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PRACTICAL OBSERVATIONS

ON

NERVOUS AND SYMPATHETIC

PALPITATION OF THE HEART,

AS WELL AS ON

PALPITATION

THE RESULT OF ORGANIC DISEASE.

BY

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HONORARY MEDICAL GOVERNOR FOR LIFE
AND LATE PHYSICIAN TO THE GENERAL HOSPITAL, NEAR NOTTINGHAM;
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Second Edition.

LONDON:
JOHN CHURCHILL, PRINCES STREET, SOHO;
NOTTINGHAM, THOMAS FORMAN, LONG ROW.
1852.

LONDON :
G. J. PALMER, SAVOY STREET, STRAND.

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PREFACE.

I SHOULD scarcely have thought it necessary to write a preface, had it not been customary to find one in every book; because under the head of "Preliminary Observations," much is included which might make a preface.

The "Observations" contained in the first edition of the present work, formed the substance of a portion of my Lectures on the Principles and Practice of Physic, delivered at the Medical School of Nottingham in 1835. The subject of functional diseases of the heart had not at that time attracted the attention which its importance merited. The value of the stethoscope as a means of diagnosis had not been so fully or universally admitted, as it now is. Physical diagnosis was then in its infancy. Since the period to which I

allude, immense progress has been made—physical signs have been traced to their efficient causes with a surprising degree of certainty—the nature of functional diseases of the heart is better understood—their differential characters more clearly ascertained—their physiological and physical diagnosis more accurately established—and, as a necessary consequence, the treatment of this interesting and important class of diseases, keeping pace with the advancement of science, has been rendered, in an eminent degree, satisfactory and successful.

The progress to which I have thus briefly alluded, has imposed upon me new duties; and the present edition, instead of being "amended and enlarged," has been almost entirely re-written, so as to constitute essentially a new work. I have omitted the chapter on "the use of the stethoscope in exploration of the chest," and replaced it by one devoted to the physical examination of the heart and central system of circulation. In the present edition, also, a more methodical arrangement of the subject has been adopted, and the different varieties of functional palpitation described in much greater detail.

To the results of my own observation and

experience, I have not hesitated to add those of the most recent writers on diseases of the heart—"attributing to each his own;" and I here beg these distinguished authors, whose works have rendered me so much assistance, to accept my best thanks for the valuable information which I have derived from them.

In its present form, this work will, I trust, prove useful to many practitioners who have neither time nor opportunity to consult more systematic treatises; while to me it will be a source of great gratification, if, in aiding them to form an accurate diagnosis of functional diseases of the heart, it leads to that object at which we all aim —a correct and successful practice.

J. C. W.

Wheeler Gate, Nottingham, July, 1852.

CHAPTER I.

PRELIMINARY OBSERVATIONS.

In the posthumous writings of Dr. Baillie, I find the following remarks :—

"There are in truth few phenomena, which puzzle, perplex, and lead into error the inexperienced (and sometimes the experienced) practitioner, so much as inordinate action of the heart. He sees, or thinks he sees, some terrible cause for this tumult in the central organ of the circulation, and frames his portentous diagnosis and prognosis accordingly. In the pride of his penetration he renders miserable for a time the friends—and by his direful countenance damps the spirits of his patient. But ultimate recovery not seldom *disappoints* his fears, and the physician is *mortified* at his own success."

Every candid and scientific practitioner must

at once admit the justice, as well as force, of these remarks, and more especially so, when he considers the time at which Dr. Baillie wrote. But for many years there has been now opened to us a new means of diagnosis, in *Percussion* and the *Stethoscope;* and of such vast importance is the information to be derived from these powers, that no one who is desirous of practising his profession in a scientific and successful manner, should neglect to study and employ them. Indebted more than thirty years ago, for my first knowledge of the Stethoscope, to my early friend the late Professor Andrew Duncan, and having afterwards enjoyed the advantage of being a pupil of the distinguished Laennec, and being moreover in the daily habit of using this instrument, I trust I shall not be deemed presumptuous in placing on record some of the practical remarks which have resulted from these sources of observation.

My object will be, especially to point out the distinctive marks between palpitation, the result of organic disease, and sympathetic or nervous palpitation—delineating less minutely the symptoms of actual organic disease, and more carefully those which simulate disease of the heart; so as

to unmask the nature of palpitation, when it exists, as a sympathetic phenomenon.

Structural disease of the heart—or great blood-vessels immediately proceeding from this organ, necessarily presents, as one of its pathognomonic symptoms, some irregularity in the performance of the accustomed functions of these parts, more or less discernible in particular cases. Either the circulation may be too rapid and powerful, in consequence of enlargement of the parietes of the heart, or it may be preternaturally languid from a very opposite condition of these structures. The current of blood may be temporarily arrested, or rendered irregular by ossified valves; or may be similarly influenced by latent disease of the muscular texture of the heart—so trifling, it is true, as almost to defy, in the event of death, the most careful scrutiny of the pathologist.

From the intimate connexion that exists through the medium of the nervous system, between the heart and other organs which perform important duties in the economy, symptoms may arise "par sympathie," so similar, in every respect, to those which proceed from absolute disease of the heart itself, as, previous to the augmented

means of diagnosis afforded by the stethoscope, to baffle the closest inquiry, and to render nugatory the best directed efforts of professional skill. Even at the present day, such attacks demand the utmost skill of the most experienced auscultator.

It is fortunate, however, that in a great majority of *nervous* cases, our present knowledge renders their nature not so doubtful; and by judicious treatment, phenomena which at first appear the most alarming, prove the most temporary, and easily to be removed.

A patient complains of palpitation, and we find also oppressed or hurried breathing, conjoined with the ordinary general indications of constitutional irritability. Upon inquiry, these symptoms are found to result from disordered functions of other viscera, of which irregularities they may be said to afford sympathetic evidence; or there is a connexion between them, and some less manifest disturbance of the nervous system. In some cases, doubtless, we are not able to trace satisfactorily the primary derangement whence these symptoms proceed; we must, therefore, consider them *idiopathic*—but the greater number are *symptomatic*.

Sir Charles Bell says, "Nervous palpitation attacks the young and sanguine, the delicate and sensitive; it may resemble the slight fluttering induced by fear, or the heart may increase in its action till it throb and beat against the side, so that the pulsation may not only be strongly felt by the patient, but be even audible as well as visible to the bystander;" still it is but a mere functional derangement, to be relieved by change of scene, or by lively society; by withdrawing for a time from the solicitude of a harassing life, or from the anxiety of speculative commerce. Confinement alone will cause it, but when coupled with an anxious mind or close study, is doubly effective.

"My son," says Wierius, "while at Bologna, pursuing his studies, had this afflicting palpitation, accompanied with a frequent capricious and intermittent pulse, but by care and relaxation from his studies he got quite well."

Where is the zealous student, whose nervous system is finely and delicately woven, who has not experienced some such affection in a greater or less degree? Who has not endeavoured to shake off the depression which palpitation brings and leaves, which comes unbidden in the earnest-

ness of study, and precedes the deep anxieties of the all important examinations — oppressing the anxious spirit with additional care, and chilling the exciting hope of success by the fear of the price of victory?

This palpitation is the *Palpitatio Cardiaca* of the old writers, a designation indicative of the view they took of its primary seat, and equivalent, in the language of the present day, to calling it a *nervous disease;* or, to quote the words of Galen, it is that "Palpitatio quæ, pluribus integra valetudine degentibus, cum adolescentibus tum adultis, subito, sine *ullo alio, manifesto accidente* evenire visa est." The better information of modern times, however, tells us, that it would not be always proper to pursue the treatment Galen enjoins: "atque omnes eos sanguinis detractio juvit."

Such cases, sometimes, it is true, may require blood-letting, but the temporary alleviation gained, in a great majority of instances, would be more than counterbalanced by the increased predisposition to recurrence, which that very blood-letting would engender.

It is to this class, then—the *nervous* or *sympathetic* affections of the heart—those which depend,

in fact, more or less, on the direct affinity this organ has with other parts of the body, that I am particularly desirous of directing attention.

In these affections, that abnormal action of the heart denominated *palpitation* forms a very prominent, and often the only feature; and is frequently, by a careless observer, regarded as symptomatic of some serious organic or structural change being established, either in the coverings of the heart, its muscular texture, or in some of its valvular apparatus. A careful and deliberate inquiry, however, will, in the generality of such cases, enable us to strip them of their apparent obscurity and danger, and reduce them to their place in a nosological arrangement.

But, it may be asked,—Does not disordered function, though in itself of trivial import, become, in the course of time, positive disease? Will it not merge into, or insidiously produce positive disease of vital organs, especially of that important organ, the heart?

The experience of Avenbrugger, Corvisart, Esquirol, Hope, Forbes, C. J. B. Williams, and other pathological writers of equally unquestionable authority, warrant such a conclusion, which, moreover, enables us to account for the alleged increase of

diseases of the heart—an increase, perhaps, in some respects, more imaginary than real.

The accurate knowledge we have obtained during the last quarter of a century, of the best methods of detecting these diseases by means of percussion and the use of the stethoscope, has shown to us numbers of cases, the nature of which, without the use of these means, never could be known. Allowing, however, that diseases of the heart have increased of late years, we have a clear and important explanation of the fact.

With the advance of civilization, the physical and moral system of man becomes more sensitive, and the passions thus necessarily acquire a greater influence over the animal organization; the more, also, the passions are curbed, after being once strongly excited and exercised, the more baneful is their influence on the nervous system, until they are completely subdued.

For nearly fifty years Europe has been, in a greater or less degree, continually under the influence of political commotion of the most exciting kind. In the more civilized parts, states have been changing and unsteady in their foreign and domestic policy; commerce has been of the most fluctuating and speculative character; indi-

vidual feelings have been powerfully called into exercise; and the passions, which fan into flame the morbid energies of the nervous system, have revelled in the luxury of gratification—subject again to the depression which follows such indulgence. During the last five years, indeed, Europe has been constantly under the influence of the disturbing causes now alluded to.

