but they are not of such a character as to be reducible to any definite rules of diagnosis.

§ 6. *Calculus.*—In the majority of instances, perhaps in all, the formation of stone commences in the calyx of the kidney. There it may remain for a time quiescent, or it may never remove from its first site. If it be disturbed it either passes out of the body entirely, its passage being attended with more or less pain, or it is arrested at some part of its progress, and there excites inflammation and suppuration. The conditions most readily recognised are inflammation of the calyx due to its presence, its passage down the ureter, its arrest in the ureter, the suppuration to which it gives rise there, and the presence of stone in the bladder.

a. Pyelitis is not unfrequently due to calculus. The only circumstance which distinguishes it in its origin from other cases, is that it has been traced to an accident, or to a run or a jump, when pain has been

suddenly felt in the loins, and the urine has been observed to be blood-stained. Ultimately pus accompanies or takes the place of the blood in the secretion of the kidney.

b. The passage of a calculus down the ureter is indicated by the presence of pain shooting down to the groin, and causing retraction of the testicle: a grinding, tearing pain which encircles the abdomen, rather than an acute one. Usually there are no symptoms of peritonitis, but they may be developed if suppurative inflammation be excited within the ureter. Like colic, the pain is rather relieved by pressure, and it is chiefly distinguished by its site, the sympathetic affection of the testicle, and the absence of symptoms referrible to intestinal derangement.

c. When the stone is arrested in the ureter, the lancinating pain of calculus is changed into the sharper and more constant pain of local peritonitis, and we have ultimately the indications of suppuration, with a discharge of pus through the bowel or the bladder, in the midst of which the stone itself not unfrequently makes its escape. Ultimately, too often, closure, more or less complete, of the ureter is the result of the inflammation.

d. When the calculus reaches the bladder it is unfortunately very generally retained there, and then we have very commonly cystitis excited by its presence. Taken as a whole, the evidence of stone in the bladder is generally very conclusive, and is only apt to be mistaken from careless investigation of the facts of the case. A sense of weight in the perinæum, pain produced by running or jumping, as well as pain felt in the glans penis when that organ is itself free from disease, and still more the sudden stoppage in the flow of urine which occasionally occurs as the stone rolls over the internal orifice of the urethra, form together a set of indications which can hardly be mistaken whether cystitis be present or not. The diagnosis can only be regarded as certain when the stone has been

felt by the sound in the bladder, but its introduction in the case of an unmarried female can only be considered justifiable when other indications are tolerably clear and distinct.

The term nephralgia is sometimes used to express the pain associated with calculus before it reaches the bladder; and in proportion as the pain is severe, we may conclude that it is due to irritation rather than to inflammation. We cannot go back to the date of its formation, but we can sometimes discover in a strain or a sudden jerk of the body the time when it was displaced. This displacement is always attended with pain, which is often so severe as to produce nausea and vomiting, any other symptoms, such as frequent micturition, being referrible to the urinary and not to the digestive organs.

Nephralgia is apt to be confounded with colic; and as we have seen colic pass into enteritis, so the nephritis which follows is liable to be confounded with inflammation of the bowels. The presence of sympathetic affection of the testicle, or the appearance of blood in the urine, would be sufficient to prevent any mistake in diagnosis; but these are often absent, and dysuria is a common effect of inflammation of the bowels: we have then, no better guide than the history of its commencement on one side of the loins, and not in the abdomen.

Rheumatic affections may also be confounded with nephralgia; but, apart from the suddenness of the incursion, and the constancy and severity of the pain, when the kidney is affected, they may be distinguished by their more general distribution, and especially by the circumstance, that the pain of a rheumatic affection is only felt on moving, or at least is very greatly aggravated by the effort.

Sometimes we have reason to believe that an attack of nephralgia has nothing to do with calculus at all, but is merely a form of gout, when the bowels are loaded, and the urine secreted is highly acid and irritating: in such circumstances there may be no unusual frequency in the calls to empty the bladder, as the secretion is scanty, and the irritation of the kidney less intense.

§ 7. *Suppression and Retention of Urine.*—The term *ischuria renalis* was invented to designate suppression in opposition to retention of urine: the fluid is not secreted at all. Coming on sometimes after exposure

to cold, it occasionally appears without any very direct cause: rarely seen in perfectly healthy conditions of the organ, it is more usually met with in cases of low inflammation supervening on long-standing disease. The eye of the experienced practitioner will discover in the aspect evidences of renal disease, but to the patient the existence of such a malady is unknown. He conceives himself to have been in his usual health immediately before, he cannot understand why it is that he passes no urine, as he feels little or no pain, and complains of no suffering. There is nothing to mark the disorder in its commencement besides the suppression, but soon the pulse becomes slow, the patient drowsy, and ultimately completely comatose. The very same sequence occurs more slowly without complete suppression when the depuratory action of the kidney is much interfered with; here they are only more rapidly developed. It may be the immediate result of an attack of nephritis; and the common occurrence of rigor at its commencement suggests the probability that, even when the organ is unsound, some congestive or inflammatory action is excited, which deprives the secreting structure that remains of its power of carrying on functions which, impaired though they be, are still necessary to life.

In retention the very same symptom arrests the attention of the patient: he is unable to pass any urine. Here the cause is not to be sought in the state of the kidney, but in some affection of the bladder or urethra; the urine is secreted and fills the bladder even to overflowing, but the patient is powerless to expel it. In some cases we take note of gradually increasing difficulty, due either to stricture of the urethra, or enlargement of the prostate, or, perhaps, only to the gradual loss of power seen in old age; in other cases, there have been no antecedent symptoms: but in all, the fact of retention points to loss of muscular power, and this is mainly caused by over-distension.

In a healthy individual unavoidable delay in emptying the bladder causes at times such distension that the muscle becomes immediately paralysed: on the other hand, an injury to the spine may at once produce the same effect. Hence we conclude that when a person who has previously had difficulty in emptying the bladder, is on some particular occasion utterly unable to do so, over-distension plays an important part, producing a certain amount of paralysis even when imperfect and quite amenable to treatment.

In addition to the information derived from the history of the case, diagnosis is greatly aided by the discovery of a fulness in the hypogastric region, which may present the definite form of a rounded tumour, and may even give rise to a sense of fluctuation. When this is felt, there can be no doubt that the catheter ought to be used; and when we fail in detecting it or any uncertainty hangs over the case, this instrument offers the very best aid to diagnosis. No surgeon should leave the hospital to enter upon general practice without feeling confident that he is competent properly to manipulate it, for even now incalculable mischief is frequently perpetrated through ignorance or want of skill. But there are circumstances in which it is to be avoided; and these may be best known by a careful study of their history. In hysterical females it is very apt to be the form which the disease of the imagination assumes, and the use of the catheter serves only to stimulate the tendency. If the history do not point to any cause likely to end in retention, it is best to wait and watch the case, lest obstinacy should lead to actual over-distension; and the best means of prevention and greatest aid to diagnosis is the administration of a brisk purgative. Again, in rupture of the bladder, the catheter must be used with great care, and it seldom teaches much. The history of such a case, with its fatal collapse and entire stoppage of the urinary discharge, is only too clear and unmistakable, and it is

surprising to how slight an injury so grave an accident may be due.

§ 8. *Diabetes.*—The chemical test for the presence of sugar is a very certain one if applied with sufficient care: but the whole circumstances connected with confirmed diabetes are so distinct that the diagnosis scarcely requires this corroboration. Unfortunately there are few symptoms which can lead to its early detection: the amount of urine passed in the twenty-four hours is so little regarded by most persons, that they seldom think of adverting to it till it be in very great excess: it is generally the existence of weakness and emaciation which excites the patient's attention; sometimes the circumstance is observed, that where the urine falls it leaves a white crust when it dries; sometimes the unusual appetite and craving for drinks lead him to suspect that something is wrong.

To the eye of the practitioner the emaciation of diabetes is very different from that of other diseases: it is not marked by any unhealthy appearances such as characterise the various cachectic states: its combination with hunger may suggest the existence of intestinal worms, but in following the scheme for the examination of the patient laid down in the early part of this work, the very next inquiries lead us at once to the true explanation. Along with the emaciation and craving appetite, thirst is excessive, the urine is secreted in large quantity, the bowels are costive, and the fæces dry and solid: under no other condition of disease is the same train of symptoms ever remarked.

§ 9. *Diuresis.*—As a temporary effect of direct stimulation of the kidney, an excessive secretion of urine is sufficiently common; its persistence is very unusual, except as a sign of diabetes. In diagnosis, as in pathology, the indications are wholly negative: it has to be ascertained that there is no sugar and no

albumen: the urine is of low specific gravity, and there cannot be any very unusual metamorphosis of tissue; but yet when the quantity of urine is great, no doubt more solid matter passes out of the body than in health, and hence there is commonly some emaciation. At present it does not appear that any logical view of its cause has been suggested.

The secretion of pale, limpid urine, as an effect of the hysteric paroxysm, has been already mentioned; but sometimes a spurious diuresis is kept up for a long time in hysterical persons when enormous quantities of fluid are drunk during the day, and of course find an outlet by the kidney. This is the condition to which the name of diabetes insipidus has been given. When the ingestion of fluid is stopped, the excessive flow of urine ceases.

§ 10. *Disordered Function.*—Under the name of functional disturbances must be included variations in the proportion of water and other normal constituents which, as they are elaborated elsewhere, may pass out of the body through the kidneys without implying specific disease of any portion of the urinary apparatus. They cannot be easily classed according to the diseases with which they are commonly associated; but assuming that the history of the case and the examination of other organs has already led to an opinion being formed on its nature, we have to inquire what additional light may be derived from an examination of the urine.

Excess of water, while it constitutes the whole disease in what is called diabetes insipidus, and modifies the characters of the urine in other states of disease, is constantly observed in health after certain ingesta, which stimulate the kidneys, and after an hysteric paroxysm: it is really a matter of no great importance.

Deficiency of water is most remarkable in fevers, and in cases in which the perspiration is excessive;

it is also observed when diarrhœa exists, and sometimes as an effect of dyspepsia, the urine becoming acid, scanty, and loaded, irritating the bladder and urinary passages. The secretion is also scanty when the renal circulation is interfered with by abdominal distension or disease of the heart, though very frequently in cases of the latter class there is more than mere functional disturbance,—congestion, if not actual disease begun. In dropsy depending upon disease of the kidney, the secretion is always diminished while anasarca is on the increase, partly as its cause, but partly too as its effect.

When the proportion of water falls much below the healthy standard, those salts which are more soluble in warm than cold water, if present in their usual amount, ought to be precipitated, forming a sediment: but here another law comes into play, because their chemical constitution varies with the amount of what, for convenience, we may term free acid or free alkali. If free acid be present, the lithates exhibit that form in which they are less soluble in cold than warm urine, and they are precipitated when the urine is scanty; if free alkali be present, their condition is changed, and they are held in solution at all temperatures. The deposition of phosphatic or earthy salts is not so dependent on the proportion of water, for they are very easily dissolved by free acid, and are very insoluble when free alkali is present: their solubility is unaffected by heat.

This explains to us why in acute rheumatism, when acid abounds, and there are copious sour-smelling perspirations, the urine is always loaded with lithates; whereas in typhus, when the powers of life are low, and free alkali is liable to be secreted by the kidney, the urine may be very scanty and very deep-coloured, and yet there is no deposit till some acid be added, when the whole becomes turbid. Such urine oftentimes appears slightly acid to test-paper, and it would appear that the lithates are secreted in the soluble

form with excess of alkali, and that the affinity of the acid present is too weak, subsequently to convert them into an insoluble form. The fact is certain, the explanation perhaps unsatisfactory; but it is the only one which our chemical knowledge of these salts at present gives.

When acid is formed in excess in the stomach in dyspepsia, and afterwards passes off by the kidney, it tends to check the flow of urine, causing a deficiency of water, and at the same time it determines the formation of the less soluble lithates, which the small quantity of water present cannot hold in solution, when cold. To speak therefore of an excess of lithates is a fallacy, because their deposition may depend merely on the proportion of water, and the presence of free acid. When lithic acid is really in excess, it is more likely to occur in a crystalline form, uncombined with any base; and to this the name of the "lithic acid diathesis" more properly belongs than to that in which the deposit is amorphous. The only valid proof of an excess of the amorphous lithates would be that the whole quantity of lithic acid passed during the twenty-four hours was ascertained to be beyond the average of health.

To speak of an excess of earthy phosphates is a more complete fallacy than that just alluded to. They are so very soluble when free acid is present, so insoluble when free alkali is present, that such a deposit indicates nothing more than the fact of the urine being alkaline. It is true that, as happens with the lithates in typhus, the urine may have a slightly acid reaction to test-paper, and yet the ordinary chemical change may not take place; in such cases the earthy phosphates may be deposited; and the only explanation that can be given is that they have been secreted in an alkaline condition, but the acid present is too weak to alter their chemical relations; for a single drop of stronger acid at once dissolves the deposit. Valuable information might no doubt be obtained

from a knowledge whether the phosphoric acid be really in excess; but this can only be ascertained by a quantitative analysis, which requires much chemical skill and much expenditure of time. There is always enough phosphoric acid present in the urine to form a deposit when converted into the insoluble phosphate of lime.

A deposit of earthy phosphates then only shows that alkali of some sort is in excess. Of this there are three principal causes: the decomposition of urea yielding free ammonia; the ingestion of alkalies or decomposable alkaline salts; and the secretion of excess of ammonia by the kidney. The first of these, when the urine is fetid, is very generally associated with cystitis, and is also developed in a very short space of time in urine which was alkaline on emission; the second is only a casual occurrence, which has no pathological value, and is only to be borne in mind as one of the possible causes; the third is that to which the name of the phosphatic diathesis has been given. It is evidently connected with states of debility, especially with exhaustion of nervous energy: we do not expect to find it always present, because of the constant daily variations in the acidity of the urine, but its recurrence at certain periods may aid us in ascertaining its specific causes. It should be remembered, too, that the amount of acid in the stomach at any given period is generally in an inverse proportion to that in the urine, and I have seen this most strikingly exemplified in cases of sarcina ventriculi when the fermentation going on in the stomach produced the greatest possible degree of alkalescence. Closely related to this change is one in which, without fetor or absolute decomposition, the urea is converted into the carbonate of ammonia, a change which is hastened by boiling, and gives rise to effervescence on the addition of acid.

In general terms, speaking of acidity and alkalescence of urine, we find them associated with very opposite conditions of health,

modified by the actual state of the stomach at the period when the fluid is secreted. A man of full habit, who indulges in the pleasures of the table, and is not disposed to overtax his mental powers or his nervous system, is very likely to exhibit in his urine copious deposits of the lithate of ammonia, especially at those times when he has been suffering from acidity of stomach, and the acid has begun to pass off by the kidney. Whereas a man of spare habit and nervous temperament, during the period of exhaustion following any excitement either of brain or nerve, is very liable to phosphatic deposits, especially while the acid is still in the stomach, and before it has begun to pass off by the kidney. On the other hand, the urine of one whose digestive organs are in an enfeebled state will contain the one deposit or the other, according to the period after food at which it is examined.

I think we may notice with regard to the lithates deposited in such circumstances, that those simply dependent on gastric derangement are of a paler colour than those which are produced by any excess. To some it has appeared that the pink colour was caused by chemical alteration of the same colouring matter which is secreted by the liver, and the staining of the utensil has been taken as evidence of biliary derangement: the investigation of this point is not complete, but it may be usefully remembered in practice.

Excess of urea is also one of the functional disturbances of the secretion. It is to be regarded as a proof of excessive metamorphosis of the nitrogenized elements, whether in consequence of a too abundant supply, or of unusual waste of tissue, as it follows on the use of nitrogenized food in excess, or is increased by disease. There is apparently no specific cause to which it can be attributed; we must be content at present to employ such general expressions as disorder of stomach and depressing influences, while observing the fact of general emaciation, sense of lassitude, and depression of mind which accompany its existence.

It is often associated with a deposit of oxalic acid, in the form of oxalate of lime. Probably too great stress has been laid on the presence of this salt, which has been often regarded as the first step in changes of which it is perhaps really the result; and this conclusion is the more probable from the very many and

very varied circumstances in which it is found. It coexists with alkaline urine and deposits of phosphates, with acid urine and amorphous lithates, with crystals of uric acid, as well as with excess of urea: but we may always trace indications of weakness and depression, whatever other special characters the case exhibits. We need not stop to inquire whether it be formed by a re-conversion of some of the normal ingredients, or by imperfect oxidation of carbon in the lungs, or whether it be formed at once in the process of assimilation, and carried into the urine, as it is when food containing oxalic acid is taken into the stomach.

