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A HANDBOOK

OF

PHYSICAL DIAGNOSIS.

INTRODUCTION.

IN the examination of the thoracic and abdominal organs, the methods employed are almost exclusively of a physical character; this is certainly the case with reference to the exploration of the respiratory and circulatory apparatuses, and in part also to that of the abdominal organs. Strictly speaking, the term *physical methods of examination* is applied only to the practice of Auscultation and Percussion; in the wider sense, however, it includes also Inspection and Palpation, as these latter frequently give as direct and valuable information as the two former methods, particularly with regard to certain of the physical properties of the internal organs, such as their consistence, increase in size, and the presence within them of air, fluid, &c. With equal propriety the term may be made to embrace the estimation of the temperature of the body by means of the thermometer, and the measurement of the shape and respiratory movements of the thorax, of the vital capacity of the lungs (Spirometry), of the respiratory pressure (Pneumatometry), and of the arterial pulse (Sphygmography), all these proceedings, the most important of which is Thermometry, being merely delicate aids to Inspection and Palpation, yielding precisely the same kind of information, but with much greater, even with mathematical, exactness. If to these methods of investigation be added the examination of the secretions and excretions of the body, and in some circumstances also that of the blood, we shall have before us all the means which are usually employed in the exploration of the thoracic and abdominal organs, and which we propose to describe in the following pages.

It is obviously unnecessary to make use of all of these methods

of examination in every case; some of them, indeed, are of but limited practical application. The mode of procedure depends chiefly on the organ affected; thus, diseases of the respiratory and circulatory apparatuses are recognised principally by percussion and auscultation, those of the abdominal organs by palpation, those of the kidneys by examination of the urine, &c. These means taken singly, however, though of greatest importance in the particular case in hand, do not exhaust all the sources of information open to us; and it is desirable, especially in complicated cases, to have recourse also to the other forementioned methods, in order to secure a full and complete investigation. The diagnosis gains in certainty and precision as the number of available methods of examination, and of the resulting pathological indications, is increased.

It is, further, an essential part of a systematic pathological inquiry that a certain uniform order be observed in the application of the different methods; the natural order is that first the general physical signs, and then the special, be taken up, as, without a knowledge of the former, the latter are apt to be misunderstood, and to lead to erroneous conclusions. The examination should begin, therefore, with the general *inspection* of the body; the practised eye often discovers in this way a multitude of signs, which not merely declare which of the organs is at fault, but frequently reveal the nature and stage of the disease with absolute accuracy. Then only should the special examination be proceeded with. This ought never to be limited to the particular organs or parts concerning which the patient makes special complaint, as his sensations are often excited by purely adventitious circumstances. In the graver class of cases the condition of all the organs must be ascertained; the physician thus frequently lights upon disorders of whose existence the patient, from the absence of subjective symptoms, had no conception, or complications are discovered without the knowledge of which a true understanding of the nature of the disease, or the formation of a sound diagnosis, is impossible. The pathology of the thoracic and abdominal organs presents numerous examples of the intimate relation which the various diseases of these parts bear to each other, and of the importance of keeping this pathological connection before the mind in forming an opinion as to the origin and nature of the morbid process under investigation.

GENERAL EXAMINATION.

THE symptoms of disease of the thoracic and abdominal organs fall naturally into two groups, general and special: in the first are included those which are caused by the reaction of the local disturbance on the system as a whole, and which may be common to the most diverse disorders, in the second those which are characteristic of disease of a particular organ, or even of the precise form of disease by which it is affected.

One of the most prominent symptoms of acute diseases throughout their whole course, and one which appears also at various stages of many chronic affections, is

FEVER.

The chief indication of the presence of fever is *a rise in the temperature of the body.*

In estimating temperature the *Centigrade* (Celsian) thermometer is that in most general use, except in England and America, where *Fahrenheit's* scale has the preference. Should the accuracy of the thermometer not be guaranteed by the name of the maker it must be tested by comparison with a standard instrument. Where circumstances do not permit of this it may be verified with sufficient exactness for practical purposes by simply taking the temperature of one's own body, or that of another healthy person; as we know that this amounts to about 37.3° C. (99.14° F.), a thermometer which gives this result on being tried several days in succession, each day about the same hour, may be pronounced reliable. Even inaccurate instruments may be employed when the exact amount of error is known, allowance being always made for this in reading the scale. The best makers generally give with each thermometer a guarantee of its accuracy, or of the precise degree of difference between it and a standard instrument. The medical thermometer is fitted with but a small scale, as all the possible variations in the temperature of the human body take place within comparatively narrow limits; thus, it is only in very exceptional cases that a point lower than 33° C. (91.4° F.) or higher than 43° C. (109.4° F.) is reached. The degrees are divided into tenths, but differences of even a twentieth are usually quite appreciable. This is precise enough for ordinary use, but for special scientific investigation it is desirable to have a more finely divided scale.