When we reflect, therefore, on the powerful influence that mental emotions exercise over the action of the heart; on the changes effected, in this respect, by anger, hatred, and revenge—by love, joy, or sorrow—by avarice and ambition; when we know that functional derangement will terminate in organic disease, and that this functional derangement is daily and hourly produced by the activity of these feelings; then we are bound to believe, that disorders of the circulation and the heart have increased of late years, and will still increase, in proportion as the nervous system is affected by the more frequent and ardent operation of the passions.

"We have no doubt," said the late Dr. James Johnson, "that the prevalence of Cardiac Diseases has arisen out of the moral and physical circumstances of modern times; and that

the evil to which flesh is heir to, will every day vary with revolving æras, per omnia secula seculorum." (*Medico - Chirurgical Review*, vol. viii. p. 79.) Corvisart informs us, that diseases of the heart were much more frequent during the horrible period of the French Revolution, than in the usual calm of social life; and Testa states, that the same fact attracted notice during the perilous period of the civil wars of Italy. Were I disposed to take a medico-political view of this subject, I should dilate on the influence of oppression and tyranny; on insubordination and independence; I should dwell on the phantom called "Liberty," and the irregular distribution of her fancied privileges; I should point out, that while she is allowed only to hover over the inhabitants of some places, in others, her true spirit is abused by the licensed outrages committed in her name. But as such a digression is not here requisite, I shall confine myself to a strictly professional view of the subject.

CHAPTER II.

EXPLORATION OF THE HEART.

In the first edition of this work I dwelt at considerable length on the necessity of our having recourse to the stethoscope as a means of becoming acquainted with the healthy sounds of the heart, and of detecting any important deviations. Thus only can we refer abnormal action to the structural changes which give rise to it; and distinguish these cases from those wherein irregularity in the performance of the accustomed functions of the heart is simply the result of nervous sympathy. The experience of more than half a century has now so fully sustained Laennec's immortal discovery, that it has become an indispensable element in the practice of medicine.

Auscultation at first met with many oppo-

nents, because its advantages were imperfectly understood. It always requires a considerable time to establish any important truth in medical science; since all our knowledge must be based on experience, and medical experience is not the fruit of a day. But the immense advantages to be derived from auscultation are universally allowed; every practitioner is now familiar with the use of the stethoscope, and acknowledges its value in diagnosis. It is no longer necessary to combat the objections which have been offered to the use of this instrument, or to demonstrate the benefits resulting from its employment; and I shall therefore proceed, without further remark, to a consideration of my subject.

The condition of the heart may be explored through means of the stethoscope or by percussion; but it is obviously of importance to have an accurate idea of the precise situation and limits of the heart, in a natural state, before we proceed to determine any morbid phenomena connected with the central organ of circulation.

It will be well, therefore, to premise a few words on the exact position of the organ and its anatomical relations to the walls of the chest. Such knowledge is absolutely necessary to en-

able us to apply auscultation and percussion with any advantage for discrimination of disease. The heart lies obliquely from right to left behind the sternum, under a surface comprised between the third and fifth ribs; a line drawn horizontally along the lower margin of the cartilages of the third ribs will cross the base of the heart rather above the level of the aortic and pulmonary valves; and a similar line, drawn midway between the cartilages of the fifth and sixth ribs of the left side will cross the apex, or point of the heart. As for the vertical limits, it may be remarked, that a line drawn about an inch and a half to the right side of the sternum, will limit the heart in that direction; nearly one-fourth of the organ, comprising the whole of the right auricle, and the upper portion of the right ventricle, being placed between the line just mentioned, and the median line of the sternum, in other words, on the right side of the body. On the left side, a line drawn obliquely upwards, from the point where the cartilaginous and bony portions of the fifth rib unite, towards the left carotid artery at the base of the neck, will form a pretty exact boundary of the heart, comprising between it and the sternum, the

whole of the left ventricle, nearly the whole of the left auricle, and the inferior or apex portion of the right ventricle. The apex, or point of the heart, is placed about two inches below the left nipple, and one inch from the left border of the sternum.

It is also important to remember, that the lungs are interposed between the anterior surface of the heart, and the walls of the chest, with the exception of the space occupied by about one-third of the right, and a small portion of the left ventricle. The practitioner should always have these circumstances present in his mind, whenever he examines a patient affected with disease or disorder of the heart. The central organ of circulation is a complicated one ; each of its four cavities performs its appropriate function; the various valves give rise to various sounds, which originate in a particular point, and are conducted along the wave of blood in a particular direction. Hence the obvious necessity of our being acquainted with the exact relative position of the heart and its several parts, in order that we may trace up diseases to their source, and discriminate them from each other. The pulmonary artery, arising from the right ventricle lies in

front of the origin of the aorta. Whenever, therefore, during life, the semilunar valves attached to these vessels become diseased, it must be difficult to detect by sound alone, in which of the two vessels the derangement exists. It should likewise be remembered that the organ varies greatly in size, and is frequently displaced by morbid changes either in the lungs or the pleuræ.

Having thus briefly noticed the relative position of the heart, I shall next consider the phenomena of the heart's action in a state of health, pointing out the order of their occurrence, and in what respects their natural sequence may be interrupted or suspended.

The contractions of the parietes of the heart, which diminish the capacity of its various compartments, and thus enable it to propel the vital fluid along the channels of the circulation, necessarily give rise to a series of phenomena, that bear a distinct and direct relation to each other, and which cannot be interrupted, at least for any considerable time, without inducing disease.

It is true, that deviations of a trifling kind, in the prescribed order of the movements of the heart, do occur from time to time; but they are of a temporary nature, and easily referable to the

agency of some evident physical or moral cause, capable of producing a transient influence on the general circulation. Such irregularities we must always bear in mind, are by no means to be considered as either the offspring or indication of disease. But whenever the natural order of the heart's movements is steadily discomposed for an uninterrupted period, as regards either velocity, strength, or regularity, then are we justified in presuming, for the immense majority of cases, that disease, either of the organ itself, of the larger blood-vessels, or of some other and more distant part, capable of influencing these, is establishing itself, and has already obtained sufficient importance to merit our attentive consideration.

Every circumstance connected with the heart's action, may be investigated, and, generally speaking, ascertained with great accuracy, through means of the stethoscope, percussion, or direct application of the hand over the præcordial region. The principal phenomena which we desire to investigate by these means, are the impulse of the heart, and the modifications it may undergo with respect to extent or force—the extent of the dulness or clearness of the sound rendered on percussion—the healthy and morbid

sounds of the heart in their numerous varieties and modifications.

The impulse of the heart, is the first phenomenon which naturally attracts our attention, for its effects may be either seen, felt, or heard. Its exact mechanism is a matter of dispute; but the commonly received opinion is, that it arises from the stroke or shock of the heart against the walls of the chest, caused by the tilting forwards of the apex on each contraction of the ventricles. This impulsive shock may be seen and felt at a point a little below the inferior margin of the fifth rib, about midway on a line drawn from the left nipple to the corresponding edge of the sternum. Dr. Hope judiciously remarks, (fourth edition, page 253,) "that the best way is to begin our examination by an application of the hand, whence we acquire a general idea of the extent and strength of the impulse, and a knowledge of the precise spot where it is strongest, and where, consequently, it is best to apply the stethoscope."

My own experience enables me to state, that we must have recourse to the stethoscope, if we desire to obtain exact knowledge respecting the impulse of the heart. On applying the instrument to the præcordial region, our first impression

is, that the shock communicated to its extremity, is limited to a very small extent of surface, and appears to be deeply seated in the cavity of the chest. But we soon detect that this is a momentary and deceptive impression; and find that the movement is, in reality, felt to some little distance beyond the point, where, during the contraction of the ventricles, the apex of the heart strikes against the walls of the chest.

As a direct effect of muscular contraction, the impulse affords a correct measure of the heart's force; it is directly proportioned to the force of the central organ, not to the energy and rapidity of its contractions, and the smallness of its cavities.

But the extent and force of the heart's impulse may be modified by several circumstances which I have now to notice. Some of these may occur in a state of health; others, during disease. The degrees are infinite. In many persons the impulse is very imperceptible from natural deficiency of power. In very corpulent persons, again, we often cannot detect the pulsations of the heart with the hand, and the space over which we can trace them with the stethoscope may be very limited. Generally speaking, all causes which produce debility may diminish the impulse. In

some persons, again, the lungs cover the heart more than usual, and the impulse is feeble until full expiration be made, when it is felt to be as strong, or even stronger, than usual.

Increase of the area over which the impulse is felt, occurs much more frequently than diminution; all violent muscular actions increase the heart's impulse. The same effect is produced by all active mental emotions, by various changes in the blood—points which will be treated more fully when we come to speak of palpitation. In persons of nervous temperaments, in thin persons with narrow chests, and in children, the heart's shock may be sometimes felt, extending over a much wider range of surface than is natural—along the whole length of the sternum, under the left clavicle, and often, though less sensibly, under the right clavicle.

The reason why we detect the pulsation of a child's heart over a larger extent of surface, must be sought in the conformation of the chest at an early period of life. It is then more contracted, and its walls are much thinner; hence the latter necessarily come in closer proximity with an extended surface of the central organ, and inversely, the same effect is produced, as would

result from the heart itself being larger than natural.