Many other functional disorders might be enumerated, but they are chiefly matters of curosity; such, for example, as the presence of fibrine in chylous urine, of oily matter, of kiestine in the urine of pregnancy, of a milky albuminous matter in malacosteon, &c. These cases are so rare that the student must be referred to works on diseases of the kidney for further information regarding them. It may be added that hæmaturia is to be regarded as a functional disorder when it depends only on some change in the condition of the blood, such as is manifested in other parts of the body by spots of purpura, or by uncontrollable hæmorrhage.

The entire dependence of functional disorder on causes altogether beyond the kidney itself, is not less remarkable than the extensive associations of its diseases with those occurring in other organs. Among fevers we find scarlatina giving rise to a form of nephritis with albuminuria: certain forms of chronic rheumatism and gout seem to be more or less dependent on degeneration of the kidney; and the connection existing between gout and uric acid brings that disease into close relation with the crystalline deposit in the urine.

Dropsy is connected in two ways with disease of the kidney; as it is induced by deficient secretion of water, which thus necessarily accumulates in the system, or by changes slowly developed in the blood rendering its watery portion more liable to transude through the vessels into surrounding tissues. The same condition gives rise at times to hæmorrhages, especially epistaxis, and is always marked by the waxy or pallid hue of anæmia. Tubercular phthisis often forms the conclusion of a case of diabetes; chorea and delirium tremens are each said to cause important changes in the relative amounts of certain of the constituents of the urine.

Head affections are in a most especial manner associated with disease of the kidney: convulsions and coma are often the precursors of its fatal termination, whether caused by uræmic poisoning, or by serous effusion in the ventricles. In a large proportion of cases of apoplexy, granular degeneration is found, but the connection of the two is probably to be traced to disease of the heart, which is so common in albuminuria. Occasionally this exists as simple hypertrophy: at other times there is atheromatous disease of the valves, and perhaps of the arteries: the former apparently produced by disturbed circulation, the latter probably only another expression of that faulty nutrition which also affects the kidney.

Plastic exudations on serous surfaces are to be met with in the pericardium, in the pleura, and in the peritoneum more commonly than in other circumstances; and both bronchitis and laryngitis are more severe in consequence of the tendency to œdema to which it gives rise. The liver not uncommonly presents evidence of coincident disease, which it is not difficult to explain when we recognise habits of intemperance as the constant source of mischief to both organs.

CHAPTER XXXIII.

DISEASES OF THE OVARIES.

General Considerations — Obscure Origin — Associations. — § 1, Encysted Dropsy — Resemblance to Ascites—Distinguishing Characters.—§ 2, Tumours known by their Pelvic Attachments —distinguished from Pregnancy.

In adverting to classes of disease peculiar to the female sex, it must be remembered that they are often mixed up with hysteria, and while that undefined malady may give rise to symptoms in any organ of the body, and may simulate any form of disease, the practitioner must be on his guard against assuming symptoms to be merely hysterical when they depend on some obscure cause which he has been unable to trace. The early changes in the ovaries, as they cannot be recognised, must therefore be borne in mind, as affording a possible explanation of symptoms otherwise unintelligible; but this is very different from the views which we cannot but regret to see advocated by any claiming for themselves a respectable position in the profession, who would refer to some undefined local changes all the anomalous characters which hysteria so constantly presents. If medicine is to be ranked as a science, we cannot ignore the clear and accurate teachings of pathological anatomy; we may not assign to any disease a cause which post-mortem examination proves to have no existence; we may not assume ovaritis, as it has been called, to be a common condition in the living, when we know that it is seldom met with in the dead body. Pathological anatomy does not teach us what hysteria is, but it teaches us in unmistakeable language what it is not, and if we learn the lesson it conveys, no truth will come home with more force of demonstration than this, that neither ovarian changes nor ulcers of the os uteri have anything to with its occurrence, except as they figure in the opinion of the practitioner, or engross the thoughts of the patient: more than this,—it also teaches that disease of the ovaries, though not uncommon, is not of such a kind as can be traced to "inflammation" in any of the multifarious forms assigned to it. All that can be said of ovaritis is, that were it present its symptoms would be undis-

tinguishable from local peritonitis confined to the region of the ovary.

The early history of ovarian growths is quite unknown to us. The first symptom is generally the patient's consciousness of enlargement of the abdomen: as an indication of disease this is classed among "alterations of size;" and it is worthy of observation that, in external form, the abdomen is liable to be unequally prominent on one side. The tumour may possibly be recognised by the practitioner before its existence is known to the patient herself—as, for example, in pressing the abdomen during fever, with bowel ailment. More rarely the growth is found out in searching for the causes of constipation; but such a condition is so common among females in this country that it can scarcely lead to the discovery of the disease. Among early symptoms, pains in the groins, and a sensation of weight and bearing down in the pelvic viscera are mentioned, and may be of service in leading to more careful examination, but they are not in any way characteristic. When enlargement has actually taken place, it is not unimportant to notice in how many instances there is no disturbance of the general health.

§ 1. *Encysted Dropsy.*—In the greater number of cases cysts are developed containing fluid. By percussion over the prominent part of the abdomen, want of resonance is discovered, and fluctuation will be made out more or less readily in the same situation, according to the stage which the disease has reached; but at its very commencement this must be imperceptible. In speaking of ascites the signs derived from these sources by which that disease is characterised were pointed out; we have now to notice the indications which the same means of investigation afford in cases of encysted dropsy.

A cyst developed from the ovary commences on one side of the mesian line, and consequently for a long period during the continuance of the case, the dulness

on percussion occupies one side of the abdomen much more than the other; fluctuation extends upwards on that side, and can be readily traced so long as one hand does not pass far beyond the umbilicus, but becomes at once obscure when it is placed towards the flank on the resonant side. When these two observations correspond, the evidence is more satisfactory than that derived from any other source: sometimes it is even more striking when the fluid is contained in several cysts, and the tumour is multilocular. In such cases fluctuation may be most clearly perceptible while the hands are placed only a few inches apart, but become obscure as soon as the boundary between two cysts is passed; indeed the position of the septa, as they reach the surface of the abdomen, is sometimes distinctly defined. Occasionally the cyst very early assumes a central position with reference to other viscera, pushing them aside into both lumbar regions pretty equally, and approaching the anterior wall of the abdomen in the hypogastrium; and then the diagnosis requires more care, and this is especially the case when its origin is in the broad ligament.

As the disease advances it gradually encroaches more and more on the whole cavity of the abdomen, and then we have recourse to other measures to ascertain that the fluid is cysted, and not free in the peritoneum.

The principles have been already laid down (p. 137) which ought to be present to the mind in every case that comes before us, and they are equally applicable to the most self-evident as to the most obscure. Rising out of the pelvis, as the diseased ovary does, it is very often possible to trace in the lumbar and iliac regions resonant bowel pushed aside, not floated upwards upon the surface of the fluid. Even when the greater part of the intestines have been forced into the thorax by the enlargement of the cyst the ribs do not spread out as when subjected to the pressure of fluid lodged in the peritoneum, and the abdo-

men has a globular form; at the same time, the height to which the dulness extends is not equal, but at some point resonance descends far below the level to which the fluid rises at another; for the very same reasons the relative positions of dulness and resonance are but little altered by change of posture.

At the risk of repetition it must be remarked that the whole of the facts upon which our inductions are formed may be resolved into the simple effects of the laws of gravitation as modified by the circumstance of the fluid being free in the peritoneum, or confined in a cyst, and the intestine, which is specifically lighter, being at liberty to float on its surface or not. Hence, in applying the fact of resonance being observed below the fluid level, or even in the groin, we must remember that it may be produced by a portion of the intestine which is naturally limited in its movement, or one tied down by old adhesions. Mistakes are less likely to be made if we have due regard to the effects of change of posture, except when the whole of the viscera are pushed up under the ribs; the relative position of the fluid and the intestine in such circumstances cannot be so readily altered.

In mere physical diagnosis those cases most resemble encysted dropsy in which adhesions have been formed in consequence of an attack of peritonitis, by which the fluid effused is as much limited in position as if it had been contained in a true cyst. In such, however, the general symptoms, which are those of chronic peritonitis, are much more severe than are ever observed in the smaller sized cysts, which alone they resemble; and the history, if correct, is wholly different. The one commences with a severe attack, of which pain in the abdomen is a prominent feature, and continued uneasiness, tenderness on pressure, quick pulse and emaciation mark its progress; in the other, the commencement of the disease is not easily traced, pain is at no time severe, and the general health is not much disturbed until it has lasted for a long time.

When the cyst is not very large, and its position central, there are two conditions which may produce analogous phenomena—a bladder or a uterus distended with fluid. In the former our necessary inquiry into the amount of the urine will be answered by a report either of retention or incontinence: no water passed at all, or a constant overflow from the paralysed viscus, and either circumstance is sufficient to suggest the employment of the catheter. Hydrometra is so rare a form of disease that it may almost be passed over, and would be best recognised by vaginal examination, which may always be had

recourse to when any doubt exists as to the nature of a local collection of fluid in the abdomen.

The remarks on this mode of investigation must be reserved till the diagnosis of solid ovarian tumours has been discussed.

§ 2. *Tumours*.—The term is only relative, as in most instances the diseased structure contains cysts with larger or smaller collections of fluid; and in the earlier stages, those in which the fluid ultimately accumulates to the greatest extent are scarcely distinguishable from those in which none at all is found: were the distinction more easily made, the information gained is of no practical importance, except we have regard to the more rapid growth and speedily fatal termination of some of the forms of solid growth. It is chiefly in these that symptoms are to be met with such as have been already mentioned as the only facts in the history of ovarian disease which can call attention to its existence: pains in the groins, a sense of weight and bearing down among the pelvic viscera, constipation, hæmorrhoids, and painful defecation; occasionally, too, the functions of the bladder are interfered with, but this chiefly occurs at a later period, when the tumour rises out of the pelvis. During its growth, occasional attacks of more severe pain may take the place of the constant dragging sensation, and as this may imply that the sensation is excited by local peritonitis, and is not the mere pain of abnormal growth, the observation would be of importance if the question of excision were ever entertained.

When felt above the pubis, the surface of a solid tumour is seldom perfectly uniform, especially when it is one of rapid growth; the feeling of elasticity is sometimes closely allied to the sense of fluctuation, when the latter is obscured by the depth at which the fluid is placed beneath the parietes and the thickness of the walls or the multitude of the cysts. Before it can be reached in this situation it must already have acquired some size, and therefore it cannot very well

be confounded with fibrous tumour of the uterus: its mobility will distinguish it from chronic matting together of the tissues by local peritonitis: and its deep connections leave no room for the supposition that it is attached to the bones of the pelvis: at the same time, it is distinguished from omental growths, or malignant enlargement of abdominal glands, by our being able to trace it under favorable circumstances down into the pelvis. No certain conclusion can be arrived at if the abdominal walls be tense and resisting; but when the patient is placed in a proper position, and the resistance can be overcome by gradual pressure, the practitioner can always place his hand between the brim of the pelvis and the growth, when not ovarian, and cannot do so when the seat of the disease is the ovary itself.

The position of the tumour generally determines that it is not due to pregnancy in its ordinary form: the exceptions are when the tumour is central, or the pregnancy is tubal. The distinction in these cases must depend almost entirely on the absence or presence of other signs of pregnancy, and it is to be remembered that the two conditions may coexist, and nothing is lost by waiting for the termination of gestation before pronouncing a definite opinion. In place of giving an elaborate account of the signs of pregnancy, which does not come into our classification, I would refer my readers to the treatises especially devoted to this subject, only remarking that this question, perhaps more than any other, calls for the exercise of common sense. The history is full of instruction, if rightly read; the time of the cessation or alleged irregularity of menstruation, and its assigned causes, compared with the manner of the patient; her appearance with regard to size, aspect, carriage, &c., give the practitioner hints that need not be quite disregarded, even when he is told of the casual recurrence of the menstrual flux; in exceptional cases, when menstruation was irregular at the time of conception, or has persisted regularly since, the sum of the signs from the breast, from the abdomen, and from the *tactus eruditus per vaginam*, are sufficient for his guidance if taken together.

Perhaps it is scarcely stated in general with sufficient distinctness that the colour of the areola is of much less moment than the development within it of the glandular follicles; it is asserted also that the fluid which so frequently oozes from the mamma

presents under the microscope all the appearance of milk in cases of pregnancy: and as the result of my own experience I may state that the undefined fulness of the abdomen, and the feeling of solidity perceived in pregnancy, is never exactly simulated by enlargement from any other cause. The sound of the fœtal heart is unquestionably the most conclusive evidence, but it is often difficult, and sometimes impossible, to discover it. Whatever be the conclusion arrived at by the practitioner, he must exercise great caution in communicating it to the patient, or her friends, except he have heard the sound of the fœtal heart or felt the movement of the living child. He may raise hopes which are never to be realised, or excite apprehensions in the minds of friends which are wholly unfounded; and in either case justly forfeit the confidence of his patient by grounding a positive opinion on insufficient data. I know no circumstance which can render an absolute diagnosis of early pregnancy a matter of real importance: the progress of the case will speedily solve all doubts.

Digital examination detects, in the early stages of ovarian disease, a tumour to one side and at the back of the vaginal wall,—moveable, but independent of the uterus, which at this period retains its normal position. As the ovary enlarges, the uterus may be somewhat pushed down; at a later period it is drawn up, and the neck is sometimes most remarkably elongated. The mobility of the mass and its regular form, as perceived in this examination, are the points which especially distinguish it from the matting together of tissues which is produced by local peritonitis of a chronic form; and the elongation of the neck of the uterus, when any change occurs in that organ, proves that the enlargement is not a consequence of pregnancy.

Various other forms of disease exist in connection with the ovaries and uterine appendages, chiefly as the result of inflammation or hæmorrhage. They are only ascertained, if known at all, by digital examination; and for information regarding them the student must be referred to treatises on the diseases of women. The list is a long one: it includes inflammation, ab-

scesses, fibrous tumours, piliferous and dentigerous cysts, displacements, pelvic hæmatocele, as well as the not unfrequent occurrence of local and limited peritonitis excited by disease of these organs.

CHAPTER XXXIV.

DISEASES OF THE UTERUS.

§ 1. *Leucorrhœa—Vaginitis—Gonorrhœa.*—§ 2. *Congestion and Ulceration, Rodent Ulcer.*—§ 3. *Cancer.*—§ 4. *Tumours, Fibrous, Polypous*—§ 5. *Prolapsus and Displacement.*—§ 6. *Disorders of Menstruation—Amenorrhœa—Scanty Menstruation—Vicarious Menstruation—Dysmenorrhœa—Menorrhagia.*

THERE is but little to be said on the diagnosis of this class of diseases, which are perhaps legitimately regarded as a special department of practical medicine; but in the very fact of a *spécialité* there is a tendency to abuse, and unfortunately persons are always to be found who will use any pretext to extend their own fame and to enrich themselves without any feeling of honour, without any sense of morality or propriety. A professional sect has grown up in England in consequence of the minute—the needlessly minute investigations of the accoucheurs of France, which, impelled by such motives, assumes to itself, under the guise of this *spécialité*, the management of all the diseases of the female sex; rightly or wrongly, with reason or without reason, referring them all to changes in the uterus. Diseases are spoken of as of frequent or constant occurrence which we search for in vain, except in a very few instances, in the dead body. In reality, small as is our list of local maladies connected with the uterus and vagina, even these are mainly due to constitutional causes, and are best met by constitutional remedies.

§ 1. *Leucorrhœa.* — Under this head we include

catarrh of the uterus and the vagina: it is no more than an excessive secretion of the natural mucus which lubricates the passage. Attempts have been made by discriminating the special characters of the secretion, to determine whether it comes from the uterus or the vagina. These facts may be interesting as curious pathological researches, but they are of no value in practice: whatever restores the tone of the system at large, and along with that gives a healthy character to the mucous lining of the generative organs, relieves leucorrhœa; local remedies may aid in its removal, but alone, though they check it for a time, they leave the cause of the disorder untouched. It is not a true catarrh, and this it is which best distinguishes it from gonorrhœa: the latter begins with irritation of the vagina, and possibly of the urethra, causing painful micturition; this is soon followed by a copious secretion of thick puriform matter, which gradually assumes the character of a thin discharge, and cannot be distinguished from leucorrhœa: it is the history alone that enables us to distinguish in cases of long standing between the one disorder and the other.