The temperature is most commonly taken in the axilla, occasionally in the rectum or vagina. The bulb of the thermometer should be introduced beneath the border of the pectoralis major, the arm brought close to the side of the body, and the forearm across the breast; the patient then, with his other hand, either keeps the instrument in position or supports the arm which is pressed against the chest. In the cases of children and weakly patients the attendants must look to the fixation of the instrument. The thermometer must remain in position 15—20 minutes before the mercury can be said to have reached its utmost height, as it is only when the arm is brought into contact with the side of the thorax that the axilla becomes a closed cavity; its temperature therefore rises slowly to that of the interior of the body. It thus serves no purpose to warm the instrument before using it; time may be economised, however, by causing the patient to close the axilla shortly before putting in the thermometer, 4 or 5 minutes being then sufficient for making an observation, which is nearly as rapidly as it can be done in the rectum or vagina. This shorter method may be conveniently employed when observations have to be frequently repeated, as, for instance, every 3 or 4 hours. In special cases, when, on account of the surroundings of the patient, the numbers on the scale can not be read off with accuracy, a *self-registering* thermometer becomes indispensable. In this instrument the column of mercury is divided into two parts by a small bubble of air, the upper portion, the index, being one centimeter in length. When the bulb is warmed the mercury expands, carrying the air bubble and index before it, and leaving them behind when it contracts on being removed from the axilla; the position of the index then indicates the maximum temperature reached. Before using the instrument again it must be gently shaken, so as to drive the index towards the lower end.

The temperature obtained in the closed axilla is that of the interior of the body and of the blood; it amounts to 37° — 37.3° C., or 0.2° — 0.4° C. more in the rectum or vagina. This does not represent the temperature at every period of the day, but only the average for the whole 24 hours. The temperature of healthy persons is subject to a *daily fluctuation*, entirely independent of external circumstances, *rising continuously from morning till evening, and sinking again from evening till morning*. It is at its lowest, 36.5° — 36.7° C., at two hours after midnight, remaining about the same point till early morning; it then rises slowly and constantly till 4 or 6 o'clock in the afternoon, when it is at its highest, 37.5° — 37.6° C.; this temperature is maintained for a short time, when it again sinks, at first slowly, afterwards more quickly, to the morning minimum immediately after midnight. Thus *the difference between the morning minimum and the evening maximum amounts to about 1° C.* Besides these daily oscillations the temperature of a healthy individual shows other slight variations connected with different conditions of the body. *Exercise* according to its violence and duration, *raises* the temperature to the extent of several tenths, or even of a whole degree; the *taking of food* has a similar effect, whilst the conditions of sleeping and waking appear to have no

influence whatever on the heat of the body. We also find slight differences in the average temperature at different ages; it falls 0.1° — 0.2° C. from childhood to middle age, rising again later in life. Sex exercises no influence on temperature.

Of the various fluctuations to which the temperature of healthy persons is subject the most important are the daily periodical oscillations, these being also distinctly appreciable in cases of fever, when patients are incapable of such muscular exertion as would be necessary to produce any change of temperature. The daily range of the temperature in febrile affections is frequently much more extensive than under ordinary circumstances, so that it is desirable, in order to be able to estimate it and the varying intensity of the fever at their proper value, to make at least two observations daily; in severe acute diseases, however, when the height of the temperature furnishes indications for the adoption of certain therapeutical measures (such as cold bathing), and when the effect of these has to be carefully noted, the temperature must be taken at intervals of 3 or 4 hours.

Though the methodical use of the thermometer in febrile diseases dates only from 1851 and 1852 (Traube, v. Baerensprung, Wunderlich, &c.), many thermometric investigations had been carried out in the previous decade, and certain important observations, such as the elevation of temperature which accompanies rigors (de Haën), the effect of cold bathing on the temperature in typhus (Currie), had already been made in the previous century.