From the above remarks, we are entitled to conclude, that in the cases enumerated, when the impulsive stroke of the heart is confined within the bounds already alluded to, being at the same time less strong under the clavicles than in the præcordial region, we may still consider the organ as retaining its proper proportions. It need scarcely be observed, that I presume the examination to be instituted during a state of perfect quiescence; and that the viscera of the several cavities, as well as the heart itself, occupy their normal sites and boundaries. Many examples, it is well known, are on record, where the heart has been, congenitally, transposed from the left to the right side of the chest; displaced by structural change of, or effusions into other parts; or even by the occurrence of an accident.*

But there may be other and totally different causes from those already considered, which will allow the heart's impulse to be communicated over a more extended surface of the chest, the struc-

* Cases of the latter kind are related by Mr. Stanley, Dr. Stokes, and in the Middlesex Hospital Reports, published in the Medical Gazette.

ture and functions of the heart itself being perfectly healthy. Here the increase of impulse is apparent, not real, and arises from some physical change in adjacent parts, whereby a denser medium for the transmission of sound is afforded, and the impulse rendered more perceptible than it ought to be at a considerable distance from its source. The principal diseases or changes of structure now alluded to are pulmonic congestion, morbid adhesions of the pleura and its appendages, hepatization of the lung, effusion of fluid into the cavity of the chest, &c. In cases of pulmonary phthisis, accompanied by excavation, the area of the impulsive sound is also increased; and here the sound is probably conducted along the walls of the cavity solidified from the condensed surrounding tissues or masses of tubercular matters. Finally, we may have an apparent increase of impulse from mere contraction of the lungs, whereby the spongy substance is withdrawn from the surface of the heart, and the latter thus allowed to come in more direct and extensive contact with the walls of the chest.

The impulse of the heart may be increased in force or extent by various diseases, but chiefly by simple *hypertrophy* of the muscular structure.

The heart has now more muscle to act with, and its contractions are naturally stronger. The more intense the hypertrophy, the longer time the impulse is perceptible. From the increased bulk of the heart it is a slow, heaving, labouring impulse, very different from the sharp, abrupt throb of nervous palpitation. The heart seems rather to dilate than to pulsate, whenever the disease exists in a high degree; a single point first appears to come in contact with the thoracic parietes, then its whole surface, after which it sinks back in a sudden manner, giving rise to the *back-stroke*, first pointed out, as a sign of hypertrophy by the late Dr. Hope. The impulse of the heart, in cases of confirmed hypertrophy, is often so forcible as not only to be apparent to the by-stander but to the patient himself, raising the thoracic parietes, and shaking the patient's whole trunk as well as the head of the examiner. In such cases, by the aid of auscultation, we may often, not only trace the movements over the whole left side of the body, from the axilla to the lowest false ribs, and over a corresponding surface on the dorsal region, but also across the chest to an almost similar extent on the right side.

Dr. Hope, however, remarks that the impulse

is seldom perceptible much beyond the præcordial region, except during attacks of palpitation.

Diminution in the force and extent of the heart's impulse most commonly arises from dilatation of the chambers, accompanied by attenuation of the muscular walls of the heart. In such cases the impulse is diffused and may be justly described as *undulatory*. When the structural disease is extreme, the impulsive sound is very much diminished or may be entirely absent, even during palpitation.

Finally, as consolidation of the lung may exaggerate the heart's impulse, so certain diseases of the chest which produce intense dyspnœa, as œdema of the lungs, asthma, &c., may almost entirely mask the natural impulse of the heart and render it nearly, if not altogether, inaudible.

Any considerable effusion of fluid into the pericardium will have a similar effect from the mechanical obstacle which it opposes to the heart-stroke.

Dr. Walshe furnishes us with some useful remarks on the change in site and character of the impulse. During pregnancy, and from over distension of the stomach, the apex beat may be raised higher up than natural, and thrown over to

the left side. Diminution of the heart also raises it slightly; but the most efficient cause of raising is commencing effusion into the pericardium. On the other hand, the site of the impulse is brought somewhat lower down, and is often displaced to the left by enlargements of the heart, especially those of the left ventricle.

According to the same author, the character of the impulse varies, and this is an important point towards the diagnosis of inorganic affections. "In some cases we have more increase of power without any change of character. In dilatation the impulse is quick and abrupt; in hypertrophy it is slow and heaving." I must, however, remark that in my examinations I have generally found the impulse in dilatation to be more of the *undulatory* kind, than of the "quick or abrupt."

By percussion we ascertain the normal dimensions of the heart, and consequently any deviation in volume from the healthy standard. Though apparently simple, to furnish satisfactory results, this operation must be conducted in a careful manner, and the student should omit no opportunity of rendering himself familiar with it by frequent practice. The patient should be placed in the recumbent posture, when the thorax may be

gently struck with the points of the fingers of the right hand *semiflexed,* their extremities being placed closely together, and so adjusted as to be in the same plane, and none of them passing beyond the others. The bare chest may be struck, or we interpose one or two fingers of the left hand, taking care to apply them firmly against the chest. In France, M. Piorry's pleximeter is often substituted for the fingers.

Percussion, thus exercised, elicits a more or less dull sound over the region of the heart, because the fingers strike over a solid and not a resonant substance. Most writers on the heart and lungs distinguish two areas of dulness in the cardiac region, the one superficial, the other deep-seated. The superficial area corresponds to the surface of the heart, which is uncovered by the lungs. It is limited, on the right side, by a vertical line about two inches in length, extending along the middle of the sternum from the level of the fourth rib to that of the sixth rib. On the left side it is limited by an oblique line, about three inches long, commencing at the superior point of the vertical line, and running downwards and outwards to the cartilage of the fourth rib, whence it curves inwards to the sixth rib, nearly opposite to

the apex of the heart. The inferior line, bounding this superficial area, is about two and a half inches in length, and runs from the apex-point just mentioned, to the centre of the lower edge of the sternum. Light percussion will suffice to elicit a dull sound from the triangular surface comprised between these three lines; for the deeper-seated area we must employ full percussion, when we find a dull sound extending vertically from the third to the edge of the sixth cartilage; transversely from the left nipple to a little beyond the right edge of the sternum, opposite the fourth cartilage; and obliquely from the upper part of the third right cartilage to the apex of the heart, near the junction of the cartilage of the fifth rib with its bony portion. According to Dr. Hope, and other writers, the extent of dulness may be represented by a circle about two inches in diameter.

The sound obtained by percussion over the region of the heart may vary much in different persons. In those who have a small heart and rather weak pulse, the sonorous character of the sound is very triflingly diminished in the cardiac region; while in others of opposite temperament and habit, it is with difficulty perceived. Various dis-

eases, either of the heart itself, or of the neighbouring organs, may produce the same effects.

Hypertrophy of the heart may be carried to such a degree as to enlarge the area of the circle over which dulness exists from two to four or five inches; the same effect, in a lesser degree, may arise from congestion of the heart and accumulation of fluid in its cavities, or in the pericardium. The same causes which apparently increase the heart's impulse, will also give an apparent increase to the surface of dulness; and a similar effect may accompany atrophy of the lung, elevation of the left lobe of the liver, accumulations in the pleura, mediastinum, &c. On the other hand, emphysema of the lung, phthisis with great emaciation, or any cause which can diminish the heart's bulk, may diminish the dulness to such a degree that the pressure of the heart seems to exercise little or no influence at all.

CHAPTER III.

PHENOMENA OF THE HEART'S ACTION, NATURAL AND MORBID.

My object being to render the present work as practical as possible, leaving to systematic writers all theoretical explanations, I shall not examine the supposed proximate causes of the various phenomena of the heart's action, or the physiological principles on which writers have attempted to explain them. It will suffice for my purpose if I give a brief account of the actions of the heart in a state of health, and contrast them with the principal phenomena which we observe during disease; pointing out, at the same time, the order of their occurrence, and in what respect they may be obscured, suspended, or interrupted.

The principal and most important circumstances

connected with the action of the heart may be ascertained by the use of the stethoscope, and relate to its movements or sounds. With respect to the former, we investigate the force or impulse of the heart's action, the extent to which its movements are perceptible, and the rhythm or order of succession in which the several actions take place; with respect to the latter, we examine the natural sounds of the heart, and the various modifications they undergo from disease or functional disorder.

When the heart is healthy and of due proportion to the size of the individual, we hear a distinct sound and impulse on applying the stethoscope between the cartilages of the fifth and sixth ribs, at the edge of the sternum. The sound is double, or rather there are two sounds, which succeed each other at a short interval. The first sound corresponds to the systole, or contraction of the ventricles, coinciding with the shock of the heart against the chest, and the beat of the pulse. It is a dull, long sound, "like that produced by jerking a chord as thick as a swan-quill," (*Hope, l. c.*,) and is best heard over the point of maximum dulness on percussion. The second sound, which is short, clear, and sharp, like the click of a

bellows-valve, corresponds to the diastole, or dilatation of the ventricles; it coincides with the pulseless state of the arteries, and is best heard on the sternum, at the level of the third rib.

According to Laennec, the healthy sounds of the heart are audible in the præcordial region alone; but this is not strictly correct. The extent to which the sounds of the heart may be heard, and their nature, are capable of being modified by a variety of circumstances. In fat persons the space over which the natural sounds of the heart may be heard is limited; it is, on the contrary, extended in children, and in lean or narrow-breasted individuals. In very thin persons, Dr. Hope has heard the sounds of the heart over the whole chest.

Any consolidation of the lung from inflammation, tubercular deposit, &c., will also transmit the sounds more readily, on the well-known principle that solid bodies are the best conductors of sound. The same effect may also be produced by accumulation of gaseous fluid in the stomach.

Nervous excitement will usually render the sounds more intense, while all debilitating diseases will, for a manifest reason, weaken them. Accumulation of fluid in the pericardium deadens

the sound, because fluid is a bad conductor. Changes in the structure, or proportions of the heart, may naturally be expected to influence the sounds which result from its different actions. And such is the case. When the walls of the heart are increased in thickness, while the cavities at the same are enlarged, (*hypertrophy with dilatation,*) both the first and second sounds are more or less increased in intensity. In a moderate degree of simple hypertrophy or thickening of the heart's substance, the ventricular contractions produce only a dull and more prolonged sound, like the murmur of respiration.