In children a more acute inflammation of the mucous membrane, usually called *vaginitis*, is not uncommon. It attacks the very same individuals who are from cachexia liable to ulcerations of the mouth, to excessive impetiginous eruptions with copious purulent discharges; and like them is manifestly constitutional. It has often given rise to unfounded suspicions and charges of crime, but there ought not to be any doubt in a medico-legal point of view, because of the absence of bruises or local injury; there are no signs of inflammation present except a degree of soreness or irritation of the surrounding skin from the purulent secretion lodging upon it. It may be dependent on the presence of ascarides.

The line of demarcation between leucorrhœa and gonorrhœa is by no means clearly marked. It is true that in the commencement of the infectious

disorder there is often seen a copious discharge of thick creamy pus, such as is never seen when the affection is not specific; but when it has lasted for some time the character of the two secretions becomes more uniform, and the diagnosis more obscure. It is highly probable that advice will be sought in the earlier stages of gonorrhœa, if this be the cause of the discharge, and the difficulty of diagnosis experienced in dealing with a chronic case is seldom felt. The aid of the microscope has been invoked for the purpose of solving this question, and also of determining whether the secretion comes from the uterus or vagina, but its teaching is by no means unequivocal.

Whenever vaginal discharge is spoken of, we ought to ascertain whether it be at all offensive, because it may be induced by cancerous disease: if blood-tinged at other than the monthly periods, it is not improbable that it is dependent on commencing scirrhus.

Leucorrhœa is so uniformly connected with causes independent of the uterus itself, that its associations demand general investigation much more than its amount or its other peculiarities. It is found with an anæmic state, with a flabby and relaxed habit, or with a condition of the rectum which excites irritation of the uterus or vagina. Upon a correct knowledge of these relations depends the successful treatment of the disease, and, on the other hand, its existence serves to point out the actual condition of a patient who may be seeking relief for other disorders, or explains some derangement of health which might otherwise be misunderstood.

§ 2. *Congestion and Ulceration.*—A very prominent place has been given by some practitioners to inflammation and ulceration of the os and cervix uteri: yet they are comparatively rare, and, as substantive diseases, unimportant. They do, indeed, accompany other conditions which may be of serious moment to the health of the patient, but in their uncomplicated form their ephemeral notoriety will ere long have passed away: true pathology and useful practice have been neither advanced nor benefited by those who have made them their study: and posterity will regard very

differently the inventor of the stethoscope and the speculum.

Simple congestion may be the consequence of over-excitement, or of sudden suppression of the catamenia; it may be excited by irritation of the rectum, or it may be only an exaggeration of that normal condition which produces the menstrual discharge: it is often associated with tumours of the uterus, or with prolapsus of the organ. After repeated pregnancy, enlargement, fissure, or irregularity of the os uteri may be often detected, to which the name of congestion is evidently inapplicable; but sometimes enlargement of the whole organ continues after delivery, and a state of venous congestion is maintained, which may result in hypertrophy or induration.

Inflammation, as applied to a muscular structure, is generally a misappropriation of language; the event we know to be a rare one. When acute or subacute symptoms are present, their true source is in the mucous membrane which lines its interior, or the serous layer which encloses the womb and its appendages. Such circumstances occur as a consequence of the puerperal state, and there is no more frequent cause of partial peritonitis (see Chapter XXX): they are also developed occasionally in females with irregular menstruation; and the lining membrane of the uterus has been sometimes inflamed by the presence of the gonorrhœal poison.

What has been called ulceration is generally only an aphthous or granular condition of the mucous membrane, and depends simply on constitutional causes: very often a patch of adhering mucus has been mistaken for an ulcer: sometimes it is only a creation of the fancy; perhaps occasionally the result of excessive leucorrhœa; it is then but a symptom, and a very minor one. True ulceration is almost certain to be either a development of scrofula, the result of cancerous disease, or of syphilitic poison. If none of these causes be present, we may safely regard the

ulceration as of no consequence in so far as it is a local malady.

The states of which we have just spoken are described as giving rise to a very great variety of symptoms: but with the exception of the feeling of weight and sense of tenderness which are the real exponents of congestion, the relations have been found to be wholly casual. By carefully recorded observations it has been ascertained that the excess and diminution of the menstrual flux, the leucorrhœal discharges, the varied sensations and imaginings of hysteria, were quite as frequently traceable in cases which presented none of those characters which are said to mark "inflammation and ulceration of the os uteri" as in cases in which the advocates of this new nosology would have discovered the more direct signs of its presence. That these signs do indicate any important condition is probably a false inference, but that the other symptoms of which we have spoken are in any way excited by it, is absolutely disproved.

Tenderness to the touch, while very probably indicating congestion, must at times be regarded as rheumatic, or neuralgic, because of the absence of anything else indicating inflammation, and one of our first principles of diagnosis is, that pain and tenderness are not to be regarded, when standing alone, as evidence of inflammatory action. Induration, perceptible hardness of the neck of the womb, is generally to be viewed as a consequence of past inflammatory action of some kind or other; but when accompanied by irregularity of surface, it is one of the early indications of cancer. *Rodent ulcer* is one of the most important of the ulcerative processes: if not actually cancerous it is closely allied to malignant disease.

§ 3. *Cancer.*—Nearly all the symptoms of uterine disorder may be excited by the commencement or progress of malignant disease: menorrhagia or true hæmorrhage, painful menstruation, leucorrhœal discharge, sensations of discomfort, uneasiness, and bearing-down, as well as constant pain, are each to be found in various instances. In its advanced stage no one who supposes himself at all conversant with the evidence of uterine disease ought to have any difficulty in recognising it. The wan and unhealthy aspect of the patient and the odour of the disease may reveal it without the need of asking a question; if it have made less progress, the existence of pain, of occasional

hæmorrhage, of constant discharge, which has very often a peculiar colour, or may have to the patient's own consciousness a disagreeable odour, partial emaciation, and sallowness are its usual characters. But any or all of these symptoms may be partially or wholly absent, especially at the commencement of the disease: it may cause no pain, no hæmorrhage, no discharge differing from leucorrhœa, no emaciation or malignant aspect. Digital examination will detect the roughness, irregularity, or hardness of commencing cancer with more certainty, and at earlier periods, than ocular examination with the speculum. But is examination often or always to be resorted to? To this question I would reply that we must be on our guard against the fancied excellence of accurate diagnosis, remembering that it is our business to treat disease, not to be supremely wise: one examination, when desired by the patient or her friends for their information, can do no harm; repeated examinations can do no good. We may conclude, with every probability of truth, that in such indistinct cases the persons who think most and talk most of the state of their uterine organs have nothing really the matter: if by examination we have discovered what we deem the indication of commencing scirrhus, the information is really of very little use; the knowledge is unquestionably valuable, but we can neither make use of it to arrest a disease which we believe incurable, nor to warn the patient of impending danger, when our convictions are not quite certain. By a little delay the symptoms become more pronounced, the examination more called for, and the result more certain; in the early stages of disease, it is therefore unwise to press for it, if we mean to act as honourable members of the profession: the uncompromising practitioner must be always prepared to say that he has discovered some curable form of disease, to justify his own proceedings, and to secure the confidence of his patient. A digital examination ought always to precede the use of the speculum,

which may be productive of much mischief if introduced in cases of cancer.

§ 4. *Tumours.*—It is unnecessary in such a short summary to separate the fibrous and the polypous tumours, because their recognition is almost wholly a question for the professed accoucheur. They are both frequently marked by the recurrence of occasional hæmorrhage, by bearing down, sense of pain and weight, &c., which call attention to the condition of the uterus itself. A fibrous tumour may often be felt through the abdominal walls, just at the brim of the pelvis, when it is situated in the body of the organ: its central position and its elevation serve to distinguish it from commencing ovarian tumour: polypous growths can only be detected by examination *per vaginam.*

Both diseases may continue for a long period without the possibility of their being actually traced. We infer the probability of polypus when occasional hæmorrhage is accompanied by constant leucorrhœa, and a sense of bearing down; when, at the same time, the os uteri is partly open, and there is no hardness or irregularity of its lips. A fibrous tumour, again, may be suspected when there is menorrhagia unconnected with general disorder, or traceable alteration of parts, and which has not been attended with pain; and when, in course of time, this is followed by discomfort in micturition, or by bearing down pains and efforts at expulsion.

§ 5. *Prolapsus and displacement.*—Besides the actual change of position due to descent of the womb, there are various alterations of direction and situation produced by flexures and versions of the organ, which give rise to symptoms of more or less serious import. Among the slighter ailments are pressure on the rectum and bladder, and, as is alleged, the production of dysmenorrhœa by the obstacle to the discharge of the menstrual fluid caused by flexure of the uterus. The most important result is probably the obstacle it presents to impregnation, and the difficulty attending

delivery if the position of the womb be not rectified in the early months of utero-gestation.

A sense of weight and bearing down is constantly produced by actual displacement of the womb. The history very generally dates from previous pregnancy, when the patient got up too soon, or continued in an enfeebled state at the time when she was allowed to get up: the ligaments fail to retain the organ in its proper place, and it falls by its own weight. Sometimes in women who have never borne children an unusual tension of the abdominal walls, by strain or violent effort, may cause descent of the uterus, just as it may cause hernia. Occasionally it is produced by the constant carrying of heavy weights: and the fact is only to be ascertained by examination.

Of late years we have heard a great deal of forms of prolapsus, which very often exist only in the mind, perhaps we may venture to say, in the mouth of the practitioner,—ante-version, retro-version—ante-flexion, retro-flexion: the former implying a displacement of the whole organ, the latter, that its body becomes flexed or bent on itself. No doubt retro-version does occasionally occur, as a very painful and annoying form of displacement, pressing upon and greatly interfering with the action of the rectum: ante-version must be a very rare condition considering the daily and hourly distension of the bladder, which lies in front of the uterus. Ante-flexion, as has been pointed out by some French physiologists, is the natural form of the womb in early life, and though it may continue abnormally after pregnancy, or may be even exaggerated, it seems absurd to assign any importance to it except when aggravated by the existence of a tumour, or abnormally fixed by peritoneal adhesion. Retro-flexion is the most unimportant among the changes of position.

Prolapsus may be limited to the walls of the vagina, or they may be involved in the descent of the womb. This often gives rise to more annoyance to the patient in walking or making any exertion than prolapsus uteri when free from such a complication. One of its most prejudicial consequences is when a portion of the bladder descends into the interior of the fold of mucous membrane, rendering it impossible to eva-

cuate its contents completely: the same sequence of events occurs as when the bladder is paralysed; the urine decomposes, irritation of the bladder is set up, unhealthy mucous is secreted, and chronic cystitis is established.

Valuable information in regard to diagnosis is also gained from an opposite condition, when the os uteri is found unusually high up. It is constant in pregnancy after the fourth month: it is often found when there has been local inflammation of the surrounding tissues: and it affords one of the most complete contrasts between large ovarian dropsy and ascites, because in the latter the uterus is always depressed.

§ 6. *Disorders of menstruation.*—These affections are to be regarded as functional diseases, directly connected with the uterus, but indirectly with the other organs of generation, and more or less dependent on general causes, of which the altered function is only a symptom. They are naturally divisible into cases associated with diminution or excess of the menstrual flux, and those of which pain is the prominent symptom.

a. Amenorrhœa.—Absence of the catamenia must be distinguished from chlorosis, inasmuch as tardy, scanty, painful, and suppressed menstruation are very often found altogether independent of general signs of anæmia; the face may be florid, the pulse good, the body well nourished, and the general health fair, notwithstanding the co-existence of amenorrhœa. Perhaps all this indicates a condition of local as well as general congestion which interferes with the due performance of the function, but quite as often the aspect of the patient is fallacious, and the real condition is atonic, the colour of the face being the effect of venous congestion rather than of general plethora. This is proved not only by the coldness and clamminess of the hands and feet, but by the fact that the menstrual functions become regular under the judi-

cious employment of tonics, and that if they be not regulated, chlorosis will speedily supervene.

When dependent on local causes, total absence of the secretion may persist through life; or the fluid, unable to find an outlet, may accumulate in the uterus and vagina: in each of these there is some defect of organization. In other instances, exposure to cold exerts some influence on the uterus, probably in the first place causing congestion, which is followed by sudden suppression; but, if the function be not speedily restored, a constitutional state is developed, and the disorder loses its local character.

In amenorrhœa which is not accompanied by anæmia we must always remember the possible co-existence of pregnancy: this suspicion is more likely to be just if previously the catamenia were always regular, and is proportionally less probable if they have been irregular in their appearance.

b. Scanty menstruation. — The presence of menstrual flux, however scanty and irregular, at once indicates that many of the circumstances which may give rise to amenorrhœa cannot be present. The chief cause of the deficiency is the existence of anæmia, which is also liable to produce entire suppression. It must be regarded as a constitutional disorder.

Though so intimately connected with age, the function is really dependent on the development of organs which age implies, and therefore in cases of retarded menstruation we have to look to the girlish or womanly appearance of the patient before interfering with the uterus; while, in the absence of the catamenia after mid-life, we have to remember that the involution of the uterus and ovaries takes place much earlier in some females than others. Suppression for a time almost always follows after an attack of any severe disease, and, if the individual have attained a certain age, may be persistent.

c. Vicarious menstruation.—No doubt many of the cases of hæmorrhage reported as vicarious are unworthy of confidence. The mere fact that the catamenia are scanty or absent is not sufficient to justify

the appellation. Beyond this, it should be shown that the hæmorrhage is one that can have no other cause, and that it presents some appearance of regularity in its return.

d. Dysmenorrhœa.—The catamenial periods are often attended with pain when menstruation is irregular: dysmenorrhœa is sometimes also complained of when the flux is regular, but scanty or pale: in all of these the disorder is unquestionably dependent on constitutional causes. The pain in such cases is probably neuralgic, as it is associated with other sensations of an analogous kind, head-ache, back-ache, &c.: it generally precedes the menstruation, and is most intense at the commencement of the discharge.

In other instances painful menstruation is accompanied by no diminution, but perhaps by excess of the catamenia, and may be connected with hæmorrhoids, loaded bowels, &c., or with other diseases of the uterus, irritability, tenderness, fibrous tumours, &c. Sometimes coagula are discharged in place of the ordinary fluid, or it is mixed with membraneous shreds. We have no knowledge of the pathological causes of these states, and must be content with the explanation which disordered function conveys.

I think we must be cautious in admitting the possibility of a contracted state of the orifice as a cause of dysmenorrhœa. Dilatation at all events constantly fails in relieving it.

e. Menorrhagia.—This term does not include occasional hæmorrhage, but must be restricted to the undue persistence and the too frequent recurrence of regular menstruation. It is most commonly dependent on some general state of system; rarely produced by plethora, it is much more frequently due to impoverished blood: hence it is seen in disease of the kidney or in general debility, increasing the anæmia which accompanies these conditions.

Sometimes it is the consequence of undue excitement of the sexual organs: and it is not an uncommon

consequence of the imperfect return of the uterus to its normal state after tedious labour or miscarriage.

Occasionally hæmorrhage very closely resembles menorrhagia when it comes on at regular intervals, and these are determined by the congestion or whatever else it is that gives rise to the monthly return of the menses; but hæmorrhage means something more than mere excess of the natural flux. It is associated either with destruction of surface, or with polypous or fibrous growth, or with irregular position of the placenta in pregnancy; sometimes it appears during the early periods of pregnancy, simulating irregular rather than excessive menstruation: in all cases, sooner or later, hæmorrhage ceases to wear the aspect of regularity, and its irregular appearance is the best indication that it is not menorrhagia (see Uterine Hæmorrhage, p. 152).

CHAPTER XXXV.

Diseases of the Joints, Bones, and Muscles.

Division I. — *Diseases of Joints and Bones — Their Constitutional Origin—Synovitis—Ulceration of Cartilage—Degeneration of Cartilage—Ankylosis—Inflammation of Bone—Periostitis—Mollities Ossium — Rickets —Fragilitas Ossium — Growths.*

Division II.—*Diseases of Muscles — Lead Palsy — Fatty Degeneration—Atrophy—Trichinosis.*

Division I.—Diseases of Joints and Bones.

The more important points connected with diseases of the joints have been already mentioned with reference to rheumatism and gout, and it is only in this relation that they can become the subjects of medical diagnosis. Their local management is referred to the department of surgery, and probably for this reason they are not regarded as legitimately belonging to the practice of medicine: but in fact they are almost invariably associated with depraved constitutional states, and must be met by remedies addressed to the system at large: in this view much of the knowledge regarding their treatment must spring from an acquaintance with the characters by which such conditions are recognised.