The temperature may be considered febrile when it rises more than half a degree C. (nine-tenths of a degree F.) above the normal point for the time of day at which it is observed; as, for instance, a morning temperature of 37.5° — 38° C., or an evening temperature of over 38° C. taken in the axilla. Such a slight deviation from the standard of health is known as *subfebrile*; when the temperature reaches 38.5° C. it is that of *slight fever*, above 39.5° C. that of *moderately high fever*, over 40° C. that of *high fever*. The highest recorded temperature, which occurred in a case of tetanus, is 44.7° C. (112.4° F.), rising after death to 45.4° C. (113.7° F.). In the most severe acute diseases (pneumonia, typhus, scarlatina, &c.), a higher temperature than 41.5° — 42.5° C. is seldom met with, except in cases of sunstroke and relapsing fever.

The march of the temperature of the body in acute diseases presents three distinct types.

1. Simultaneously with the commencement of the disease, which is usually announced by a rigor, the temperature begins to rise rapidly and continuously to a certain height, 39° — 41° C.;

at this point it remains several days, showing only the ordinary daily fluctuation of 0.5° — 1° C. Under favourable circumstances the temperature then falls almost as speedily and continuously as it rose, usually within 12, 24, or at most 36 hours, to the normal point or even slightly lower, in the latter case to return again to the temperature of health when convalescence is established. The best example of this type is fibrinous pneumonia in the adult, in which defervescence begins about the seventh day, seldom earlier. The transition from the temperature of disease to that of health after this manner is termed *Crisis*. These three well-marked stages in the course of the temperature, namely, that of rapid increase (*stadium incrementi*), that in which it is stationary (the *acme*), and that in which it sinks to the normal point (*stadium decrementi*, or *crisis*), are clearly defined in very many acute diseases, though in some the periods are shorter, in some longer, than in pneumonia. Febrile conditions in which the temperature during the acme shows little or no variation for several days receive the name of *continued fever*.

2. In many other acute diseases the temperature rises more slowly, so that several days elapse before it attains its maximum; this rise may be continuous, the normal daily fluctuations, however,—slight increase from morning till evening, slight decrease from evening till morning,—being still traceable, or it may be interrupted. The highest point being reached, it is followed by the period named *acme* or *fastigium*, lasting days or weeks, and characterised by much greater daily variations than are found in health. These *exacerbations* and *remissions* resemble those of the normal range, inasmuch as they occur at the same times—morning and evening; the exacerbation is usually at its height in the afternoon or evening, the remission at its lowest point in the early morning hours. The daily difference amounts to 1° — 2.5° C., or rarely 3° C. When the disease has a favourable issue the return to the normal temperature is *gradual*, and takes place either in a continuous descending line (that is, without the evening exacerbations), or in such a way that both the morning and evening temperatures are each day lower; or the morning remission may be well-marked, while the evening exacerbation remains, but becomes smaller on each day and thus slowly approaches the morning temperature. This gradual re-establishment of the normal temperature, which is accomplished in 3—7

days, is designated *Lysis*, as distinguished from rapid defervescence or *Crisis*; and the febrile conditions indicated by a stage of acme, or fastigium, marked by the above-mentioned oscillations, are named *remittent fever*.

3. The third typical course which may be taken by the temperature is found in *intermittent fever*. The paroxysm begins suddenly, usually with a shivering, and the temperature speedily rises to a height otherwise reached only in the most severe acute diseases, 41° — 41.5° C., or even higher: in a few hours it sinks again as quickly and continuously to the normal point. On the third day (tertian type), less frequently on the second day (quotidian type), that is after 24 or 48 hours, the same phenomena are repeated at the same time. When the febrile paroxysm is later by a few hours (postponing type) the quotidian becomes tertian; and similarly, when it is earlier by a few hours (anticipating type) the tertian becomes quotidian. The least common type is the quartan, in which the fever returns at the end of 72 hours. In the intervals of exemption from fever (apyrexia), the temperature and general condition of the patient are perfectly normal.

In other cases, of which the type is *relapsing fever*, the febrile attack lasts longer, the temperature mounts to 41° C. or higher, and returns to the normal point in a continuous line. The intervals between the seizures have not the same well-defined quotidian or tertian character as in intermittent fever, but vary in duration from days to weeks. The last-named temperature-types, the intermittent and relapsing, are sometimes closely simulated by the occurrence of sudden exacerbations in the course of various acute diseases, depending on an extension or complication of the local affection; in these cases, however, the temperature in the intermissions is never that of perfect health.