In higher degrees of hypertrophy, the contraction of the ventricles merely gives a prolonged shock, attended by hardly any sound.

When the parietes of the heart are more thin than ordinary, and the cavities enlarged, (*dilatation with attenuation,*) the pulsations may be heard over a greater extent of space than is natural: the first sound becomes loud, brief, and clear, while the impulse is feeble; the second sound is more or less increased. In fact, we may lay it down as a general rule, that the extent of the sound is in direct ratio to the thinness and weakness of the heart, and consequently in in-

verse proportion to its thickness and strength; whereas the *impulse* is, in general, inversely as the extent of pulsation, and directly as the thickness of the ventricular walls.

Dr. Walshe, (*l. c.* p. 192,) judiciously observes, that we should lay more stress on any change in the line of direction along which the sounds are naturally conveyed, than in their extent, intensity, &c. The first sound "passes slantingly upwards to the left acromial angle, growing weaker and weaker on the way. The second sound, with the base region as its centre, radiates to the right and left acromial angles, being heard with greater clearness towards the left than the right."

Any permanent change in the line of direction, along which the sound should be conveyed, is a much stronger presumption of the existence of organic disease than modifications in the intensity or character of the sounds which may result from circumstances unconnected with actual disease of the heart, and not incompatible with the enjoyment of moderate health.

A few remarks on the movements of the heart, numerically considered, may here be appropriately introduced.

The number of pulsations made by this organ,

during a minute, in the healthy adult, vary from sixty to seventy-five. When this range is much exceeded, unless as a consequence of disease, the individual is of an irritable and nervous temperament. If, on the contrary, the pulsations fall short of the above range, the constitution will usually be found to partake proportionately of the dull, phlegmatic character, and to be equally torpid in the performance of all its other functions. It must not, however, be forgotten, that many circumstances influence pulsation. Temperaments and idiosyncrasies materially affect it; posture also must be taken into consideration; and we must always bear in mind that the heart beats more frequently when we are standing up than when we are lying down. An attempt has been made to explain this last circumstance on mechanical principles; the heart, it is said, receives less resistance from the column of blood when the body is in an horizontal position, and requiring therefore less force to propel the blood; it consequently beats with diminished frequency. The absence of muscular effort may have some share in producing the same effect. It is also well known that the pulse of most persons

becomes more or less accelerated towards evening, but the cause of this diurnal variation has not been satisfactorily explained.

The period of infancy exercises a very marked influence on the frequency of the pulsations of the heart. In very early life, when the maximum of mobility may be said to prevail, the heart beats nearly twice as quickly as it does in the adult ; but the pulsations lose in strength what they gain in velocity. Perhaps it may be laid down as an axiom that the velocity of the heart's action in an healthy state bears a direct ratio to the capacity of the cavities and the thinness of their walls; and an inverse ratio to the general volume of the organ. The strength of the pulsations, that is, the power or force of action, depends, on the other hand, on the thickness of the walls and smallness of the cavities. In infancy the heart bears a smaller proportion to the general development of the body than in the adult, but its cavities are larger in proportion to their thickness. In some rare cases the number of pulsations, instead of being increased, is diminished, and this may take place to a very remarkable degree. The deviation from the natural standard is here func-

tional ; for organic disease of the heart never gives rise to any well-marked slowness of the pulse.

By means of the stethoscope the practised ear can so far analyze the heart's actions, as to mark the time occupied by the contractions of each of its cavities, and the determinate order in which they occur, constituting what physiologists have denominated the *rhythm* of this organ. The following is the rhythm, or order of succession in which the actions of the heart take place. 1. The auricules contract, (*auricular systole,*) and impel the blood into the ventricles ; 2. this action is hardly completed when the ventricles contract, (*ventricular systole,*) and expel the blood into the great vessels; 3. the ventricles expand; 4. an interval of repose succeeds, when the auricles again contract, and so the succession goes on. The relative duration of these phenomena has been thus calculated—one-half, or somewhat less, may be assigned to the contraction of the ventricles; one-fourth, or a little more, to the dilatation of the ventricles; another fourth to the interval of repose, during the latter half of which the auricular systole takes place. According to this statement, if we take any given period, say

twenty-four hours, we conclude that the ventricles are in action for eighteen hours,* and rest six. The auricles are in action for nine, and rest fifteen.

But it is not necessary to prosecute this part of the inquiry any further: enough has been said to show the great importance of an accurate knowledge of the phenomena of the heart's action, as more immediately derived from the use of the stethoscope; and the manner in which the information so derived may be turned to advantage in the investigation of disease.

I have already noticed some modifications of intensity and character which the sounds of the heart undergo; but we have yet to examine several other sounds which bear no similitude to any that occur during health, and a knowledge of which is necessary as a means of distinguishing the several diseases and disorders of this organ. The abnormal or morbid sounds of the heart are now generally denominated "murmurs." They may be distinguished into two kinds — the organic and the inorganic; the former accompanying change of structure in some portion of the

* Dilatation is regarded as active, not passive.

heart, the latter being unattended by any structural disease of that organ which we have been able to detect.

The limits of the present work prevent me from entering on any detailed account of organic murmurs of the heart. I must presume that the reader is sufficiently acquainted with them, and shall therefore only allude to a few considerations of a general nature. Those who may require minute descriptions will find them in the admirable works of Drs. Hope and Walshe, to whom I, as all other practical men, must acknowledge obligation.

The essential character of all organic murmurs is "blowing"—the *bruit de soufflet;* but this may pass into the grating, filing, rasping, sawing, &c. They are essentially intermittent; a single murmur is never kept up continuously through a series of beats; yet, when once developed, they are habitually persistent, and accompany every beat of the heart. They may occur at any point of the rhythm, during the systole, the diastole, or the interval of repose.

These organic murmurs are essentially connected with the imperfect closure of the orifices of the heart; and as they may occur *with* the

current of the blood or *against* it, they have been distinguished into direct and indirect, or regurgitant.

Again: as the heart possesses four orifices, and as each orifice may give rise to two murmurs, the number, theoretically speaking, might be set down at eight; but in practice we find that many of these murmurs are so excessively rare that they need hardly be taken into consideration.

Organic valvular disease, giving rise to morbid sounds, is much more frequently seated on the left side of the heart than on the right; according to Dr. Hope, the proportion is as sixteen to one. The direct and regurgitant murmurs connected with the pulmonary valves are extremely rare; so also are the direct murmurs of the tricuspid valves. Regurgitant murmurs of the latter valves are more frequent, but are still comparatively rare.

The indirect mitral murmur, corresponding to the systole of the ventricles, and arising from regurgitation of the blood through the mitral valves, is the most common of organic murmurs. It is rarely functional, and, according to Dr. Walshe, never of purely blood origin. The truth of the assertion, however, is somewhat doubtful.

This is a soft bellows murmur, heard at or above

the left apex, and accompanies any lesion which may hold the mitral valves open, and thus prevent them from performing their function of closing the orifice in such a manner as to oppose regurgitation of the blood whenever the left ventricle contracts. A more uncommon murmur is a diastolic at the apex, and which has been supposed to indicate contraction at the mitral orifice. The systolic aortic murmur is also very common, and arises from any lesion which may contract the aperture of the aorta. This murmur accompanies the contraction of the ventricles, and is heard opposite the third interspace. Finally, we have a diastolic murmur of the aortic valves, heard over the same point, and caused by any change of structure which prevents the valves from completely closing the orifice. This murmur indicates regurgitation through the aortic aperture; it is a soft prolonged bellows sound; and is more audible below the sigmoid valves, and down along the ventricle, than a systolic murmur is. Rheumatic inflammation of the heart is its most frequent cause.

Finally, we must not forget the attrition murmur of pericarditis. This was denominated the *craquement de cuir*, by M. Collin—the creaking

sound; but it may present a great variety of characters, according to the condition of the effused lymph, which seems to be its efficient cause. This murmur is generally double, because it takes place during the forward and backward movements of the heart within the pericardium; and its different varieties may succeed each other more or less rapidly in the same case—an useful diagnostic character, since it is not observed in valvular organic murmurs.

Inorganic or functional murmurs of the heart, are, however, more intimately connected with the subject of the present work, because, as their name indicates, they accompany functional disturbance of the organ, and do not arise, like the former class, from organic lesions.

Inorganic murmurs of the heart are merely varieties of Laennec's bellows sound or *bruit de soufflet*. They are of a "whiffing" quality, generally slight, moderately prolonged, and appear to depend either on certain changes in the blood or in some modification of the heart's action. Both these circumstances, indeed, often concur to produce the inorganic murmur, which then probably depends on attenuation of the blood with increased velocity caused by abrupt action. Keeping these

two circumstances in mind we can readily foresee in what kind of cases functional murmur is most likely to occur. Laennec was fully aware that the bellows murmur might exist when the heart was perfectly healthy. He remarked that the sole disorder which almost constantly accompanies it, is a more or less marked state of nervous agitation. Subsequent experience has fully confirmed the truth of this observation. The functional murmur is not constant but occasional, and is commonly developed by violent action of the heart, such as often takes place in hysterical females, during chorea, &c. On the other hand, any cause by which the quality of the blood is attenuated will favour the production of functional murmur; and hence it is most frequent in anæmic persons of every description, whether the deterioration of the blood be caused by malaria, chlorosis, hæmorrhage, &c. The seat of the murmur is at the aortic and pulmonary orifices, and it accompanies the systole of the ventricles; it is scarcely conducted along the aorta, and is best heard at the second cartilage of the left side. (*Walshe, l. c.* p. 219.)

The site and time of occurrence are important points to note, because they exclude all other mur-

murs connected with the diastole, and thus facilitate diagnosis in a matter where, notwithstanding the great progress of science, much difficulty still exists.