In very many cases the disease which has become located in the joint, from whatever cause it may have been originally derived, is beyond the aid of remedies: structures have been removed, or materially altered in their minute organization, and new formations have been added, which can no longer be modified by treatment suited to the primary disease; even surgery is

unable to offer any material relief. These changes sometimes serve as landmarks by which we are enabled to define more exactly the nature of a subsequent attack. We recognise gout by its tophaceous deposits, as they are called; osteo-arthritis by chronic thickening of the ligaments and distortion of the joints; and we feel the greatest certainty that the case is one of simple rheumatism when all traces of previous suffering have disappeared: in repeated seizures the symptoms tend to become less and less distinctive of the special malady, and to present a certain similarity of character, which renders diagnosis difficult.

Synovitis, as distinguished from synovial rheumatism or gouty synovitis, is only known from the circumstance that while there is no history of previous rheumatism or gout; other joints are not implicated. For though simple synovitis can generally be traced to accident, it is also true that an accident is a frequent cause of an attack of rheumatism or gout in an individual predisposed to either disease.

Ulceration of Cartilage is a most important form of joint disease, and one readily mistaken for synovial rheumatism. The fact that pain is felt in other joints, though it may be only sympathetic (*e. g.* pain of the knee in disease of the hip), will lead any but an accurate observer to the conclusion that the affection is rheumatic.

Its origin is sometimes very obscure, but it occasionally follows acute synovitis: and although experience must be said to be rather against the belief that the inflammation is in the first instance rheumatic, still such may sometimes be the true explanation. On the other hand, while in a majority of instances it has a strumous origin, yet the disease certainly occurs in persons who have no such tendency. The most direct proof of its existence is obtained by comparing the amount of pain constantly present with that which is excited by movement of the joint, and especially that form of pain felt when the surfaces

are brought into contact by concussion or direct pressure: and in addition to this, the general fulness of the joint while yet there are no signs of over-distension of the synovial sac.

The *pulpy degeneration of the synovial membrane*, while presenting more decidedly the characteristic of obscure origin and development, has a very close resemblance to chronic synovitis, whether due to accident or to rheumatism. A little care will suffice to show that while its history does not point to any of the ordinary causes of synovitis, the enlarged sac does not distinctly fluctuate as it would do if distended with serum.

Ankylosis is only of importance with reference to its origin. A stiff joint may result from a variety of causes, and the effect, so far as the stiffness is concerned, will be the same: but the chances of modifying or improving the condition of the patient depend almost entirely on its cause.

It is unnecessary here to repeat the remarks already made upon posture and gait, and upon active and passive motion: with reference to diagnosis these modes of examination serve to point out the various conditions of stiffness or immobility, of pain produced by muscular effort, and of pain produced by the motion of diseased surfaces on each other, or by the stretching of inflamed ligaments; distinguishing them from muscular paralysis. Loss of power is the usual complaint of the patient, when the condition consists really of inability to use the power which exists.

Inflammation of bone, whether ending in suppuration or in necrosis or caries, belongs entirely to the surgeon, because local treatment and operative interference are constantly demanded. *Periostitis*, according to its origin, is regarded either as medical or surgical. It often has a distinctly rheumatic character; but it is still more frequently syphilitic. It consists of a local enlargement on the surface of the bone, tense and tender, very generally smooth, but sometimes also irregular, interfering more or less with

voluntary motion, because of its relations to the origin or insertion of muscles, but not hindering passive movement, unless its position be in close proximity to the joint; these characteristics point very plainly to periosteal inflammation. When the acute stage is past, or when the affection has come on more gradually, the thickening and induration may be accompanied by very little pain. Its relation to secondary syphilis is so constant that the discovery of nodes is very often sufficient to determine an obscure case: their most common situation is on the front of the tibia, and next in frequency they are found over the cranium.

Mollities ossium, in its correct application, refers to a form of disease in which the solid constituents of bone are lost, and it is reduced to little more than an outside crust, with a pulpy interior. From this two consequences result, which seem at first sight rather opposed to each other; the bones bend under long continued strain, either as means of support to the weight of the body, or as points of resistance to the action of muscles; but they are equally liable to fracture from trifling causes, when the strain is brought to bear on them suddenly. Nothing is more distinctive of the true disease. And if a somewhat analogous condition is seen in cases of disseminated cancer of bone, it may generally be discriminated by the absence of cancerous cachexia, the appearance of health which the patient presents, and the circumstance that the fractures heal so rapidly. The term has been employed rather vaguely to include all forms of softening, but there can be no doubt that there is a special condition of degeneration, differing alike from the cancerous and the strumous cachexia, and from simpler and senile atrophy.

Rachitis is usually regarded as a strumous affection, and there seems good ground for asserting that the disease in its worst form is seen in scrofulous persons. At the same time, it seems to me impossible to draw the line anywhere between the slightest

bowing of the leg in a perfectly healthy child, and the greatest amount of deformity in one "eaten up" with scrofula, so long as there is simple bending and no ulceration of bone or cartilage.

It is more natural to conclude that scrofula, when present, gives the stamp of its own intractable nature to rickets, and causes it to assume a greater degree of severity, though in truth the two diseases are quite distinct. The bending of the bones in childhood, without any marked tendency to fracture, and their subsequent hardening into their distorted shape, or under favorable circumstances their return to their normal form and direction—these characters together are quite sufficient to mark the disease.

The term *fragilitas ossium* ought to be restricted to atrophy. There are many circumstances which render a bone liable to break more readily than in health; the various results of inflammatory action, ulceration, abscess, neurosis, caries; growths of any kind which produce absorption of bone tissue; as well as disseminated cancer and mollities, each may be the cause of what is sometimes called by way of distinction "spontaneous" fracture. Atrophy differs from all of these in presenting no definite form of disease. It is usually assumed to be associated with the degenerative changes of old age, when the absorption of tissue exceeds its re-production; and especially with fatty degeneration, which is sometimes seen at earlier periods of life.

In rickets and in mollities ossium the earthy constituents of bone are diminished, but their different characters are caused by the circumstance that in one the bone-earth is not deposited in sufficient quantity to meet the requirements of growth, in the other it is removed after its deposition, and is replaced by morbid structure: the one is rather a consequence of faulty nutrition, the other is the effect of actual disease. In atrophy the fibrous material is removed as well as the lime; and hence, while in mollities the remaining portion of earthy structure is crushed and splintered by the bending of the bone, in fragilitas the bone itself breaks across.

Growths, whether *malignant* or *non-malignant*, so interesting to the surgeon, need not be discussed here. When we pass from such simple forms as periosteal thickening and exostosis to the more definite growths, the question of their removal by surgical interference, and the possibility of their return, are points so intimately connected with their diagnosis, that the student must be referred to works on surgery for information on the subject.

Division II.—Diseases of Muscles.

The diseases of muscular structure are not numerous or of much importance: those chiefly concern us, in medical practice, which lead to paralysis, more or less complete. One of the most common is that which is found associated with lead poisoning, when the metal is actually found deposited in the muscular tissue, and causing destruction of its fibrillæ. It is in great measure limited to the extensors of the forearm and the muscles surrounding the intestinal canal, and it is especially recognised by the blue line round the gums, which can always be traced when the system is impregnated with the mineral. Another condition, which is perhaps of greater importance, is that in which the true muscular fibre becomes replaced by fat; fatty degeneration is very frequently discovered in the walls of the heart, rendering its action feeble, and materially shortening existence by its effects on the circulation. In the voluntary muscles the same change is occasionally observed; and in the absence of direct evidence of its existence it may be extremely difficult to determine whether the resulting paralysis be caused by want of muscular power or of nervous energy. The only rule that can be applied to distinguish them is derived from the distribution of the nervous system: when the disease is confined to a nerve, the paralysed muscles all derive their energy from the same source; when the paralysis is due to disease of the brain or spinal cord, it will be observed that on either side muscles supplied by nerves issuing

from the canal at a greater distance from the brain are necessarily involved whenever the disease affects those which receive their nerve-force from a higher portion of the spine. In paralysis caused by disease of muscle, the same law does not hold good. Atrophy of muscle is a constant consequence of loss of nervous energy, and the causes of fatty degeneration are yet so little understood that the state of the muscle alone cannot form any safe ground for diagnosis. The subject of progressive muscular atrophy has been already discussed (p. 236).

The muscles are constantly involved in cellular inflammation, and, when suppuration follows, the fibres are bathed in pus, which burrows among their structures. Occasionally the fleshy belly of the muscle becomes the site of small abscesses, but inflammation of the fibre apart from that of the investing sheath of areolar tissue is unknown.

Occasionally the presence of the *trichina spiralis* leads to a very general condition of disease of the muscular system, to which the name of *trichinosis* is given. This parasite, unlike the tænia, does not assume two different forms of existence, as it happens to exist in different animals. The little cyst which forms around it is only altered muscular tissue, and the animal is the same when found in the pig, when it gives rise to what is called "measly pork," and in man. It does not locate itself anywhere in the intestinal canal, but the young brood at least are not killed in the stomach; they pass thence into the blood and again escape from the vessels into the muscular tissue, where they are recognised by the little knots which can be felt in its texture.

CHAPTER XXXVI.

DISEASES OF THE SKIN.

General principles of diagnosis—§ 1, *Erythema—Intertrigo—Roseola—Urticaria.*—§ 2, *Prurigo—Lichen—Strophulus*—§ 3, *Psoriasis—Lepra—Pityriasis.*—§ 4, *Vesicular eruptions—Eczema—Miliaria—Herpes—Scabies.*—§ 5, *Pustular eruptions—Impetigo—Ecthyma—Acne—Sycosis.*—§ 6, *Pemphigus—Pompholix—Rupia.*—§ 7, *Perverted secretion—Stearrhœa Nigricans—Ichthyosis cornea—Vera.*—§ 8, *Parasitic diseases—Tinea favosa—Porrigo decalvans—Tinea tonsurans—Pityriasis versicolor.*—§ 9, *Tubercles of the Skin.*—§ 10, *Syphilitic eruptions.*—§ 11, *Lupus—Scrofulous ulceration.*—§ 12, *Endemial diseases of the Skin—General Remarks.*

It is pretty generally admitted that the information possessed by most practitioners of medicine in this department is exceedingly vague: the lines of demarcation between the various forms are indefinite, and the results of treatment for the most part unsatisfactory. It is true that in general the diseases of the skin are not of very great importance, but it is an erroneous conclusion that they will not therefore repay the trouble of study. Our failures in treatment are not unfrequently the result of ignorance, and a little pains bestowed on ascertaining the true principles of diagnosis, and acquiring an aptitude in discriminating the varieties which these diseases present, will very soon enable the student to learn for himself what mode of treatment is useful in one form, useless or even hurtful in another. It will thus limit the choice of his remedies to a few that may do real good, in

place of his ringing the changes on a variety of impotent drugs, to be at last relieved of a tedious and unmanageable case, only by some accidental change in the constitution of the patient, which at once dissipates the local disorder.

On a superficial view nothing should be simpler than the diagnosis of skin diseases. If a man but use his eyes aright, it may be said, he ought to be able at once to distinguish them: here is surely an instance in which the symptom is pathognomonic of the disease. In this, I believe, consists the great difficulty, and this short-sighted reasoning is one of the chief causes of the ignorance that prevails. If the scope and intention of the preceding pages have been made at all intelligible, no argument is needed to prove that skin diseases do not in this respect differ from others; they are by no means isolated facts in the economy; and while we must acknowledge the faulty action in one tissue, we must not ignore it elsewhere. The evidence of the constitutional fault is, however, not always manifest, and when present, its language is not always the same. The symptoms which were enumerated in the early part of our inquiry, as indicating the general condition of the patient, have to be reviewed; but though we find some preponderating more than others in particular classes of skin diseases, there are none which may be fairly classed as diagnostic of any individual disorder. We are thus forced to take up the two subjects separately, and frame our diagnosis of the cutaneous affection, independently of the more general derangement of which it is chiefly a symptom; and this limitation prevents our being able to correct the opinions based upon one set of observations by that derived from the other.

One rule may be given at the outset as applicable to all cases, and especially to those about which there is doubt, that the distinguishing characters are most readily traced in the commencement of the disease,

and the student should make it his business always to see the most recent spots of the eruption. This is in fact the history of the case, which is often written more correctly in the different patches on the skin of the patient than it is ever detailed in the most accurate case-book. Next in value to seeing the eruption at its earliest stage is a good account of it from the patient himself; and in this we have only to guard against asking leading questions, where interrogation is so necessary to elicit the facts at all.

In certain forms, concomitant fever may or may not exist, and in such it is essential to mark its presence or absence: but this rather with reference to treatment than to diagnosis, for we do not regard those as cutaneous diseases of which fever is an essential element; we deal with it simply as one of the constitutional states which must be considered in its casual relation to the eruption, of whatever nature, which is present.

§ 1. *Erythema—Intertrigo—Roseola—Urticaria.*—In subdividing the subject of this chapter, it will be most convenient to consider those forms, first, in which the epidermis is not altered; the skin is red, perhaps elevated and tender, but its surface is unbroken.

The eruption of *erythema* consists of a uniform redness, with puffiness of the skin, distributed in distinct patches of some size: it is accompanied by little constitutional disturbance. When fever is present, we suspect that the disorder is not erythema, or conclude that the febrile symptoms have some other cause. The skin, though somewhat elevated, has not the hardness of erysipelas: after the first day or two the colour becomes bluish or livid, and this to an inexperienced eye might simulate the dusky redness of diffuse cellular inflammation; but the heat and the tension are absent, as well as the constitutional irritation.

The extent of the eruption and the form which the patch presents, vary extremely in different cases. These circumstances have given rise to several varie-

ties being enumerated, but their discrimination is of no importance, with one exception; *Erythema nodosum* is very distinct from the other forms of the disease. It is most commonly seen on the front of the leg, in distinct rounded patches, which are considerably elevated and very tender. It is sometimes attended with a good deal of constitutional disturbance, and as the inflammation subsides the skin acquires a bluish colour, and the patches become soft, and present something very like a sense of fluctuation, which may be mistaken for commencing suppuration. The disorder is believed by many to be an associate of rheumatism.

In the broadest sense, any red patch on the surface of the body which is not caused by erysipelas might be called erythema. Writers on skin diseases often enumerate all such cases, and describe the various causes which may give rise to the appearance: it seems better to restrict the name to those instances in which the redness is produced by something more than mere irritation of the skin, and in which it is not sympathetic only, as when a red patch is seen over a joint affected with acute rheumatism. But an erythematous blush so often points out the situation of grave and serious mischief that whenever fever is present it becomes our duty to study the case very carefully, in order to discover the deep-seated lesion, of which none are more important than cellular inflammation and secondary suppuration.

Intertrigo differs from erythema chiefly in its origin. It is the name given to that redness which is caused by irritation or chafing of the skin. The local exciting cause is marked, and gives its character to the inflammatory action which follows; and whether the redness be produced by friction, or by tension of the skin, it is really recognised by this circumstance. It is perhaps rather more fugitive, if its cause be removed, and there is less sensible change in the condition of the skin than is observed in erythema.

I am inclined to regard *roseola* as a sort of spurious exanthem; it is to be seen when measles are about,

as well as when scarlatina prevails, but without the coryza of the one or the sore-throat of the other.

It resembles those diseases in attacking young persons and presenting febrile symptoms, though of a very slight and evanescent character. It may be best described negatively: the patches are not small and semilunar as in measles, nor are they punctate and close-set as in scarlatina, and the whole surface is never involved, as is sometimes the case in the eruptive fevers; though roundish in form, the borders are not defined, nor the surface elevated, as in erythema or urticaria, and there is no attendant irritation or itching.

Urticaria, "nettle-rash," by its very name, gives an idea of its general form; but while the sting of the nettle raises a white wheal on a sensitive skin, the colour of the patches of urticaria is generally redder than that of the surrounding surface. This is often perhaps the consequence of its duration, just as the mark of a lash is first paler, and then redder than the rest of the skin; sometimes the patches are deep-coloured from the first, and when they continue for any length of time, they tend to become purple or bluish. The eruption is attended with tingling or itching: its progress is sometimes very rapid, lasting not more than one or two days if it be the result of something taken as food or medicine; in other instances it continues for a week or two, and occasionally in its chronic form it may exist in more or less distinctness for weeks or months.