The march of the temperature in *chronic* diseases, when they are accompanied by fever, resembles that of the remittent type, with morning remissions and evening exacerbations, the morning temperature being slightly above the normal, the evening temperature indicating a considerable degree of fever. In another class of cases the type is intermittent, the morning temperature being normal, that of the evening high; more seldom the intervals of apyrexia are of one or more days' duration, during

which time both morning and evening temperatures show no deviation from the healthy standard. Both these temperature-types are frequently met with, as in the caseous pneumonia which leads to pulmonary phthisis and in the chronic inflammatory diseases of the abdominal organs.—There remains to be mentioned a somewhat rare form of temperature course, the *typus inversus*, occasionally observed in phthisis and other diseases; in it the remission takes place in the evening, the exacerbation in the morning.

A second sign of fever is *acceleration of the pulse*.

The pulse, in a healthy adult, beats at the rate of 60—80 times per minute, averaging 72; in fever its frequency varies from 80—150. A pulse of 100 may be regarded as indicating slight fever, 100—120 moderately high fever, above 120 high fever; a pulse of 140—150 is rare, even at the crisis of acute diseases, and generally warrants a grave prognosis. Above 150—160 the pulse becomes very small and thready, and is usually the immediate precursor of death in acute organic or zymotic diseases. A pulse of 150—160 occurs, in non-febrile affections, only in certain very rare cases of exophthalmic goitre (Basedow's or Graves' disease*).

The acceleration of the pulse is for the most part due to the increased heat of the body. This view is supported by the fact that when animals are exposed to a great heat the heart contracts more rapidly, and when they are cooled again it acts more slowly; and further, at the onset of a fever the rise in temperature often precedes the acceleration of the pulse, and, in the same way, in rapid defervescence the pulse does not become slower till the temperature has first begun to fall. The elevation of temperature, however, though the most important, is not the only cause of the acceleration of the heart's action, as a given alteration of temperature is not always associated with a corresponding change in the pulse; and different individuals, having

* The unusual rapidity of the pulse in this affection is most probably referable to irritation of the sympathetic. Cases of *compression of the vagus* by cervical or intrathoracic tumours are characterised by a very rapid pulse, the cardio-inhibitory function of that nerve being suspended by the pressure. I have, in one instance in which the vagus was involved in a swelling of the lymphatic glands, noted a pulse of 160 accompanied by no elevation of temperature.

the same temperature, often show great differences in their pulse-rates. Those forces which in health produce a quick pulse,—such as muscular exertion, mental irritation,—operate much more powerfully in disease, and in that way tend to disturb the relation which undoubtedly exists between temperature and pulse. The same result may also follow the occurrence of certain morbid complications: thus on the accession of an affection of the base of the brain we may have a high temperature with a slow or even subnormal pulse, evidently in consequence of irritation of the origin of the vagus; and a rapid pulse with a relatively low temperature is frequently observed in cardiac diseases, whether primary or appearing in the course of another affection. Further, in collapse and shortly before death the temperature may fall while the pulse rises. It is thus obvious that the frequency of the pulse cannot be regarded as a trustworthy measure of the intensity of a fever; nevertheless, apart from complications, the influence of a febrile temperature on the pulse is thus far manifest, that when a considerable alteration of temperature takes place the pulse never remains entirely unaffected, but invariably responds to a certain extent. The frequency of the pulse in fever, like the temperature, is subject to periodical daily fluctuations, having a morning minimum and an evening maximum; and, other conditions being left out of consideration, the extent of this daily difference bears a certain proportion to that of the oscillation of the temperature, so that according as the remissions and exacerbations of the latter are more or less marked the frequency of the pulse is more or less affected. The subsidence of the febrile pulse also, like that of the temperature, may assume the form of crisis or of lysis; in the *former* case it occurs rapidly, simultaneously with the sinking of the temperature, and may reach the normal point at the very beginning of convalescence, while in the *latter* case it takes place gradually,—sometimes continuously, but more often interruptedly,—with a slight rise each evening.

Besides elevation of temperature and acceleration of the pulse, changes in the *wine* rank as signs of fever; these, however, will be discussed further on.