According to Dr. Walshe, the main points of distinction between organic and inorganic murmurs are to be sought in the circumstances that functional blood murmurs are always attended by a continuous humming murmur in the veins, and are never permanently hard or of a high pitch. The same author remarks, that " in seeking the causes and seats of any endocardial murmur, the essential points in the inquiry are —its relationship to the systole or diastole—the spot of its maximum intensity on the surface of the chest, subsidiary considerations of great importance are the direction of transmission, the duration, clinical progress, quality and pitch of the murmur, and beyond itself, the state of the heart's natural sounds, and the presence or absence of certain audible phenomena in the arteries and veins, or in both. (*l. c.* p. 221.)

The venous murmur, described above, as constantly accompanying every marked degree of anæmia, is a valuable auxiliary in the distinction of functional from organic murmurs. According

to M. Andral it is always heard whenever the proportion of the red globules falls below 80 in 1000; but this statement has been objected to, and venous murmurs have been shown to be much more common than was formerly believed. It is most readily distinguished by applying the stethoscope lightly over one of the jugular veins; is invariably continuous, low, and resembles the sound produced while pronouncing the word "who" in a blowing manner; sometimes it bears much resemblance to the sound of a humming-top, and hence has been denominated the "venous hum." Whenever the venous hum accompanies the bellows murmur in anæmic persons, we may infer that the abnormal sound in the heart is of purely functional origin; there may, however, be an organic disease producing a murmur, and a co-existent inorganic murmur, and in consequence the diagnosis is often difficult.

CHAPTER IV.

ON SYMPATHY.

The terms sympathy and sympathetic will frequently recur in the succeeding portion of these observations. I therefore think it advisable to give some brief account of the general nature of this mysterious influence and the laws to which it is submitted ; while, at the same time, I shall point out more especially its agency in the production of the disorders now under consideration.

To speak accurately, sympathy means fellow-feeling, or fellow-suffering ; and as our feelings are of two kinds, either natural or morbid, so also, are the corresponding sympathetic feelings of two kinds, and to be distinguished, like the former, into natural or morbid. Natural sympathies belong to the general study of life, and to the physio-

logist; the morbid are more particularly the province of the practical physician. It is easier to say what sympathy is not, than what it is; and the efforts of the most distinguished physiologists have led to little better than negative definitions of it.

Life consists in, and is maintained by the concurrent action of various organs and functions. The more complex these are, the more complex will be organization and life. In this respect, man stands at the head of all created beings. The principal organs of the human body are of a highly complicated structure; and physiology teaches us that the functions performed by these organs are seldom of a simple kind. It almost always happens that parts more or less distant—contrivances which at first sight seem to have no connexion with the principal organ—contribute to its function, and are necessary, either at all times, or on extraordinary occasions, to its complete integrity. The relation thus established may be considered as the effect of natural sympathy, and to give rise to a series of associated actions, the sum total of which constitutes the healthy function. But in addition to these, there are other natural and associated actions which lie

dormant as it were—which may be regarded as supplementary, and are not manifested until some impediment to the due performance of the function rouses them to activity. The respiratory efforts of the cervical and abdominal muscles, and the spasmodic actions of the diaphragm, may be cited as examples. These are natural sympathetic acts, excited by morbid conditions, and which have been too much overlooked in the study of the difficult subject now before us.

Sympathies, properly so called, may be defined to be relations between organs or parts, in virtue of which, an impression on one part or organ gives rise to an effect in some other, without our being able to refer the modification produced to physical influences, or associated actions, and without any effect being produced on the immediate parts. This definition embraces natural and morbid sympathies; and it is obviously necessary to form a correct idea of the former before we can pretend to unravel the intricacies of the latter.

The natural sympathies are extremely numerous and diversified. To give any account of them would lead me through the whole range of physiology; but for the better understanding of morbid sympathies, it is expedient to notice a few

points which have been satisfactorily determined.

In the first place, it may be laid down as a general law, that sympathetic relations have been instituted between contiguous or remote parts, for the purpose of promoting the due and perfect performance of the several functions. This is the main object towards which they tend ; and the law furnishes us with an explanation of many phenomena which would otherwise be unintelligible. The progress of physiological knowledge daily increases our acquaintance with these sympathetic acts ; and shows that many, which were formerly set down to the account of some mysterious influence, may now be explained by the fact, that they are associated actions of distant parts called into play to favour the due performance of some vital function. The application of this law will be more particularly shown when we consider the associated actions of the heart and respiratory apparatus.

In the second place, it has been fully established that sympathies are most readily exercised between parts or organs having a certain analogy with each other, either in structure or in function. The extensive sympathies between the skin and mucous mem-

branes, between the uterus and mammæ, the effects which follow castration, and the development of certain parts at the period of puberty, are examples.

Finally—but this rather applies to morbid sympathies—certain sympathetic acts are nothing more than instinctive efforts of nature to relieve the economy from some offending cause, or restore the integrity of some disturbed function. Thus, the lachrymal glands pour forth fluid to wash irritating substances from the surface of the eyeball. Cough is excited to expel irritating substances from the bronchial tubes. Sneezing in the same way affects the membranes of the nostrils, and expels the air through them, carrying with it all irritating substances. Deep sighs accompany sorrow, and relieve the heart from the congestive state produced by depressing passions. In joy the tears often flow; while in intense grief they are suppressed. When they do flow, it is a proof of moderate sorrow; for tears do not bring relief, but they indicate that it has been brought. It is of great importance that we should be acquainted with the true design and mode of operation of these acts; because, although many of them are instinctive, they are likewise subject to volition,

and may be developed at will, so as to become curative agents.

Morbid sympathies differ from the natural in this, that the sympathetic relation arises during a state of disorder or disease, and is propagated from the affected point to some distant one, which had previously been healthy, but soon becomes involved in the disturbance.

These are even more numerous and obscure than natural sympathies; and the reciprocity of morbid sensations or affections is still, in a great measure, mysterious to the best physiologists. We are not always prepared to show how it happens, that when one part is irritated, another part—and that a distant one—participates in the irritation; by what means two parts are connected together in such a manner, that when one feels or acts, the other is affected without any apparent influence being exerted on the intermediate organization. A blow on the head, for example, will produce syncope or vomiting; deleterious substances introduced into the stomach, cause vertigo, confusion of thought, and visual illusions; and the ungrateful odour of certain plants gives rise to a sensation of pressure at the chest, and temporary suspension of the heart's action.

It is thus—

"That when the dawn, in russet mantle clad,
Walks o'er the dew of yon high eastern hill,
The cock, that is the herald of the morn,
Doth with his lofty and shrill sounding throat,
Awake ————."

It is thus, from the impression of light, that the greater part of the animal kingdom are stimulated to activity with the approach of the sun, while they retire to repose as it sets. It is thus the eye of the rattlesnake becomes brilliant from desire—its fascinating power—that "gentle, dumb expression," which "turned at length the eye of Eve."

The erect bearing of the cock after victory; the swagger of the turkey; the amorous movements of the pigeon, are familiar examples of muscular acts determined by sensation. So also it is that in intense grief, or in fear, as I have before stated, certain secretions are stopped; the tears do not flow, and the saliva is suppressed. From bad news, the breath will become intensely fetid. From bashfulness, the sebaceous discharge assumes an unpleasant odour, and the body is bathed in sweat. The phrase "green-eyed monster," is correctly applied; jealousy, as Horace says, making the

liver swell with bile, and causing jaundice. The effects of fear on the alvine secretions are familiar to every schoolboy; and when cholera raged among us this had no little influence in spreading the epidemic. (*Bushnan on Instinct and Reason.*)

An infinity of examples might be adduced in illustration of the vast relations which exist between the various parts of the animal frame, and of the close connexion which the *physical* has with the *moral* and *intellectual* faculties of man. It is thus that various passions of the mind so much influence functional derangement of the heart; and it is thus by the remarkable influence of what we call sympathy, that we explain the peculiar and remote operations of certain medicines.

Various classifications of sympathies have been adopted; but these artificial distinctions do not throw much light upon the subject. John Hunter divided them into *contiguous*, *continuous*, and *remote*. Other physiologists divide them into *general* or *universal*—*particular* or *specific*. To that into *natural* or *morbid* I have already alluded. Again, sympathies have been classed according to their original seat, some manifesting themselves on the organs of *volition*, while

others arise from *instinctive propensities,* or from the *emotions* and *sensations.*

Those sympathies which are included under the first two heads of this latter division, operate through the medium of the motor nerves, if we except a few examples referable to instinct only, though manifesting themselves on the muscles of voluntary motion. They may be said to form the chain of communication between the brain and corporeal organs, and thus enable these latter to obey the dictates of the will, and administer to the necessities of life.

To the class of sympathies that manifest themselves through the organs of volition and instinct, belong all the decided effects produced on the voluntary agents of the body, which emanate from *consciousness.* There is, *however,* this difference between the purely voluntary and instinctive sympathies : the former result from the circuitous processes of imagination, reasoning, or association, and may be easily traced ; while the latter, proceeding *not* from consciousness, but from sensations excited by animal appetites, or innate propensities, cannot be always mentally traced. Their physical effects, moreover, are *instantaneous, inevitable,* and *perfect* from the beginning ; while the

former requires time and practice to bring them to perfection. In other words, the instinctive sympathies operate independently of reason, even prior to its dawn ; the voluntary associations are dependent on this faculty.

Sympathies resulting from *emotions* and *sensations*, on the other hand, declare themselves, through the medium of a much more equivocal agent. Our internal sensations, as Majendie observes, are always vague and confused, even in the healthy state ; they are still more so, when disordered ; and hence it is not surprising that the sympathetic acts connected with, or arising from them, should partake of the same vague character, and be traced with difficulty. These sympathies manifest themselves not only on the organs of volition, but on those of *involuntary* motion, as well as on others destined for the functions of *secretion*. The effects they produce on the organs of volition are intimately allied to such as arise from instinctive propensities, inasmuch as they are often produced independently of the will.