It is distinguished from all other cutaneous affections, which are similarly distributed, by its patches being perfectly smooth; there is neither oozing nor desquamation of the surface; it can hardly be confounded with erythema nodosum, which is so much more prominent, and presents much larger patches with undefined borders. The spots of urticaria are small, with well-defined edges and when they run together to form a patch, they still present the same

appearance, which is exceedingly characteristic. The varieties are quite unimportant.

§ 2. *Prurigo—Lichen—Strophulus.*—In this subdivision there is no necessary breach of surface; the cuticle is elevated in small distinct points, without any secretion, and the desquamation is accidental: the eruption is of a form designated as papular. It seldom happens, however, that it is seen exactly in this condition, because there is always itching, and the top of the papule becomes abraded, leaving a red spot or a small crust of coagulated blood. The diagnosis is not difficult if these circumstances be considered; and even when, as in the severer form of *lichen agrius*, suppuration exists, careful inquiry will disclose that such a condition has only arisen in consequence of the long continuance of the disorder in a cachectic individual, and was not the form in which it first appeared: other portions of the eruption may also be discovered in which the papular character is manifest.

Prurigo has less distinctly the character of a specific disease than lichen, and the cutaneous affection would seem to be frequently the mere consequence of scratching. In many instances, when associated with dirt and neglect, the itching is apparently caused by the *pediculus vestimenti.* In other cases the term *pruritus* would better describe a condition in which nervous irritation is the main element of disease.

In *lichen* we find the papules on the skin quite distinct when the surface is not abraded: they are more easily made out when they are separate from each other than when grouped in patches, as is so often the case. Our diagnosis is, then, to a certain extent negative, the skin is altered in texture more decidedly than in urticaria, for example, and yet there is no desquamation, no exudation, no suppuration. To such a state of things the name of lichen is appropriately given.

Lichen and prurigo are generally distributed on the outward aspect of the limbs, and avoid the flexures of the joints. In this respect they especially differ from scabies, with which, notwithstanding the great dissimilarity of the original lesion, they are sometimes confounded, because of their intolerable itching, and the change which is produced in their appearance by constant scratching.

Strophulus is the lichen of infancy. The word is unhappily chosen, and the English terms of gum and tooth rash are nearly as objectionable, as conveying false impressions of the origin of the affection. It is absurd to speak of gum or tooth rash in an infant only three weeks old. It occurs in isolated spots which may have a tendency to be more numerous in certain parts than others, but are more grouped in patches. There is no moist exudation, and no crust of suppuration forms, *except* where the skin is abraded, and a scab is seen.

The distinction between ordinary lichen and prurigo is really more a question of names than of things. It may be observed that lichen is more generally grouped in patches, prurigo is more diffuse : the itching of the former is comparatively slight, that of the latter intense and intolerable ; as a necessary consequence the skin is abraded by the nails, and a case of prurigo is always marked by scratches and bloody points. The cases in which the disease runs an acute course, and those in which it presents any tendency to ulceration and suppuration, are both commonly referred to lichen, the more ordinary chronic papular eruption is usually called prurigo.

One or two varieties must be mentioned, not so much on account of their individual importance, so that their diagnosis is obscure. The *lichen circumscriptus* assumes a very complete circular form, which in common parlance brings it under the general classification of "ring-worm," a name which includes diseases by no means related to each other: to the student this appearance is apt to suggest the idea of lepra or even herpes. With the latter it ought not to be confounded, because there is no secretion, no vesication, no crust: from the former it is distinguished by the circumstance that desquamation is the principal feature of the one, is only an accidental occurrence in the other. In lepra large white scales surround a portion of the skin which scarcely differs

from that of health, in lichen circumscriptus the whole surface is rough, even though the edge be more elevated than the centre; the desquamation of the cuticle occurs as small fine scales, and is quite a subordinate phenomenon: the patches of lepra are large or numerous, of lichen smaller and solitary.

The same affection occurring in the scalp gives rise to what is very often called porrigo decalvans, a name as undefined as the vulgar epithet of ring-worm. It is marked by the hair falling off in a circular patch, the surface being roughened and covered with minute scales; there is no vesication, suppuration, or ulceration. In this respect it differs from most other diseases which produce loss of hair, when there has been some previous severe affection of the scalp, and the patch of baldness only comes to be remarked when the skin has again recovered its natural condition; in that form of porrigo to which the name *decalvans* should be limited, the hair falls off in consequence of disease of the bulb, apparently caused by a parasitic fungus, the skin being left perfectly smooth and free from scurf.

The *prurigo pudendi* again deserves notice from the occasional absence of all eruptive character together. It is no doubt often caused by want of cleanliness, by the presence of irritating secretions, of slight eczema, or some form of parasite about the roots of the hair; but undoubtedly pruritus does exist without any of these causes, and it must then be regarded as sympathetic of internal irritation of the uterus, the bladder, or the rectum. The same remarks apply even more constantly to *prurigo podicis*, which is constantly associated with internal hæmorrhoids and ascarides. If these be regarded as instances of a sympathetic or neuralgic character, it may be doubted whether, in a great number of cases, the same explanation might not be given, the appearance of eruption being really the effect of scratching: this is especially true of that form which is associated with a gouty habit.

In strophulus the papular character of the eruption is least defined. It consists of distinct spots scattered all over the body, but especially the arms and legs, which are elevated, and have a semi-transparent appearance, almost exactly analogous to a vesicle: it is less to be distinguished by its aspect than by the fact that, with the exception of varicelloid eruptions, there is no disease in which solitary vesicles are uniformly distributed; they are either grouped together, or they affect certain localities more than others.

§ 3. *Psoriasis — Lepra — Pityriasis.*—The term *lepra*, as it gives rise to a certain amount of ambiguity, is now very generally abandoned. There is

but one true scaly or squamous affection of the skin, and to all the varieties the generic name of *psoriasis* is given. Formerly, those cases in which healthy skin is surrounded by squamous portions, especially in an annular form, were called lepra, whilst those in which numerous small spots, or single larger patches, are wholly covered by scales were called psoriasis; the crusts in the former being more adherent, and consequently larger and whiter than in the latter.

The cuticle is materially altered in its form and character. It does not desquamate accidentally in consequence of a casual interruption to the secretion, as in scarlatina or erysipelas; nor does the presence of a papule, as in the last class, cause the premature death, so to speak, of the small portion of cuticle which covers it; but the epidermis is secreted in some abnormal manner which leads to its agglomeration into scales of some size, which after a time become detached, and fall off, or are removed by scratching. When a scale of this sort is seen anywhere on the surface, there can be no difficulty in recognising the disease; and in fact its diagnosis simply rests on making out this circumstance.

The varieties of psoriasis are not of any great importance. A case of *lepra vulgaris*, as it used to be called, presents no difficulty in diagnosis. Neither can there be much obscurity in one of *psoriasis guttata*, with its little round scales scattered over various parts of the body. In one instance only did it present any difficulty to me, when the spots were few in number, and on each the scales had agglomerated together into a mass, like the limpet shell of rupia. The variety called *diffusa* is that which is most nearly approached by chronic eczema, and when the majority of the scales have been removed, the absence of any history of moisture at any period is the best guide in diagnosis.

The greatest difficulty in recognising the character of the eruption is experienced when the scales have been removed by a warm bath; the fresh cuticle underneath them presents a red shining aspect, which may for a moment be mistaken for chronic eczema. When it begins by a solitary patch it may be difficult to distinguish it from lichen circumscriptus, especially on the

hand or face, where constant washing removes the scales as soon as formed. The distinction rests on the principle already enunciated, that in the squamous diseases the cuticle is secreted in an unnatural condition, and consequently where the scale has been removed the skin looks red, and smooth, and shining, whereas in lichen the detachment of the cuticle is only caused by its nutrition being interfered with from the existence of papules, which give a certain degree of irregularity to the surface.

Like the previous class these diseases especially affect the outer sides of the limbs, and avoid the flexures of the joints. They are not necessarily attended with itching, but if once irritated the itching sometimes becomes very intense. They are essentially chronic in character, and the history only shows that there has been a rough patch observed somewhere or other which has not received any attention till it has attained some size, or till the same eruption has appeared elsewhere.

Pityriasis used to be classed as a squamous disease; perhaps one of its varieties, *pityriasis capitis*, marked by a constant excessive desquamation of the cuticle over the scalp, which falls as white powder when the hair is brushed, might be so considered: it is nothing more than an excess of natural secretion, and can scarcely be called a disease of the skin. *Pityriasis versicolor* is now referred to the parasitic growths; its most prominent feature is the change of colour, as there is no sensible alteration in the cutaneous tissue accompanying it.

§ 4. *Vesicular Eruptions.*—There seems to be a practical advantage in grouping together all the diseases commencing with a vesicle, because when this one point can be ascertained, the place of each will be readily discovered by a comparison of the number of eruptions which have this character in common. At the risk of adopting a very faulty classification, both *miliaira* and *scabies* must be here referred to. In reality miliary eruption has no claim to be considered as a disease of skin at all, and scabies clearly belongs to the parasitic group.

The first inquiry, of course, ought to be how long

the disease has lasted, and how it commenced; and then search must be made for a vesicle in the early stage. If the first appearance of the disorder cannot be traced, we have to remember that the serum must either continue to ooze away, keeping the part constantly moist, or harden into a gum-like crust; or that it may dry up altogether, leaving small, round, dry scales, as the only remains of the vesicle; but, on the other hand, by exposure, the cutis may be irritated, and produce a purulent secretion, which forms crusts like those of the pustular eruptions. These conditions may give rise to some difficulty in diagnosis; they belong to one form of eruption—viz., *eczema*.

In this variety a number of vesicles are always found together, coalescing and forming a patch of varying size. It is distinguished from the other vesicular eruptions by their neither being disposed in regular groups, nor occurring singly. In its simple form the vesicles either constantly rise on an uninflamed surface, and gradually disappear, or the skin continues red and moist after they are burst: in the former, the appearance of fresh vesicles prevents our referring the shrivelled and dry ones to any scaly eruption; in the latter, the moistened surface prevents its being mistaken for erythema, or erysipelas, which is the name commonly applied to it by patients.

Occasionally the reddened skin is dry, and covered with small scales: that this is not psoriasis is proved by the circumstances that the skin is evenly inflamed all over, and that the scales are not aggregated in patches which run into each other. As a consequence of the inflammation, the skin is generally cracked and sometimes bleeds, and this never happens with psoriasis unless the scales be very thick and adherent, when the diagnosis cannot be difficult. This form of eczema is best seen in what is called "grocer's itch," or on the hands of washerwomen.

When the oozing from the surface, in place of continuing as a thin serosity, becomes purulent and har-

dens into crusts, the name *eczema impetiginodes* has been employed. It is quite unnecessary to distinguish this from real impetigo, for the diseases are closely analogous, except when the borders of the eruption are red and inflamed, and the eczema is spreading; if there be only a chronic purulent discharge the name given is quite immaterial.

The miliary eruption or *sudamina* cannot easily be mistaken. It is often seen in such a disease as rheumatic fever, which is accompanied by profuse perspiration. The chest usually, in such circumstances, more frequently than any other part of the body, is found covered with small transparent granules of the size of millet seeds, which evidently consist of minute elevations of the cuticle distended with serum. They have no practical significance.

The great characteristic of *herpes* is, that the vesicles are distributed in groups or clusters: they are also larger than those of eczema, and do not so readily fuse together. On their disruption the secretion almost always forms a gum-like scab; their duration is commonly short.

Among its more constant forms we find the following: *Herpes labialis*,—occurring in one or two patches on the lips, sometimes on the nose, and more rarely about the eyelids; in common parlance described as the effect of a "cold," and evidently associated with irritation of the mucous membrane. *Herpes circinatus*,—one of the "ring-worms" in which the clusters assume an annular form; the vesication and the scab alike distinguish it from lichen circumscriptus and from lepra; there can be no excuse for a mistake, except when the eruption is disappearing. *Herpes zoster* is only remarkable for its situation, and the extent to which it may reach, encircling as it does the one half of the trunk, and though generally bounded in a remarkable manner by the mesian line before or behind, yet sometimes passing beyond. *Herpes preputialis* is worthy of notice because it has been sometimes mistaken for chancre; it has no peculiar characters to distinguish it from any other form of herpes; it is perfectly different from any syphilitic affection.

Patches of herpes wherever occurring, usually known as "shingles," except in the few instances

enumerated, are so exactly like the eruption on the lip, which is familiarly known to every one, that description is unnecessary. It is often preceded by considerable local irritation, and a sort of cutaneous neuralgia very frequently remains after it has died away.

Scabies should not, perhaps, in a scientific work be classed as a vesicular disease, because the vesicle is really an accident, and may be replaced by a pustule. But for purposes of diagnosis it is well to retain it in its present place, because whereas lichen, prurigo and the scaly diseases all have their chief site on the outer sides of the limbs and back of the trunk, the vesicular eruptions generally, and scabies in particular, select the inner aspects of the limbs and the flexures of the joints. The acarus, which is the essence of the disease, does not inhabit the vesicle, but grooves out a curved channel for itself, which may be generally seen as a black line like the letter *S:* but its presence always determines the eruption of solitary vesicles, which may in course of time become pustules: and these are sure to be found at the flexure of the wrist or between the fingers, and along the inner side of the arm, wherever else they may be. One vesicle, with a distinct groove from it in such a situation, is enough for diagnosis, any amount of itching without these signs is of no value: prurigo causes quite as much itching, and pustular, or even quasi-vesicular eruptions, occur very frequently among children of the lower classes which closely resemble scabies, and can only be pronounced not to be so by observing this remarkable predilection for locality and the constant presence of the groove when the parasite is really present.

§ 5. *Pustular Eruptions.*—A fully-developed pustule is quite unlike anything else, but just as at certain stages of the vesicular eruptions the secretion is not serum, so in the pustular the secretion is at first

not true pus, and, after the pustule has burst and discharged, the crust may not be quite characteristic. In *impetigo* this difficulty is most likely to be met with, because its characters vary as the disease is spread over a large surface in solitary pustules, called *impetigo sparsa*, or is limited to distinct patches, when the name *figurata* is applied to it. In the former the single pustules have at first much the appearance of vesicles, but they very soon lose their transparency: among vesicular diseases we have found no such example except scabies; and therefore, when a case of this kind is met with, the question cannot be, is it eczema which exists only in patches, or herpes which forms small and well-defined groups, but whether it be scabies or impetigo: the answer is only to be obtained from the diagnosis of scabies. When, again, the eruption occurs in patches it is more liable to be mistaken for herpes: but the course of the two diseases is quite different; the one commences suddenly, and is preceded by irritation, the other is gradual, and its beginning is unobserved; the one terminates in a few days, the other lingers on for weeks or months.

The common history of impetigo is that, after some degree of redness and tumefaction of the skin, a few distinct pustules slowly make their appearance, the irritation which accompanies them being so slight as to escape observation in most instances, and the eruption itself receiving little attention. The matter contained in them very soon becomes decidedly purulent and forms a firm scab: but before those first observed have had time to dry up, others appear in succession, which are either scattered and distinct, or in close proximity to the former. It is scarcely possible to say in the first instance which of the two varieties is likely to be developed.

When the disease has already lasted some time, and a thick crust has formed, it matters little whether it be called eczema impetiginodes or impetigo,—herpes it cannot be; for the only

question worth considering is, whether there be any appearance of redness or tendency to spread about its margin. The crusts of dry pus, when solitary and rather large, are very like those of the next subdivision, ecthyma: when in clusters, or covering a large surface of the scalp, they can only be mistaken for favus. The scalp, and neck, and face, are the chief sites of impetigo figurata, which is more rarely seen on the limbs: impetigo sparsa occurs chiefly on the back and arms, and less frequently on the legs.

In *Ecthyma* the pustules are large and solitary, although very often a number are found together on one limb, and none elsewhere, showing thus a tendency to aggregation. The great distinction between it and impetigo, independently of the difference of size in the pustules, seems to be that the cutaneous texture is more deeply affected: in the one there is an abraded surface which secretes pus, in the other there is a nearer approach to an ulcer under the dry crust with which it is covered. This brings it into close relation to rupia, which is only distinguished by the ulceration being more unequivocal, the scab larger and more adhering: in rupia, too, there is no tendency to aggregation, the scabs are few and solitary.

Ecthyma is seldom found in the chronic form: it is easily distinguished from boils or carbuncle by the circumstance that it is quite superficial, and there is consequently no surrounding elevation of hard and tumid skin, as when the suppuration proceeds from the deeper textures. Nothing has been said of the syphilitic eruptions, because they must be taken by themselves, but it is worth noticing here that when there is much approach to ulceration this disease comes nearer in appearance to one of the common forms of secondary eruption than any we have yet had to refer to.