The sympathies of *emotion* seem to influence the whole nervous system ; primarily and subsequently the heart and circulation, the secretory organs, and other parts which perform their functions

independently of the will. This operation they apparently effect through the intervention of that communication which exists between the brain and the *great sympathetic nerve* in the course of the cerebro-spinal axis. Thus is explained the simultaneous effects produced by anger, hope, fear, grief, joy, &c., which are apparent at once, and at the same instant in the nervous and circulating systems.

The sympathies arising from *sensation*, likewise operate in many cases on the sanguineous system, more especially those referrible to the *morbid* class, while in others, they affect the muscles, and produce involuntary motions of the voluntary organs. Thus, pain excites increased action of the heart and arteries, and is followed by all the phenomena of fever; and the sensation produced by tickling the soles of the feet, induces spasmodic excitation of the respiratory muscles, giving rise to *laughter*, which, if carried to excess in an irritable temperament, might be succeeded by convulsions of a more serious nature. These and innumerable other examples, are common-place matters of fact, with which most persons are familiar. "Of the vinculum, however,"—observes Dr. Wilson, in his philosophical and learned letters

on morbid sympathies—"which connects the sympathising part with that where the irritation is applied, we remain totally in the dark." This may have been true in Dr. Wilson's time; but knowledge has progressed since then, and I shall now endeavour to show, that in a great number of cases, we are enabled to trace the connexion which escaped that acute observer.

The preceding remarks apply to sympathy in general; but *morbid* sympathies, or those which manifest themselves during disease, should principally occupy the attention of the practitioner. These may operate in all the ways already pointed out; but they are principally associated with our emotions and sensations. They are often the result of some local or general irritations, applied from without, or generated within the body; in some instances, they are calculated to affect the functions only; while in others, they influence the vital actions of the parts in which they happen to be seated.

It were mere waste of time to enter into any dissertation on the intimate nature of sympathy. It is a vital, nervous act, which, in the present state of our knowledge, we cannot attempt to explain. It is impossible to show in what manner

nervous influence is transmitted from one nerve to another distant nerve ; because we are altogether ignorant of the nature of nervous influence. We cannot tell how volition and sensation are carried along the trunk of the same nerve ; and we cannot, *a fortiori*, explain how they may be transmitted from one nervous filament to another, which has no apparent connexion with it. Yet, although we cannot discover the *how*, we may often understand the *why*. Taking the fact as granted, we can establish some general laws to which it is submitted—we can often trace the links of the chain which associates distant parts together ; we can point out the *rationale* of the associated sympathetic acts, and explain the object they are destined to fulfil in the economy. This latter circumstance is of great practical utility ; because, in many cases, sympathy is exercised on the instinctive acts of voluntary muscles, and by irritating the instinct, which we can do at will, we convert the sympathetic influence into a curative agent. This applies particularly to the influence of respiratory acts upon the circulation.

Sympathy is exercised through the medium of the nervous system. Each part, organ, and tissue of the body is connected with every other part,

through the nerves ; the nervous system is a perfect circle, uninterrupted at any point. Hence every part of the body is capable of sympathising with every other part ; yet experience teaches us, that the sympathies are limited. Some contiguous organs appear insensible to their relation of proximity, whilst a close sympathy unites most distant parts. Again, parts which receive their nervous influence from the same nerve, may evince no tendency to sympathise with one another ; while the slightest irritation in another part, may at once be felt by some distant organ or apparatus which has no evident nervous connexion with it. Still the effects of sympathy, whether natural or morbid, are not chance effects. They follow certain laws ; for nature never blindly operates. There is a reason for everything she does, if we could only discover it.

Experience and observation alone can teach us the innumerable facts connected with morbid sympathies. They form by far the greater portion of the symptoms of disease. Having obtained the facts, our duty is to interpret them, and to ascertain by what laws they are governed.

Any organ, or tissue of the body, may be the exciting point of morbid sympathy ; but the prin-

cipal points are the same as those which have the greatest sympathetic influence during a state of health. Hence, in respect of their seat and frequency, morbid sympathies are governed by the same law as natural sympathies ; and we are led to the conclusion, that in a great number of cases, the former are merely an exaggerated condition of the latter. The mucous membranes, the skin, the stomach, and the brain, are the points whence sympathetic influence most frequently radiates during a state of health ; and from these same points do we find morbid influences generally derived in a state of disease.

Natural sympathies appear to be instituted for the purpose of ensuring the due performance of our several functions. Are morbid sympathies destined to assist in restoring these functions to their natural state, when disturbed ? It would be going too far to answer this question in the affirmative ; but it is certain, that in many cases morbid sympathy manifests itself in the production of associated acts, which perform the office of curative agents, either by limiting mischief which has already occurred, or by contributing to restore the deranged function to its natural state. Another general fact connected with sympathy is this, that

the *exciting* point *from* which the influence is exercised on a distant part during health, is the one *towards* which the reciprocal influence is most likely to be exercised during disease. The active agent in health, becomes the passive one in malady.

Analogy of structure or function is a determining cause of sympathy between distant parts. This law is of very general application. Similar parts have a tendency to take on similar actions. Nay, more than this, the tendency may be propagated from one individual to another, as we often observe in yawning, laughing, hysterics, convulsive movements, &c.

The symmetrical law of disease may be founded on this relation. Although some have considered that it is rather the condition of blood than of the nervous system that determines this remarkable location of disease. Thus, a man may have an eruption on the skin of the fore-arm, and soon afterwards an eruption identical in shape, size, and colour, may appear on the corresponding part of the opposite arm. On this principle we can explain the action of some styptics when administered internally, and the well known popular fact of epistaxis

being often arrested by the application of a cold key to the back of the neck.

Finally, a numerous class of sympathetic actions receive their explanation from Dr. Marshall Hall's beautiful development of the reflex function. It is now fully established, that the spinal marrow constitutes a centre of nervous influence perfectly independent of the brain. Irritation of the sentient extremity of a nerve may be propagated backwards to the spinal-marrow, where it implicates the motor roots, and from these latter, is reflected on the various parts to which the motor filaments are distributed. This simple and elegant theory furnishes to us the *vinculum* of which Dr. Wilson spoke. It explains many of the accidents accompanying difficult dentition; teaches us how injury of a sentient nerve on the foot may excite tetanus, and gives a clue to an immense number of acts which thus become morbidly associated with our sensations, and which, prior to Dr. Hall's discoveries, were completely unintelligible. Before Dr. Hall's time, however, this reflex theory had been applied, not indeed to the spinal-marrow, but to the cerebrum itself. Physiologists had remarked that many parts of the body which receive fila-

ments from the same nerve do not sympathise together ; while, on the contrary, many organs which have no apparent nervous communication, exercise reciprocal influence in a very remarkable manner. They hence conclude that, in such cases, impressions and sensations are conveyed to the central organ, (the brain) and from it *reflected* to all parts of the nervous system. They do not, however, influence all these parts, but only such as are related either in function or structure to the original point whence the influence emanates.

This theory may serve to explain a certain class of sympathies, but it is far from possessing the same precision as the true reflex theory, nor is it founded, like the latter, on demonstrable facts.

It is, perhaps, the only view that can be maintained at present with respect to the sympathies of volition. The *vital* organs, however, are but sparingly supplied with cerebral or spinal nerves, and as their functions are not subject to the influence of the will, they require some other less capricious and controlling power. It is presumed that they obtain this from the *great intercostal* or *ganglionic* system of nerves ; the maintenance of a complete consent between the different organs and tissues on which they are distributed, being

evidently not the least important duties which they have to perform, perhaps the only office nature has assigned to them. Whether they accomplish this independently of the brain, is a point not determined, and one which has afforded much interesting physiological controversy. It has been maintained that the *great sympathetic* form a system of themselves, being in close connexion with, but not solely dependent on the brain; co-operating, but having a separate existence.

The centre of this system is the great semilunar ganglion, and solar plexus, which, together with the other minor ganglia, are considered as so many reservoirs of nervous sympathy, which manifests itself through this agency, in the same manner as mind operates through the medium of the brain and cerebral nerves. Every part of the frame that has an *involuntary* function to perform is in more or less intimate communication with this system, and derives nervous filaments from it: and the more direct the intercourse, the more decided and important are the sympathies which result. Hence it is "that those sympathies which proceed *from* the gastric centre are more powerful than those which are propagated *to it* from distant parts;"

the stomach lying in close proximity to the semi-lunar ganglion and solar plexus, and being liberally supplied with nerves from that source. Hence, in all probability, the reason why a severe blow over the stomach proves so often fatal.

The *par vagum*, *phrenic*, *glosso-pharyngeal*, and *spinal accessory* nerves appear to be appropriated solely to supply the power of performing the respective functions of the several parts to which they are distributed ; and their frequent junction with the sympathetics is only an evidence of the great necessity there is of preserving a perfect accordance between the organs, structures, and viscera essential to animal life.

The doctrine that the *great sympathetic* nerves are devoted solely to the establishment of a chain of reciprocal affinity and mutual co-operation among the various viscera and tissues on which they are distributed, and that they accomplish this by means of a power *independent* of the brain, is not exactly in accordance with that generally received ; still it is a very plausible theory, and goes further than any other to explain the acknowledged laws of sympathy. To sum up this part of my subject, then, I may observe, that some sympathies, more especially those which proceed

from mental emotions, are exercised through the medium of the brain and cerebral nerves. In other cases, where the irritation of a sentient nerve causes disturbance in parts supplied by the corresponding motor branches, the sympathy is exercised through the medium of the spinal-marrrow, and the intervention of the brain is not required. Lastly, visceral sympathies may depend on the connecting filaments of the great sympathetic nerve.

Having thus established, as far as the limits of the present work admitted, some of the principal laws connected with sympathy, and endeavoured to point out the sources to which we are to look for an explanation of its phenomena, let us consider it more particularly in reference to our subject, and examine the nature and mode of action of those influences which act on the heart through the medium of sympathy. The functional disorders of the central organ of circulation cannot be well understood without an acquaintance with the causes which excite them, and with the peculiar manner in which these causes act. The disorders alluded to are, for the most part, sympathetic, and it is therefore necessary to consider the various sympathies from which they result. The

reciprocal influences of the heart and other organs or systems of the body are extremely numerous. As the cerebro-spinal system sends sentient life to every part of the body, so does the heart transmit nutritious life to every portion likewise. Its connexion with the organs and tissues is just as intimate and universal as that of the brain, and its sympathetic relations, therefore, almost as diversified. In addition to the general causes of sympathy which operate on the heart, there are some special ones that it may be well to notice. The heart, as the central organ of the circulation, acts as a reservoir as well as a propelling machine, and its functions are for the most part of a mechanical nature. Hence we can readily understand how any disturbance of the circulating fluid in any important organ, may, by disturbing the balance, derange the function of the reservoir; and from this circumstance, we may be prepared to foresee that many derangements of the heart's function, which at first sight appear merely sympathetic, are virtually produced by disturbance of the circulation at some point more or less remote.

Again, it is not unreasonable to conclude, that changes in the quality of the blood may exercise a sympathetic influence on the heart, whose internal

surface is ever in contact with that fluid. We have, indeed, a striking example in anæmic palpitation, one of the most frequent forms of functional disorder of the heart. It would require a separate work to treat this interesting part of the subject in a complete manner, but I must content myself here with this brief allusion to it. Lastly, we should remember that the capillaries in every part of the body are continuous with the heart, forming minute and distant, yet still integral parts of one and the same system. The continuous sympathy of John Hunter may therefore be exercised between the root and its remotest branches. A certain degree of inflammation in the capillaries of any part of the body will inevitably excite more or less sympathetic disturbance of the heart, into which continuity of tissues must enter for a certain amount, because the same degree of irritation applied to the sentient filaments of the parts never gives rise to the same degree of febrile disturbance, as inflammation of its capillaries does. Irritation exercised at one extremity of the circulating system must necessarily manifest itself at the other extremity, because it is there that the principal actions of the system have their seat, and are most numerous.

Mental emotions are a very frequent cause of sympathetic disturbance of the heart and their influence has become the subject of such universal remark, that the word "heart" in many languages is synonymous with moral affections. The influence here proceeds directly from the brain to the central organ of the circulation, acting on it as on other muscular tissues. In reference to this point, it is necessary to distinguish two kinds of emotions. Some are exciting, and instantaneously stimulate the heart to increased action, while they augment its vigour at the same time. Joy and anger are examples familiar to every one. When moderate, these emotions give increased energy to the heart, and to the whole of the muscular system; though when carried to excess, they may prove fatal, probably by causing congestion of the heart.

A vigorous circulation is necessary to enable man to perform any of his actions with great energy, and perhaps, we may discover the cause why emotions of the exciting kind, as anger, &c., which are destined to develop violent muscular efforts, commence by stimulating the heart to increased action. Indeed, man adopts this principle instinctively, though in an inverse form. When about to make any violent effort, he com-

mences by contracting certain muscles. As Shakspeare says, he

> "Stiffens the sinews, summons up the blood,
> Setteth the teeth, stretches the nostrils wide,
> Holds hard the breath."

During these acts, the vigour of the heart is momentarily increased, because muscular contraction has the effect of sending an increased quantity of venous blood to the central organ, and impeding the flow of arterial blood from it.

The depressing passions, on the contrary, as fear, &c., diminishes the vigour of the heart, and general muscular system. Fear is an instinctive apprehension of danger, and instinct prompts us to flee from danger, though reason may teach to combat and overcome it. Hence, as violent muscular efforts are not required, but the contrary, the energy of the heart is diminished by this passion. It excites sympathetic palpitation ; but the latter is of a fluttering kind, and is a secondary effect or feeble reaction on the blood, which flows in upon the heart from the exterior.

It has been asserted that the heart is sometimes under the power of the will. Fontana, it is said, could quicken or retard his pulse at pleasure; and the well-known case of Colonel Townsend, related

by Dr. Cheyne, is frequently quoted as proof of this fact. To me it seems certain, that in these or analogous cases, the influence of volition on the heart was exercised through the medium of the respiratory muscles. By quickening or retarding the respiratory acts, we can modify the pulsations of the heart, but in no other manner. John Hunter was aware of this, and gave practical demonstration of it in his own person. It is related of that celebrated physiologist, who suffered under organic disease of the heart, that he dissipated a fit of incipient syncope, and saved his life by making violent respiratory efforts.

The heart is more intimately connected with the respiratory system than with any other, and the sympathetic relations between them are therefore most numerous. They are, in the first place, contiguous organs. In the next place, the functions of the heart and lungs are necessarily associated by the circumstance, that the two sides of the heart communicate together through the medium of the pulmonary circulation. We have been too much accustomed to consider the circulating system as an independent piece of machinery, forgetting that the motor engine, and the receiver, are double organs, which do not communicate

directly, as the term "circle" would seem to imply, but indirectly, through the lungs, the capacity of which varies at every moment, influencing the passage of blood through the tissues, and being, moreover, subject to the control of volition. The heart and lungs, then, are associated in the act of circulation, and this association satisfactorily explains the varied sympathies which exist between them. This interesting subject has been most satisfactorily studied by Dr. Wardrop, whose excellent work on the Diseases of the Heart I must refer the reader.

The various changes in the capacity of the chest during respiration, must necessarily modify the passage of the blood through the pulmonary vessels, and therefore influence the circulation in the heart. Inspiration favours the flow of venous blood into the right side of the heart, the passage of the blood through the pulmonary arteries, and the flow of arterialized blood through the pulmonary veins.

Expiration promotes the transmission of arterial blood from the lungs to the left side of the heart, and thence along the arteries: it also impedes the flow of blood from the right ventricle into the pulmonary artery. In general terms, inspiration

is accessory to the venous circulation, expiration to the arterial circulation. Keeping in mind these two principles, we can satisfactorily explain various associated or sympathetic actions of the heart and lungs, according as the wants of the economy may require the flow of venous or arterial blood to be accelerated or retarded.

Physiologists have often asked why crying relieves grief; why the act of sighing so constantly attends sorrow; why we yawn when we are wearied; why heart disease is accompanied by peculiar cough; why persons recovering from syncope are attacked by convulsions, &c.? These and many similar actions are examples of the associated acts to which I have already alluded; they are instinctive efforts of nature to relieve congestion within the heart, stimulate that organ when necessary, or restore the troubled balance of the circulation. We have only to analyse the physiological effect of these different acts on the state of the circulation within the chest, in order to understand the corresponding influence which they must exercise on the circulation within the heart. The convulsions which accompany recovery from deep syncope, however, are not respiratory associated acts; they are instinctive efforts

of the voluntary muscles which, through the contractions, send an increased quantity of blood to the heart, at the very moment it requires an increased stimulus.

The study of these various acts, and of the manner in which they co-operate to restore the disturbed balance of circulation in the heart is of the highest importance ; for, as I have more than once observed already, they are capable of being repeated at will, and thus converted into preventive or remedial agents. Thus, it is probable, that syncope might be prevented in many cases by voluntary contraction of certain muscles, and an appropriate adjustment of respiration ; that functional palpitation might be relieved, if not altogether calmed by such a management of inspiratory and expiratory acts, as is best calculated to moderate the heart's action. The progress of physiology here opens a wide and interesting field to the experimental practitioner, the cultivation of which will repay his labour.

The sympathetic influence of the stomach and digestive organs on the heart is very great and extensive. This ceases to be matter of wonder to us, when we reflect that the mucous membrane, stretching from the mouth to the anus, is a secret-

ing surface, studded with innumerable sentient papillæ, and daily exposed to a mass of heterogeneous stimulating matters, poured in, in the form of food, drink, or glandular secretions. Thus it happens, that the alimentary system is so often the seat of primary irritations, which are productive of disease. Yet, although the morbid sympathies which subsist between the stomach and various distant parts, are doubtless reciprocal, it appears to me that those which radiate *from* the gastric centre, are more powerful than those which are propagated *to it* from remote organs. Hence, knowing the connexion that exists between the stomach and heart, not only from proximity, but intimate and important nervous communication, we are prepared to understand how disordered functions of the heart, indicated by palpitation and all its distressing concomitants, should frequently proceed from disease or derangement of the stomach and intestinal canal.

The ingestion of improper food into the stomach often excites palpitation instantaneously. This is a fact of every day experience. The irritation arising from worms, from the presence of vitiated secretions, or excrementitious matter in the intestinal canal, is also a well-known cause of sympa-

thetic palpitation. Flatulency of the stomach often excites palpitation in irritable or nervous persons, predisposed to that affection. In all these cases the derangement of function in the heart is supposed to be sympathetic, that is to say, arising from nervous consent, without any disturbance of intervening parts. But a closer examination of the subject will show that this is not always so. Vitiated secretions may sometimes disturb the heart, not by irritating the sentient extremities of the mucous papillæ, but by changing the qualities of the blood. Flatulency of the stomach often excites palpitation, by mechanically impeding the descent of the diaphragm, as is shown by the relief afforded from a mere change of position. Again, we should remember that the liver bears nearly the same relation to the cardiac and abdominal circulations, that the lungs do to the right and left cardiac circulations. Corvisart observed, "that the liver becomes engorged in almost every disease of the heart," and so, reciprocally, may disturbances of the portal circulation derange the right side of the heart, by causing congestion through the inferior cava. This principle will, I believe, explain many sympathetic palpitations—that of incipient gout for example—connected

with a disordered condition of the biliary apparatus.