Acne and *Sycosis* are names applied to suppuration of the follicles. The latter confined to that which appears at the roots of the hair in the beard, the former including all other cases. In this sense, every common pimple may be called acne; but the name is reserved for cases in which there are so many as to show a general tendency to this kind of suppuration.

Although the course of each individual pimple be not very prolonged, yet the progress of the disease is slow: not unfrequently this tardiness is shown in persistent redness after the actual suppuration is at an end, and its continued recurrence in the same follicles. When such a blotchy redness alone remains, and no pustule is to be seen, a learner may be at a loss to what class he ought to refer the case; its rugged surface renders it unlike eczema, and the absence of crust shows that it is not impetigo; its redness and its position, only on the face or back of the neck, prevent its being confounded with lichen and psoriasis: it is most apt to be taken for tubercle of the skin.

Sycosis much more nearly resembles impetigo: crusts generally form, and are very obstinate and adherent: but it is to be observed that the skin is elevated round the crust, which is just what we should expect from the circumstance that the suppuration proceeds from a follicle deeply seated in the cutis, and not from its surface.

Favus, which has been classed among pustules, we shall refer to its true place as a parasitic growth.

§ 6. *Pemphigus or Pompholyx and Rupia.*—These two disorders, although very different in their history and causes, may conveniently be classed together, because they are characterised by the existence of bullæ (literally bubbles). In *pemphigus* the contents of the bulla are always serous, in rupia puriform; and they thus correspond in some measure to the division of the smaller eruptions into vesicular and pustular. In connexion with this there is a similarity in history, the one appearing more frequently in an acute form, the other being always chronic; there is also a chronic pemphigus, to which the name *pompholyx* is given, to complete the analogy with chronic eczema.

Whether this disease be of shorter or longer duration there is always redness of the skin, the cuticle rising in separate blisters, generally rounded and pro-

minent, and filled with serum; the duration of each blister is not long, but great difference is observed in the rapidity with which the subsequent healing process goes on. There can be no question as to whether it be a vesicular eruption, because of the immense difference in size; indeed, the only disease in which similar blisters are ever seen is erysipelas; and for this it cannot be mistaken.

In the sequel the appearance of the skin depends much on the rapidity of the healing process; and when fresh bullæ have ceased to appear, or the morbid action is for a time suspended, there may be considerable doubt as to the true nature of the disorder. The skin may be merely morbidly red in patches, or it may be covered with rounded spots over which the cuticle has been removed, and new epidermis is forming; or again, these spots may be covered with a sero-purulent discharge, which in some is converted into a thin crust: in such instances the history of the case will best explain the meaning of what is seen.

Rupia, although it be said to commence as pemphigus does, in a bulla of some size, presents but few analogies to it. It is far more nearly related to ecthyma; it is not a blister full of clear liquid, but a very large pustule, which does not come from beneath the skin like a boil, but yet goes deeper into its texture than the mere pustular eruptions, leaving an ulcerated surface, of considerable depth, covered by a thick crust. This, its ulterior stage, is the characteristic one of rupia. It has been compared to a limpet-shell, and the resemblance is in some instances not far-fetched. In its earlier stage the spots are few and large, and there is not much redness around; they contain unmixed pus, not bloody or sanious matter: but it is only when there remain solitary spots of ulceration, of a circular form, covered with a thick crust, around which the skin is moderately elevated, that the disease deserves the name of rupia; and in whatever way it have commenced, whether like ecthyma or even impetigo, it is now rupia; and the name is of importance, because it at once points to a condition of system.

We shall have to refer to this form of disease when speaking of syphilitic affections, and it is of vast importance to be able to say whether rupia be or be not specific. But there is one mistake which I have seen made by persons who form their diagnosis from pathognomonic signs. A limpet-shell crust is to them the sign of rupia, and when the desquamating crust of psoriasis assumes this form, the one is mistaken for the other. It is surely needless to say that the shape is only accidental, the history and the condition of skin are perfectly distinct, and not less so the condition of system.

§ 7. *Perverted Secretion.*—A large group of skin diseases consists of those in which some perversion of the natural secretion takes place. The majority present no points of interest in diagnosis. Excess or deficiency of sebaceous secretion, except in the form of *Stearrhœa nigricans*, when it assumes a black colour, is of no practical importance. In other cases, disease of the sebaceous glands leads to the formation of tumours (*e. g.*, *steatoma*), the development of so-called horns, and *ichthyosis cornea.*

There is no disease which can be confounded with *ichthyosis vera.* Certain trades produce an unusual thickness, hardness, and dryness of the cuticle, which may, in some degree, simulate it; but when occurring in parts of the skin not so exposed there cannot well be any mistake. Sometimes, indeed, on recovery from chronic eczema, the skin may for a time be hard and dry, but the history of the case sufficiently distinguishes the two disorders; ichthyosis is a congenital malady, and consists essentially in an excessive secretion of closely adherent epidermis.

§ 8. *Parasitic Diseases.*—The distinction which this name implies is only of recent date; perhaps microscopical researches may yet extend the class, and at all events we may hope for more definite knowledge of the relation of the various forms of parasitic life to the eruptions with which they are associated; such as in acne and sycosis.

The most important of this class is one that has its

seat in the hair follicles—*favus*, or *tinea favosa*. It used to be classed among the pustular eruptions, because it first appears as a small yellow spot, the sheath of the hair filled with the fungous growth; but it has no tendency to suppurate. It grows with great rapidity, and when neglected forms large, hard, dry crusts, which have a peculiar mouse-like odour. It is most liable to be confounded with impetigo, but it requires only moderate care to determine whether the crust be hardened pus or an independent growth. In fact, diagnosis rests on the presence or absence of secretion: be the crust of impetigo never so dry, some trace of purulent secretion is sure to be met with; and if removed by a poultice, the moist, exuding surface cannot be mistaken. Knowing this fact, we have no need to particularise the rounded form, the cracked, broken-looking surface, and all the other characters which older writers were obliged to enumerate. It is met with commonly in the head, but sometimes also down the back of the neck or in front of the ear.

Porrigo decalvans, which is sometimes called alopecia areata, also belongs to this class of diseases. The hair falls out in a patch of a circular form, leaving the skin of the head perfectly smooth: the absence of cutaneous eruption of any kind proves that it is connected simply with disease of the hair and not of the skin: this, too, is found to be a microscopic fungus. In order to associate it more definitely with parasitic disease, it has been proposed to call this variety *tinea decalvans*.

Tinea tonsurans, the most common form of ringworm of the scalp, also belongs to this class. It has been unfortunately called *porrigo circinatus* and *herpes tonsurans;* thus leading it to be confounded with herpes circinatus, which has again been denominated "ring-worm." In truth, there is no relation between the two diseases, beyond the circular form of each, a mode of development common to a great number of

cutaneous affections. It is especially marked by the patch of surface being covered with short hairs, which look as if they had been cut off with scissors. The skin itself is dry, and free from scabs. A near approach to it is seen when lichen circumscriptus is found on the scalp. The distinction consists chiefly in the circumstance that lichen is a papular eruption, whereas in the parasitic disease the skin is merely dry, and possibly covered with branny scales: the hair, too, in lichen, falls off, and is succeeded by a fine growth of new hair, which is soft to the touch, and does not give the sensation of short bristles so characteristic of tinea tonsurans.

The name *pityriasis versicolor* will probably continue in use, though in the Nomenclature *tinea versicolor* has been substituted for it. It was long a puzzle, because it has certainly something of a squamous character, but in a very subordinate degree. Its chief mark is a yellowish-brown discoloration, in small circular patches, which sometimes spread all over the body. There is no vesication, no crust; the small scales of the epidermis fall in larger quantity than in health, producing some degree of roughness; and the eruption is sometimes attended with much itching. It is now shown to be connected with the growth of a fungus. The varieties called *rubra* and *nigra* probably belong to the same category; they are described as being very rare, and none have come under my own observation.

§ 9. *Tubercle of the Skin.*—Although not a very common malady, it is necessary to point out how it may be distinguished from other cutaneous affections to which it bears some resemblance. It is most frequently seen on the face, and is sometimes limited to the nose or the ear, producing a most disagreeable alteration of the features. The disease consists of smooth, rounded eminences, which are accompanied by a general puffiness of the adjacent skin, and marked

by livid or bronze discoloration. The name is an unfortunate one, because it is usually applied to one particular development of the strumous diathesis, with which tubercles of the skin have nothing in common. Usually aggregated over a limited surface, the eruption does not present any regular groups, except in those rare forms which have received the names of *frambœsia* and *molluscum*, from fancied resemblances which they present. In very severe cases it may implicate large tracts of skin, and then the name "Elephantiasis of the Greeks" is applied to it: "Elephantiasis of the Arabians" is a wholly different disease: French authors employ this name even in mild cases. It is always accompanied by disorder of the assimilating functions, and common belief assigns as its frequent cause the improper use of stimulants.

In speaking of acne it was mentioned that at one stage of its progress, when no suppuration was going on, and the skin presented a red and rugged appearance, it was liable to be confounded with tubercle. Such a mistake is very liable to be made by one who knows skin diseases only as described in books, because both are equally found in persons of dissipated habits. Very little experience serves to distinguish the smaller size and brighter colour of the hardened points in acne from the rounded knobs and livid colour of tubercles: the disagreeable expression produced by the tumid features of the latter are very different from the bloated aspect of the drunkard whose nose and cheeks are inflamed by an eruption of acne. In addition to this, the history, if rightly inquired into, details the existence of previous suppuration in the one, and its absence in the other.

Tubercle of the skin is one of those cutaneous affections which have a counterpart among the syphilitic eruptions: its diagnosis, however, is, as we shall find, not difficult.

§ 10. *Syphilitic Eruptions.*—This class of eruptions has no legitimate place among cutaneous disorders; they are the mere exponents of a specific disease; but it is necessary in a work on diagnosis to point out their resemblance to some of those which have been already enumerated, and to show how they may be distinguished from them.

Their most marked feature is the copper-coloured tint of the surrounding skin; but this is only another instance in which persons who trust to one sign, however uniform, are sure to be occasionally mistaken. Not only do eruptions, which are certainly not syphilitic, sometimes present a discoloration in healing which can be called by no other name, but true syphilitic eruptions are occasionally free from it. It is only by studying the whole history of the affection that a correct opinion can be formed. The first question is whether the characters of the eruption correspond exactly to those belonging to any of the classes of disease already enumerated, because an individual may have had primary syphilis, and the system may still not have become infected. If it present any peculiarities, and especially if marked by the coppery tint, the next point is to inquire into the possibility of syphilitic contagion; and this can only be done, especially with females, by indirect interrogation: it is still more important to ascertain whether there have been any symptoms of syphilitic poison, such as sore throat or periosteal inflammation: the circumstance of the hair falling off, or the existence of iritis, tends to the same conclusion.

In regard to the eruption itself, we notice that the copper colour is not limited to parts which are already healed, except perhaps in urticaria; and the disorder does not exactly correspond to any of the definitions already given: it approaches nearer to one than another, and may simulate any of them except the vesicular, which, if it ever exist, is extremely rare.

The urticaria or roseola is no longer a simple redness of the skin, assuming a livid hue as it dies away; but it has a tendency to desquamation—it becomes brown instead of purple. The lichen is larger and discoloured, and has a more decided scab on the top; it approaches more nearly to the characters of psoriasis. The squamous affection again is much less scaly and more tubercular; the desquamating cuticle does

not cover the entire surface; it is thin and subordinate. The form resembling tubercle does not present a smooth elevation, which gradually subsides into the tumid skin around; but it is prominent, covered with scales or crusts, and is scattered over the body in place of being aggregated together.

In the pustular eruptions the analogies are closer, but still the characters are defined. If resembling impetigo, it forms a well-marked ring, the suppuration penetrates deeper, and the skin around is consequently elevated. If it seem more like ecthyma, we shall have a difficulty in saying that it is not rupia; the skin is deeply ulcerated, and a thick crust forms on its surface; its circumference is round, and its edges high; while in its commencement there is neither the bright redness nor the occasional mixture of blood with the pus, which is common in ecthyma. When the disease assumes these suppurative forms, ulceration of the angle of the lips is not uncommon, and greatly confirms the diagnosis. Its discrimination from rupia is less important, because the same treatment which is called for in the one is equally suitable to the other; but it is less frequently like true rupia than something intermediate between that and ecthyma.

Coincident with any of the foregoing eruptions, especially when their character is pustular, we sometimes find deep burrowing ulcers on the face, and at the alæ of the nose, resembling lupus, or there may be ozæna from commencing disease of the bones of the nose, with soreness of its lining membrane.

Congenital syphilis is chiefly marked by ulcers at the angles of the mouth, cracked lips, running of the nose, "snuffles," condylomata, and ulceration of the anus and pudendum, with emaciation.

In reference to the copper colour of syphilitic eruptions, a few words may be added on the subject of cutaneous discoloration generally. As an objective phenomenon it forms the direct exponent of purpura and of jaundice, and is the chief feature of anæmia and chlorosis: it helps us to distinguish measles from

scarlatina, and it materially aids our diagnosis of cancer, and of disease of the heart and kidneys.

In other cases the change of colour is more distinctly confined to the skin itself, as when, for example, a dusky grey or blue colour is produced by the internal use of nitrate of silver. In some persons the existence of any simple cutaneous disease, *e.g.*, herpes, or lepra, is always followed on its decline by a brown stain, which lasts long after the skin has acquired its natural condition in all other respects, and this is particularly the case with persons of a dark complexion: it is the very same change which is seen after syphilitic affections, except that the colour in the latter may be much darker, and commonly lasts for a longer period. In others, again, patches of a brown or yellowish colour are seen, which have been called *ephelides*, from their supposed connection with sun-burning: they are very like syphilitic stains, except that they are scarcely so dark, and they have not been preceded by any other eruption. In their commencement they resemble pityriasis versicolor, except in the absence of branny scales and roughness. They begin with small spots like freckles, which gradually enlarge and coalesce, forming large maculæ which have not the circular form which pityriasis presents.

In what is called *bronzed skin*, the whole body becomes gradually of a brown colour, sometimes variegated here and there by portions of natural colour. This condition has been thought of late years to be perhaps connected with disease of the supra-renal capsules.

We need not allude to the congenital peculiarities of nævi, or the freckles of early life: neither does the deficiency of colour in the albino belong to conditions of disease. Occasionally white spots are developed in advanced years, especially on the scrotum of old men known as *vitiligo*, the true nature of which is as yet not understood. It does not seem connected with disease properly so called.

§ 11. *Lupus and Scrofulous Ulceration.*—Though generally regarded as belonging to the domain of surgery, these diseases are evidently of constitutional origin, and their characteristics ought at least to be known to the physician. There seems reason to believe that they belong to the same diathesis, and are chiefly modified by the age of the patient. They are marked by the same general feature of indolence and unwillingness to heal, by the inefficiency of local treatment, and by their being both modified by the same internal remedies. Lupus is more distinctly

cutaneous; it is superficial, and shows a great tendency to spread. Scrofulous ulcer is always preceded by abscess, and can only be regarded in a secondary sense as a disease of the skin.

Lupus may arise in several ways, and it is only the constitutional cachexia which, modifying its subsequent course, gives it a specific character. Its seat is most frequently about the alæ of the nose, the lips, and the cheeks. Its commencement may be referred to three principal varieties of cutaneous eruption, the vesicular, the pustular, and the tubercular: occasionally resembling herpes, it more usually begins like a spot of impetigo; and when it attacks the cheek, it sometimes presents the form of tubercles. In the early stage it differs from the two former by its insidious commencement and slower progress, by the firm adhesion of the crust and the surrounding tumefaction of the skin, and its dusky colour. When such characters mark any form of eruption about the nose or the cheek, it is not improbably lupus, especially if scrofula can be traced in the family: if it be lupus, the crust covers an ulcerated surface, which very soon begins to spread. From tubercle of the skin it is chiefly distinguished by the absence of the bronze tint, and by its forming a defined group or patch on one cheek. In the majority of cases of lupus, scales or crusts soon form on the surface, which gradually thicken into scabs, and leave ulcers behind when removed; but in one variety the disease proceeds without any ulceration at all, the destruction of the skin in its progress, being marked by seams and scars, which are not seen in tubercle: such cases are naturally less distinct than those in which ulceration has occurred.

Scrofulous ulceration is very commonly seen on the side of the neck, and the formation of an abscess there must always be regarded with great suspicion. Indolent abscesses in other parts of the body, without assignable cause, are also very probably due to scro-

fula. They are not uncommon on the back of the hand, and in the neighbourhood of the elbow. The characters by which scrofula is recognised have already been discussed; and we may here call to mind the fact that, in scrofulous children, the cutaneous eruptions are usually of the suppurative kind, and are remarkably indolent and intractable: *impetigo larvalis* is one of this class; they often excite inflammation and enlargement of the cervical glands, which may be the first beginning of scrofulous ulcer.

Although the one disease be most common in childhood, while the other occurs at adolescence, or after maturity, yet occasionally scrofulous ulcers are seen in adults, and lupus at a very early age.

The ravages of syphilis on the face are sometimes closely allied to lupus, and there is every probability that in such cases the scrofulous diathesis is present as well as the syphilitic taint: it is recognised by its coppery tint, and the co-existence of other symptoms, such as sore throat, eruption on other parts of the body, &c. Syphilitic lupus is quite distinct from caries of the bones of the nose, which is to be regarded as a specific action of the venereal poison: it usually results in extensive ulceration and great disfigurement.

We have to distinguish lupus from epithelial cancer of the lip, which usually commences by a single nodule, and gradually increases in size without ulcerating, until it has acquired considerable dimensions. The distinction is less easily made between it and another form of cancer of the skin in the early stage, when there is no appearance of morbid growth, and only a spot of ulceration, which subsequently spreads in every direction, and commits frightful ravages. Subsequently the distinction is less difficult, because lupus in its progress leaves scars where the disease has subsided, while in cancer there is no trace of the healing process at all.

Cancrum oris in childhood again has not the indolent, sluggish characters which mark all the preceding conditions: it begins with ulceration in the interior of the cheek, which spreads with great rapidity, producing sloughing and destruction of all the tissues adjoining. The fetid smell and rapid progress of the disease prevents its being confounded with any other of analogous character.

§ 12. *Endemial Diseases of the Skin.*

Systematic authors refer to a variety of diseases as inherent in

various localities, to which particular names have been assigned in the districts where they occur. Examination of the statements given seems to prove pretty clearly that many of them are referrible to syphilis and scrofula; others again are probably varieties of tubercle of the skin, which is much more liable to be developed in warm climates than our own; the worst cases seen in this country generally occur in persons who have returned from India. The Arabian Elephantiasis consists rather in hypertrophy and induration of the cellular tissue than in any true disease of the skin. Such disorders need not occupy a place in these pages, because they are so rarely met with, and are not likely to throw any difficulties in the way of the student.

General Remarks.

In tracing the main features by which diseases of the skin are to be discriminated, and applying to them the rules of diagnosis, we are in great measure restricted to the distinct objective phenomenon which each case presents taken in connection with its other and more general symptoms. In many cases the inspection of the eruption is all that is wanted to determine its classification; and this is especially true of what may be called typical examples, but quite as frequently our judgment is influenced by other circumstances which the history of the case records. Practical habitude can alone give the power of determining which among these have any direct bearing on the cutaneous affection; and the educated eye can often determine the class to which any case belongs from its general aspect and history, without entering on a minute examination of its specific character.

When seeking for the solution of a difficulty, subordinate matters must not be neglected, such as the station in life, the probability of hereditary taint, of unsuitable food, or of exposure to infection, which the appearance and manner of the patient suggest. With this object the physician may be induced to ask many questions which seem to have little to do with the skin: unquestionably in a great many instances it is true that the more correct the history of the patient's past life, the more certain is the diagnosis of any particular ailment. I will add a few illustrations of the manner in which these additional facts afford hints for our guidance in diagnosis.

A febrile state more or less accompanies erythema and roseola, but seldom co-exists with urticaria, and its comparative mildness separates these from erysipelas, phlegmon, measles, and scarlatina. It distinguishes the acute from the chronic form of eczema, and marks the boundary very often between eczema impetigi-

nodes and true impetigo. It draws an equally clear line of demarcation between pemphigus and rupia. It is always present with herpes, but when the fever is severe, the eruption is certainly only subordinate to some internal disease. Insufficient nutriment or exhaustion of body cause many of the varieties of skin disease to assume a suppurative character; the bearing this in mind will often lead to the discovery of the true original lesion where lichen, eczema, or scabies have undergone such a change. The same causes, as they explain the presence of ecthyma and rupia, guard against the needless assumption of a syphilitic taint. Poverty and dirt alike go hand in hand with scabies and prurigo, but with the latter there is poverty of blood as well as of purse. The character of the food recently taken has often a definite relation to urticaria. The habits of the individual and the condition of the digestive organs have a close relation both to acne and tubercle of the skin.

A life of dissipation affords grounds for the suspicion of syphilis; and it is especially to be remarked that the diseases more nearly resembling it are chiefly of a cachectic character; and in so far as such a condition is opposed to a life of gaiety, does the suspicion become stronger, that the eruption is specific, if the idea of cachexia be not suggested by the aspect of the individual, when no distinct avowal of primary symptoms can be obtained. Close confinement and impure air certainly prepare the way for the scrofulous forms of disease to which the more obstinate of the pustular eruptions have been with justice referred. A life in a warm climate is much more likely to give rise to tubercle of the skin than to lupus or acne.

The probability of contagion is another circumstance which sometimes influences the judgment. It must be remarked that, excluding syphilis, those eruptions only can be viewed as really contagious in which parasitic life is concerned; at the same time there are sufficient facts to make us hesitate in asserting that others are not propagated in the same way. We can easily conceive that pustular matter reaching an abraded skin may give rise to suppuration there, and the disease once excited may continue, if the system be in a condition likely to insure its permanence: but the persons who seem to afford instances of this sort of contagion are usually exposed to the same influences, whatever they may be, that develope the disease; and thus the spread of impetigo through a family or a school is no proof that it was communicated from one child to another.

The mistake more frequently made is that of assuming that impetigo must be either favus or scabies, as it happens to be on the scalp or on the limbs, because there seems to be good evidence of its having spread by contact.

Much attention must not be paid to the statement that the

eruption itches or causes great irritation, as a guide to diagnosis. The susceptibility of the skin varies most remarkably in different individuals, and not less the moral courage to resist the inclination to alleviate the distress by scratching, which seems almost like an instinct provided for the purpose; on the other hand, the itching is very greatly increased by the fresh irritation so produced. In one sense the information is of use, because where itching is complained of we may be sure that the inclination has been indulged, and that the appearance of the eruption is modified by it. No circumstance tends more to create varieties among the forms of skin diseases, and a great many of the anomalous examples may be referred to this cause.

CHAPTER XXXVII.

POISONS.

Meaning of the term—False analogies.—§ 1, *Common poisons—Narcotic—Irritant—Gaseous—Slow poisoning.*—§ 2, *Chronic poisoning—Mercurial tremor—Alcoholism—Phosphoric inflammation—Colica pictonum—Ergotism.*—§ 3, *Animal virus—Syphilis and Gonorrhœa—Hydrophobia—Cow-pox—Glanders and Farcy—Malignant pustule—Equinia mitis—Bites and Stings—Snakes and Scorpions.*

The term poison is one which has been very loosely applied, and has given rise to many false theories and erroneous conclusions. Meaning, in its strict sense, a tangible substance which, when introduced into the body in certain appreciable quantity destroys life more or less rapidly, the name has been extended to every *materies morbi* capable of transmission, whether its existence be a subject of demonstration, or only inferentially proved by the symptoms exhibited. There is probably much to be said in favour of this application of the term, but it ought to be remembered that the condition of the system with reference to the two forms of poison is wholly different. In the one we know that the symptoms arise as soon as the poison gets into the circulation; that they continue so long as it is there, and cease on its removal; and that their intensity is in direct proportion to the sensible amount of the poison introduced, governed in minor degree by the susceptibility of the individual. In the other we also know that the symptoms do not arise as soon as the poison is introduced into the blood, but only after certain blood changes have been

excited by its presence, and the altered blood begins to react on other tissues. We know too that the poison never exists in the blood in appreciable quantity, and cannot be transmitted by it, but is generated afresh in enormous amount, usually on some epidermic or epithelial surface. Further, we have the strongest evidence to show that the intensity of the symptoms has nothing to do with the quantity of the poison. In the case of the ordinary poisons we can trace, with comparative certainty, the laws of their operation in the economy, and we are only too apt to reason from the known to the unknown; yet in everything but the name the blood-poisons differ so entirely from ordinary poisons that it seems to me wholly irrational to apply to the one class conclusions derived from the other. If any analogy be sought to explain their action, it must rather be in the slow process of fermentation than in the rapid changes ensuing on the introduction of a sensible poison.

§ 1. *Poisons; properly so called.* — It is not the purpose of this work to enter on the field of medical jurisprudence; and therefore we must content ourselves with a general outline of the points which may serve to discriminate a case of sudden illness from one of ordinary poisoning.

Much may be learned regarding the nature of the attack, independently of ascertaining the fact that poison has been taken, by a careful inquiry into the antecedent circumstances. Among them stands, first, the suddenness of the seizure. We are led to inquire if there have been any premonitory symptoms—any ailment prior to its occurrence; how the patient was last engaged—whether he had taken food, drink, or medicine; who was in his company, &c.; and, in order to be prepared to give evidence, if called upon, it is wise to mark every circumstance about the patient, anything remarkable in the room, among the attendants, &c.; and to be careful that nothing be thrown

away. The order of the phenomena is to be noted, so far as we can collect it from the statements of others, or from our own observation.

His general condition next occupies our attention: the absence of fever; a condition of collapse or depression; of sickness or vomiting; of pain; of excitement or delirium; of tetanic spasm or convulsion; of unconsciousness, insensibility, or coma. These must be contrasted with similar conditions arising out of various diseases, in order to ascertain whether any sudden internal lesion could have caused the group of symptoms presents. It is scarcely necessary to remark, that those diseases (*e. g.*, cholera) which in the suddenness and intensity of their attack resemble cases of ordinary poisoning, may often be discriminated by their epidemic character. A few special indications of the more important classes of poisons may be here pointed out, in order to guide the student in his investigation of cases of this nature.

a. Irritant poisons produce irritation of the mouth, throat, and stomach. This may amount to actual corrosion, or consist merely in a burning sensation on the tongue and constriction in the throat; perhaps it may affect the larynx, causing hoarseness; or there may be acute pain in the stomach, which is afterwards associated with tenderness to the touch. The latter is usually distinguished from peritonitis following on rupture of the stomach by its much more local character and its lower degree of intensity; except perhaps when a corrosive poison has been taken, and then the indications in the mouth and throat are conclusive. Rupture of the stomach most commonly follows upon a long train of dyspeptic symptoms indicating ulceration, or is caused by a violent blow after repletion. Vomiting and diarrhœa are usually the concomitants of irritant poisoning, and rarely of rupture, except when a fit of vomiting is its cause. In both cases extreme collapse is very often present, and then the pain is a less prominent symptom; but in those which are caused

by poisons, we shall probably find other phenomena belonging to the nervous system, such as giddiness, dazzling of the eyes, tinnitus aurium, spasms, cramps, convulsions, &c., because their effects are not due simply to corrosion, but are produced by a specific action on the cerebro-spinal system, in addition to that which they exert upon the nerves and mucous membrane of the stomach.

b. Narcotics and Sedatives.—These poisons affect primarily the nervous system, and, through that, the circulation; producing stupor, stertorous breathing, depression of the heart, lividity of the face, and in some instances convulsion and delirium. The narcotico-acrids possess also irritating qualities, and such are attended with the burning sensations in the throat and fauces peculiar to the irritant poisons: if these sensations be followed by the supervention of nervous symptoms, the diagnosis is comparatively easy. In poisoning by the simple narcotics there may be more difficulty in arriving at a diagnosis. Opium produces stupor, somnolence with contracted pupils, and coma. This order of sequence is the best aid to diagnosis, especially in the absence of convulsions: the same order is also observed in cases of albuminuria; but the symptoms come on more slowly, occupying days in place of hours, except when the coma is hastened by convulsions, which are very common among the head symptoms of Bright's disease, and are exceedingly rare in narcotic poisoning. This order is exactly reversed in another class of cases, which commence with convulsion and terminate with prolonged stupor; we have already referred to these in speaking of serous and transient apoplexy. If the history be unknown, as in a patient brought from the street, there are points of time in which the symptoms of the two states closely correspond; the probable duration must here be taken into account, and the rapid or gradual development of the symptoms. When, from circumstances, it appears probable that the seizure has been sudden, a condition

of drowsiness, partial stupor, and unwillingness to move, must not be taken as conclusive of poisoning by opium. We must refer to the state of the pupils, which in the functional disorder are seldom contracted, as they are in the cases of narcotic poisoning: the condition of the mental faculties also affords aid in diagnosis, as they are nearly natural when the patient is roused from the state of narcotism; while there is great confusion, perhaps complete unconsciousness, of surrounding objects and circumstances, in one who is suffering from epileptic sopor.

At a further stage the complete coma may closely resemble sanguineous apoplexy. Here we have regard to the suddenness of the seizure, the existence of any degree of consciousness, and the absence or presence of paralysis. If the patient can be roused at all, and there be no paralysis, the probability is in favour of poisoning by opium; if the seizure appear to have been sudden, in favour of apoplexy. Equal contraction of both pupils points to poisoning, unequal contraction, or dilatation to apoplexy. Intoxication, when of such a degree as to be classed among cases of narcotic poisoning, may generally be distinguished by the odour of the breath.

Hydrocyanic acid is extremely sudden in its action; there is less of coma and more of convulsion accompanying the condition of unconsciousness. It very often reveals itself by its powerful odour.

The poison of strychnia is easily recognised by its violent tetanic spasms when occurring in a person who has not been previously ailing, and who exhibits no wound or injury to which tetanus could be attributed. Belladonna, hyoscyamus, and others of the same class, are generally accompanied by symptoms of delirium; and in some instances a cutaneous eruption, somewhat resembling urticaria, has been observed. The extreme dilatation of the pupil by the solanaceæ contrasts strikingly with its contraction by opium.

c. The *gaseous poisons*, while they oppress the brain,

producing chiefly a comatose state, also prevent the proper oxygenation of the blood, and are therefore specially marked by lividity of face. The place where the person is found, and the sense of suffocation experienced by those who attempt to rescue him, seldom leave any room for doubt.

d. Slow poisoning.—Attention has recently been revived to this mode of the employment of poison, because of the suspicion that it has been carried to a fatal issue, in more than one instance, with impunity. It was supposed to have been very generally practised by the poisoners of former ages; but the light of science has shown how very few of the poisons can be so used, and how very readily they may be detected, if suspicion be only awakened. Antimony and arsenic are those which have been recently employed: the former may be very readily disguised; the latter requires more ingenuity for its concealment. One of the most striking features of the cases recorded was the entire cessation of the symptoms in the absence of a particular member of the family; and such a coincidence ought, of course, to arrest our attention. In the employment of antimony many symptoms must be wanting which ought to be found in any condition of stomach that could otherwise account for the constant vomiting and extreme depression. By arsenic, again, ulceration of the bowels is actually produced, and, therefore, the absence of general indications is not so distinctive; but the medical attendant may be aroused by the presence of some particular symptoms, such, for instance, as tingling sensations in the hands, which are recorded as among its more constant concomitants.

Vegetable poisons have not been, and perhaps cannot be, thus employed. When introduced in small quantity, they appear either to be decomposed or to pass out of the body without exerting their poisonous influence, while the system gets accustomed to their presence, and tolerates them in larger doses. One

remarkable exception to this is said to be found in digitalis, which, by its continued administration, acquires a cumulative power, suddenly acting as a poison when given for a time as a medicine. Its effects then resemble an ordinary case of poisoning by digitalis, and present nothing remarkable in consequence of the slowness of its introduction.

The subject of slow poisoning, as it has received little attention, requires at present further study. It affords an illustration of what has been so often urged, that in every case our judgment must not be based on the evidence of one single fact. The presence of the poison in the body, without its usual symptoms, except when found in a poisonous quantity in the stomach itself, is as unsatisfactory, in a case of sudden death, as the detail of ill-defined symptoms without the discovery of the poison in a case of slow poisoning; whereas a definite group of symptoms may be enough to outweigh the negative evidence that chemistry has failed to find the foreign substance in the stomach or the tissues.

§ 2. *Chronic poisoning.*—The distinction between this and the last variety consists in the fact that after a time the blood and tissues become so altered by the continued application of the poisonous agent, that a set of symptoms is developed which have little or no relation to its primary action on the body. The best known varieties are *mercurial tremor*, *colica pictonum*, *delirium tremens*, or *alcoholism*, and *ergotism;* to which perhaps may be added *phosphoric inflammation.* Two of these have been already considered as diseases of the nervous system (Chapter XVII). Phosphoric inflammation of the jaw seems to be a specific action excited by the constant inhalation of the vapour of phosphorus, somewhat analogous to the mercurial inflammation of the gum accompanying the ptyalism produced by that metal. Both occasionally terminate in necrosis, but this result is much more common in

the one than in the other, inasmuch as the inflammation due to phosphorus seems to commence in the periosteum, while the mercurial action first affects the gums. The occurrence of necrosis is very often the first circumstance which clearly indicates the poisonous action of the phosphorus, while the inflamed gums of mercurial action can scarcely be misunderstood.

Colica pictonum presents a very well defined group of symptoms. The disease is due to the absorption of lead; it is gradually developed, gaining intensity with every fresh addition to the poison already accumulated in the system; its symptoms are in a great measure local, and their peculiarities have been already referred to; at present we have only to consider them as parts of the whole.

The preliminary inquiry into the age and social position of the patient, or some particular in his history, may afford information that he has been exposed to the influence of the poison; in other respects we learn nothing except the occurrence of occasional constipation with colicky pains. The first severe attack is usually of colic: there is nothing, however, specific in its character; the tongue is generally somewhat furred, and the bowels obstinately confined; there is no acceleration of pulse; and the skin is inclined to be cold from the prostration caused by a tearing, grinding pain, as opposed to a stitch—a sharp or darting pain; the abdomen may be full and tympanitic, but it is not tense or tender, and is often retracted: pressure rather relieves, while motion does not aggravate it, and, therefore, in place of lying motionless with his knees drawn up, the patient rolls and tosses about in bed. The history, if it fail to point out the source of impregnation, yet assists the diagnosis by excluding other affections of a non-inflammatory character, of which pain in the abdomen is a prominent symptom. It indicates that the disorder has come on gradually, and thus excludes the possi-

bility of some undigested or unwholesome food recently taken acting as the cause of colic; it not only refers to previous attacks of less severity, but also to the gradual increase of pain during the present illness: these circumstances, taken along with the diffused character of the pain, render it less liable to be confounded with that attending the passage of gall-stones; while the knowledge of previous constipation or sluggishness of bowels excludes the possibility of diarrhœa. In patients thus affected, a blue line is generally found along the edges of the gums, which when well marked is very conclusive. Something similar is often seen, when there is no evidence of lead-poisoning, among the lower orders, whose teeth are encrusted with tartar; and a red line is believed by some to exist very constantly in cases of phthisis. These cannot lead to mistakes if the lead line has been carefully observed in marked cases; and the presence of other symptoms can alone justify us in calling the case one of Colica Pictonum.

In a more advanced form of the disease paralysis is observed, especially affecting the extensor muscles of the fingers and wrists; sometimes limited to those of one or two fingers, especially the second, third and fourth, but more generally implicating all the extensors. This affection, commonly known as "drop-wrist," may be met with occasionally without the prior appearance of colic; this is rare, however, and is chiefly seen in cases in which the lead has been introduced exceedingly slowly. In its last stages, the general health also suffers, and there is sometimes considerable emaciation; the poison tells upon the brain, producing epileptic seizures, &c., and a well-marked condition of general cachexia is established.

Ergotism is but little known in England, and is chiefly marked by the occurrence of spontaneous gangrene. It can only occur among persons living on rye bread, when the diseased grain is not separated from the healthy. It has never been known to follow the medical use of the ergot; the amount

under such circumstances is not sufficient, neither is its action long enough maintained.

§ 3. *Animal virus.*—We might with some show of reason class under this head all the communicable or infectious diseases, because, as we have seen, there is every ground for believing that in each case some *materies morbi* passes from the bodies of the sick to propagate the disease to other persons. But in the majority of instances the fever-poison is imperceptible to our senses, and the mode of its transmission absolutely unknown to us: and although in smallpox the virus may occasionally be communicated by actual contact, yet it is evident that its propagation is more constantly due to miasmatic emanations.

Syphilis and *gonorrhœa* present this difference, that they cannot be communicated by miasm, and that the virus must actually be introduced under the cuticular surface in order that the disease should be conveyed from one to another. Both of them as local disorders are considered to belong wholly to the province of surgery, and therefore no attempt will be made to give any details on the subject, or even to indicate the principles of their diagnosis. Their only interest being when their existence tends to obscure other phenomena, or their features present any similarity to disease of a wholly different origin.

They are separated from each other by a very broad line of demarcation, the one being merely a local malady, while the other tends to become constitutional; the one can, and the other cannot, infect the system at large. It is this power of the syphilitic poison to pass into the blood, and to manifest itself in various tissues and organs, which sometimes brings it within the cognizance of the physician. It is often difficult, and yet not unimportant in practice, to be able to determine that, when primary syphilis has existed at some previous period, the system *has not* become impregnated; and, also, that this poisoning of the body *has* taken place where the existence of the primary malady is denied.

The decision rests chiefly upon the mutual dependence and connexion of the whole group of the symptoms; the peculiar ulceration of the fauces and perhaps of the larynx; the specific character of the cutaneous eruptions; the very frequent falling of the hair, and the presence of periosteal thickenings; in severe cases, caries of the bones of the nose is also present. The more complete the picture is as a whole, the more confidence we feel in the diagnosis: the specific characters of each may, singly, deceive us. The patient's habits and mode of life are very likely to throw light on the question, when a suspicion of syphilis is denied; and we may form some estimate of the probability from the course of the primary sore, where its previous existence is

admitted: as a general rule, we are informed by writers on this subject, that a sloughing or phagedænic sore, or one followed by a suppurating bubo, is less likely to be followed by secondary symptoms than an indurated chancre.

With reference to gonorrhœa, almost the only questions of interest which can arise with reference to diagnosis, are when, in the female, it has to be distinguished from leucorrhœa, and especially from vaginitis in the child as a medico-legal question, and when it serves as the exciting cause of rheumatism, ophthalmia, and other analogous diseases.

Hydrophobia is a more definite example of animal virus. The nature of the disease is so little known, and the opportunities which each observer has of studying it are so few, that its diagnosis is, in fact, nothing else than a knowledge of its whole history. We have here no test to apply to the disordered functions, by which we can measure the information they convey, and there is no other condition which really simulates it, or ought to be mistaken for it. Cases are indeed recorded in which persons entertaining a delusion that they had been bitten by a mad dog, have seemed to labour under a similar disease; if the symptoms were really analogous, it is impossible to say wherein this differed from hydrophobia, except that the bite of a rabid animal was wanting, and that the disease terminated in recovery when the delusion had been successfully removed. We know only the category of symptoms, and we know absolutely nothing more.

Sometimes the bite is difficult to cure, is inflamed and irritable: most commonly it seems to heal kindly, and only inflames at a later period; but it does not appear that either condition is necessary to the issue. Then, again, in ordinary cases, the dangerous symptoms appear about six weeks after the bite; but the period that may elapse is, so far as we know, unlimited. When they have once begun, they go on most rapidly to a fatal termination. First, there is a general feeling of malaise, a convulsive constriction of the throat in attempting to swallow liquids, and slight acceleration of the pulse; then comes an instinctive shudder at the sight or sound of any fluid, followed by a remarkable erethism of the nervous system, which produces spasmodic contractions of the muscles, especially about the throat and larynx, and convulsive paroxysms at the least jarring noise or sudden movement. In this condition the patient is especially excited by currents of air on any part of the body; and the spasms may be thus renewed even after death. At last, the unhappy victim of this frightful malady becomes violently delirious, and rapidly exhausted; and he either expires in the recurrence of convulsions, or more frequently becomes tranquil before death, and sinks pulseless and exhausted.

A peculiarity which attends most cases of hydrophobia, the constant hawking and spitting up of adhesive mucus and saliva, was, at one time, fancifully interpreted into an imitation of the bark of a dog; it simply depends upon the inability to swallow and the irritation in the throat, the act being performed in a peculiar manner in consequence of delirium: as in insanity, the patient bespatters indifferently the bed-clothes and the floor, or even the attendants, with his expectoration. The inclination to bite seems purely mythical.

There are only two points which call for especial notice with reference to diagnosis: first, the instinctive dread of liquid is to be distinguished from a delusion; it is really occasioned by the spasmodic difficulty in swallowing, and only presents any character of a mental hallucination when delirium has supervened. Secondly, the convulsive movements must not lead us away from hydrophobia to epilepsy and tetanus; they really have no close analogy to it, as the case presents neither the unconsciousness of the one, nor the permanent spasm of the other. Strychnia poisoning resembles hydrophobia in the excitability or erethism of the nerves connected with the voluntary muscles, but in nothing else; it cannot really simulate the disease.

This subject has been already referred to in speaking of diseases of the nervous system (Chapter XVII), but it seemed desirable to fill up more in detail the short outline there given.

Cow-pox is scarcely known but as the result of the operation of vaccination, which is now so generally practised that very few can be exposed to the risk of contagion who have not already suffered from the disease. The chief question of interest, perhaps, is the recognition of the various stages of the disease having been passed through in such a way as to afford the best possible security against smallpox. The points to be borne in mind are the vesicle having attained a sufficient size on the seventh or eighth day, while yet its contents are serous or only very slightly milky; the further progress of pustulation being completed without excessive suppurative action; and when the crust has cleared away, and the pit remains, that it should not form too deep a scar, but that its interior should be dotted with fine spots, just as if the surface had been pricked over with the point of a pin.

Glanders and *farcy* have been already mentioned in their relation to pyæmia (Chapter VII). Although belonging to the same class as cow-pox, they present this striking difference, that in them the blood-change induced is one very analogous to, if not identical with, pyæmia; whereas in cow-pox its character is quite specific, and its results such as are produced by no other known cause.

Malignant pustule is another disease occasionally propagated

to man from the lower animals. Its occurrence is so rare that it need not detain us. *Equinia mitis,* or "grease," in the human subject belongs to the same class, but is so rare that it can scarcely give rise to any difficulties in diagnosis.

Not the least important members of the group are those instances in which a specific poison secreted by an appropriate gland is injected under the skin by the tooth or the sting of some animal. In some cases the poison is so deadly that life is destroyed in a very short time, while in others nothing more occurs than the production of slight local irritation. The bite of the cobra or the rattle-snake, and the sting of the scorpion, are looked upon with the greatest dread in hot climates; but there are few natives of temperate climates whose poison can endanger life.

CHAPTER XXXVIII.

HUMAN PARASITES.

Classification.—§ 1. *Intestinal Worms—Tape-worms —Round Worms—Thread-Worms.*—§ 2. *Cysts—Hydatids — Acephalo-cysts — Other Entozoa — Ectozoa—Entophyta—Ectophyta.*

The number and variety of these creatures is now so great that their study requires separate consideration. We must here be content with an enumeration of only a limited number of the principal groups; and for the purposes of diagnosis we may divide them into (1) intestinal worms, (2) cysts, (3) other entozoa, (4) ectozoa, (5) entophytes and epiphytes. Among these some are of much more importance than others, and among them will be found cases in which the presence of the parasite only excites symptoms such as may be seen in other diseases of the same organ; cases, too, in which the characters of the disease are such as are only seen when the parasite is present; and again, cases in which the presence of the parasite is an accident of the disease.

§ 1. *Intestinal Worms.*—Of this class it is especially true that the symptoms to which they give rise are not such as lead directly to their cause, and they very often remain unexplained till the creature has been seen. They present themselves in three principal forms, as broad or tape-worms, round worms, and thread-worms.

a. Tape-worms, so named from their appearance, are discharged as a number of flat fragments of various lengths, crossed by transverse joints, where separation

is liable to take place, and each portion of the animal which is discharged has, consequently, a square termination.

The number of species which has been observed is now very great, but two are much more frequently seen in this country than the remainder. They are, 1. *Tænia solium*, marked by notches on either side, irregularly alternating along the edges of the flat body, one of which occurs between every two joints, and is situated rather nearer to the lower than to the upper one. 2. *Tænia lata*, or *Bothrio-cephalus latus*, marked by a line of depressions, one for each segment, running down the centre of one of the flat sides of the parasite.

Their presence is apt to be overlooked because they give rise only to such symptoms as may readily be regarded as those of dyspepsia;—pain of a gnawing character at the epigastrium, uneasiness after food, cough and headache, usually accompanied by a craving appetite; the patient is out of health, and generally somewhat emaciated. This craving is to be distinguished from the large consumption of food which sometimes accompanies emaciation in the course of a wasting disease, when the digestive apparatus has not been deranged; and also from the ravenous appetite of diabetes. In the former there is no disorder of the intestinal canal, in the latter there is thirst as well as hunger; when the symptom depends on the presence of tape-worm, there is always derangement of the digestive organs, and the sensation is one of craving rather than of hunger.

The diagnosis is only complete when portions of the worm come away in the fæces. Their shape, as each small segment is more or less elongated in proportion to its breadth, enables us to form an idea of the length of the entire worm; when they are long and broad, we may conclude that it is of considerable length; when short and broad, the remaining portion is probably not great; when narrow as well as short, the fragments

come away from near its head or fixed extremity. It is a curious circumstance, in regard to the two species of tænia, that they relatively abound more in certain localities; the bothrio-cephalus is usually imported into this country, and is soon expelled from the body, while the solium among us lives and thrives. Perhaps it is due to some peculiarity of this kind that the remaining species, ten in number, have been so seldom met with, and of these some only in a rudimentary state.

b. Round worms, not unfrequently called *lumbrici*, are chiefly represented by the *ascaris lumbricoides*. Seldom solitary, but never existing in large numbers, they are in shape not unlike the common garden worm, and are chiefly lodged in the small intestines, where their presence does not seem to give rise to any very marked symptoms; occasionally, however, they are productive of mischief by wandering into the appendix cæci, the gall-duct, or the stomach; and, when lodged high up in the canal in childhood, they may give rise to chorea or convulsions.

c. Thread-worms. By some misconception the name *ascarides* is constantly given to thread-worms. The common variety is the *oxyuris vermicularis;* the *trichocephalus dispar* being more rarely seen: it also occupies a higher portion of the canal, and is easily distinguished from the oxyuris by its long thin head and neck. The common thread-worms of equal size throughout, and not unlike chopped thread, are found sometimes in enormous numbers, and reside chiefly in the rectum. They are very common in children, and produce irritation of the mucous membrane, as shown in picking the nose, scratching the anus, &c.; sometimes they crawl into the vagina and cause much annoyance. It does not appear that they give rise to any derangement of health, but they are commonly associated with depraved states of the alimentary canal and unhealthy secretions.

§ 2. *Cysts.*—Within a comparatively recent period

it has been discovered that the *cysticerci* inhabiting hydatid cysts are only an abnormal development of the ovum of a tænia, which has not found a habitat suitable for its development into a tape-worm. In one instance only, and that the tænia solium, has the cysticercus, and the fully developed animal of the same variety been found in man.

Two other tape-worm hydatids are found, the most common being the *echinococcus*, of which the corresponding tænia has not yet been seen in the human species, while there are eight tape-worms, including two varieties of bothrio-cephalus, of which the cysticerci have not been observed. These facts are of great interest to the physiologist; but as a question of diagnosis all that can be done is to trace the existence of the cyst in whatever organ it may be found; we are not yet in a position to distinguish cases in which the fluid is contained in a barren acephalo-cyst, from those in which the hydatid has been developed from the ovum of the tape-worm. Occasionally the cyst ruptures, and portions of the animal are evacuated, giving certainty to diagnosis, and in other cases the supervention of suppuration suggests the probability that the patient is not suffering from a simple collection of fluid.

The other *entozoa* are, to a great extent, objects of curiosity, especially to the student of natural history. Some of them are more common in other countries than among ourselves, and few, with the exception of the *trichina* already alluded to (p. 597), can by any possibility become the subjects of diagnosis.

Of the *ectozoa*, with the exception of the *chigoe*, which is never seen in this country, it may be said that their whole interest consists in their exciting cutaneous eruption, in combination with the existence of dirt and neglect, which their presence always betrays.

The *entophyta* and *ectophyta* are all microscopic, and are only traced in connection with certain forms of cutaneous eruption, or affection of the mucous membrane, of which they are either essential or accidental complications. As such, they have been already referred to in previous pages, and repetition seems unnecessary.

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