It may, likewise, be called in aid to explain the sympathy which exists between the heart and uterine system, during pregnancy, disordered menstruation, &c. Here the balance of circulation in the abdominal organs is evidently disturbed, and it seems reasonable to conclude that the functional derangements of the heart are mainly owing to that disturbance. The vomiting which accompanies pregnancy, is evidently destined to relieve temporary congestion of the heart, and the cardiac symptoms are best relieved by means capable of restoring the lost balance of the circulation.

CHAPTER V.

ON PRIMARY AND SYMPATHETIC PALPITATIONS OF THE HEART.

HAVING explained the best methods of examining the heart, especially by the use of the stethoscope ; having also explained, as far as our limited knowledge of the nature and laws of sympathy will admit, the mode in which the heart is liable to become consentaneously implicated, either in consequence of the operation of morbid influences on the brain and nervous system in general, or of disease seated in remote parts ; we are now prepared to investigate the nature and symptoms of palpitation, one of the most frequent indications that functional derangement is established in the heart.

The advantages of distinguishing whether disorders are merely functional, and the importance,

in such cases, of tracing them to their respective sources, are too apparent to require comment. These are the only means through which we can arrive at a knowledge of the treatment best adapted to afford relief or obtain a cure.

Palpitation may be defined as a temporary augmentation of frequency in the action of the heart, the pulsations of the organ being at the same time perceptible to the individual.

These phenomena constitute the essential features of the affection when it depends solely on functional disorder. When connected with morbid changes in any of the textures of the heart, other symptoms usually associate themselves with those I have enumerated in my definition.

Functional disorders of the heart have been distinguished by authors in a great variety of ways; but the most simple classification appears to be that under which the heart's action is considered as perverted, diminished, or increased. The latter will comprise palpitation in all its varieties.

Functional palpitations, again, may be subdivided with advantage into several species. Thus we may have cardiac, or primary palpitation from disorders directly affecting the heart; and nervous or sympathetic palpitation from consent, with

derangements seated in more or less distant parts of the economy, and affecting the heart through nervous sympathy mainly.

Of cardiac, or primary palpitation, Dr. Hope distinguishes three forms, according to the exciting causes, which may be congestion, or over stimulating blood, or the arrival of blood in excess to the heart. These three forms may, however, be united under the single head of active palpitation.

This latter, which I have also denominated plethoro-nervous palpitation, generally occurs in persons of a plethoric, sanguine, and susceptible habit. It consists essentially in an increase in the velocity and force of the heart's action. It may be induced by any cerebral impression capable of accelerating the general circulation while it augments its force; by active exercise, such as dancing, violent running, rowing, &c., or by stimulants, either external or internal. It may accompany, also, such diseases as are of a sthenic character; or may result from the suppression of natural secretions and evacuations—this latter especially tending to increase a plethoric condition of the system.

Plethora, indeed, may be called the predisposing cause; and all impressions calculated either to

increase the quantity of the circulating fluid, or to discompose the equilibrium of the nervous system, may (cæteris paribus) produce the paroxysms. The latter are often attended with very great dejection of spirits, and a small oppressed pulse which might lead to the erroneous idea that the affection depended on nervous debility. Cases of active palpitation are very numerous in young persons at the prime of life who indulge in sedentary habits, or suddenly abandon the active exercise and full diet of a country life, without making a corresponding change in their regimen.

It may fairly be questioned how far the complaint, in a great majority of the cases now alluded to, may not depend on congestion of the heart itself; and this leads me to the consideration of a point which has hitherto been treated in a very imperfect manner by nearly all writers on diseases of the heart. Dr. Wardrop, (*On the Nature and Treatment of Diseases of the Heart,*) indeed, is the only author who has described congestion of the heart in a complete or satisfactory way. His observations, originally published in the *Medical Times,* on this condition of the central

organ of the circulation are highly valuable, and worthy of serious consideration.

It has been long well-known to physiologists, although practitioners have not sufficiently applied the principle, that many circumstances favour the influx of blood to the heart, while they impede its afflux, thus causing congestion, or a temporary stimulus from the increased quantity of blood which is thrown on the central organ. The chief agent in this disturbance of the circulation is muscular contraction. Violent or long continued muscular action always accelerates the flow of venous blood to the right side of the heart, and impedes the exit of arterial blood from the left side.

The respiratory act also exercises an important influence over the quantities of blood contained in the heart. Inspiration favours the flow of venous blood into the right side of the heart through the pulmonary arteries, and the exit of arterial blood from the left side through the pulmonary veins. The expansion of the chest and pulmonary tissues during inspiration evidently contributes to the production of these two effects.

Expiration, on the other hand, gives an ad-

ditional impulse to the stream of arterial blood. Here the contraction of the chest and lungs promotes the transmission of blood from the pulmonary tissues into the left side of the heart, and also the propulsion of the blood from the left ventricle along the arteries, at the same time that the expiratory act impedes the current of blood from the right ventricle into the pulmonary artery. It is not improbable also that the system of pulmonary vessels, which are from their nature susceptible of various degrees of distention, equalizes the circulation in the heart by retaining any surplus quantity of blood until it can be received into the central organ. In extreme cases, the subcutaneous veins also assist in the performance of this function by receiving an additional quantity of the circulating fluid.

These principles may serve to explain many interesting and important phenomena connected with associated actions in the economy. Thus, whenever it is necessary to give temporary vigour to the heart and circulation, various muscles are brought into action and become, as it were, "set." On recovering from deep syncope, the voluntary muscles are convulsed, the inspirations become protracted, and the expirations more powerful, for the

purpose of sending an increased quantity of stimulus to the heart. On the same principle we account for the palpitations or accelerated movements of the heart which often accompany chorea, &c., and explain the remarkable difference in the pulse according as the body may happen to be in the erect or recumbent posture. The varied conditions of the respiratory act must also, according to the principles laid down, contribute in a powerful manner to restore the balance of the circulation whenever it is disturbed by moral causes acting on the heart, or by physical causes operating on the organs of respiration. Deep expirations relieve the left side of superabundant blood; and hence sighing is so common a symptom of oppressed heart. In like manner "the acts of crying, weeping, sobbing, &c., are resorted to by the system in order to effect alterations in the quantity of blood both in the lungs and heart, when the circulation has been deranged by mental emotions." (*Wardrop*, l. c., p. 74.) The hysterical paroxysm might perhaps be better explained on the supposition that the acts which characterize it are intended to relieve some disturbance of circulation in the heart, than on the theory of their being purely nervous.

Cardiac congestion occurs in the right side of the heart, and is one of the most frequent causes of active palpitation. The stream of blood is first conveyed with increased velocity into the right auricle, thence into the right ventricle, and finally into the branches of the pulmonary artery. If this condition continue for any length of time, the venous blood must regurgitate into the right auricle, and become stagnant throughout the venous system.

The chief causes of cardiac congestion are mental emotions of an exciting kind, suppressed evacuations, and violent muscular efforts. We have frequent examples of the influence which the latter exercises in producing congestive palpitation among the young members of cricket or gymnastic clubs. The violent and long continued muscular efforts made by many of these young men in the prime of life and vigour, without sufficient training, or preparation of the respiratory organs, often give rise to very severe and obstinate paroxysms of palpitation, which have a tendency to recur again and again from the slightest exciting cause.

The symptoms which accompany the species of palpitation now under consideration, are ac-

celerated breathing, dyspnœa, and dry paroxysmal cough. The feeling of dyspnœa is sometimes considerable when the respirations are not more frequent than natural, and when the lungs, as proved by stethoscopic examination, are quite healthy. These symptoms evidently arise from disturbance of the circulation within the chest ; and nature endeavours to restore the balance by exciting the various acts already alluded to, such as sighing, deep inspirations, sobbing, paroxysms of screaming, laughter, &c.

The impulse of the heart is always increased, laboured, and struggling ; but the force of the arterial pulse is diminished, because the heart is unable to circulate the blood with its accustomed energy. This comparison between the relative forces of the apex beat and the pulse, affords us the best diagnostic sign of congestive palpitation. In purely plethoric palpitation, the force of the heart's impulse and of the pulse are both increased.

Cerebral symptoms, of a more or less distressing kind, often accompany congestive palpitation. The most common are vertigo, swimming in the head, ringing in the ears, temporary disorder of the intellectual functions, and a peculiar tottering

of the gait, which comes on suddenly, and compels the patient to grasp the nearest object for support. There is often, also, some pain or uneasiness about the præcordial region, which the patient endeavours to relieve by deep inspiration or a single short cough. In severe cases we may observe the distressing panting for breath, consisting of short inspirations, followed by long expirations, but very different from the dyspnœa of pulmonary disease, where both respiratory acts are equally accelerated.

From what has been said, it appears that congestion and plethoric palpitations have many characters in common. They are, in fact, essentially of the same nature; but in the latter the whole system is in a state of plethora, while in the former the excess of blood is confined, in a great measure, to the heart and pulmonary venous system.

The diagnosis of active palpitation is seldom attended with any difficulty, even in cases where the contractile power of the heart is increased to a very considerable extent from repletion or preternatural stimulation. The only disease with which such a condition is likely to be confounded is hypertrophy in its early stage; but with a

little care we can always distinguish its true nature.

In those cases of active nervous palpitation which depend upon, and are connected with a plethoric condition of the system, the contractile power of the heart may be increased to a very considerable extent, owing to the organ being in a state of repletion, or preternatural stimulation. The disorder in such cases bears in many respects a close resemblance to the early stages of hypertrophy, and some little care is requisite to distinguish its true nature.

Case.—A stout, ruddy-faced, plethoric country girl consulted me in consequence of the extreme inconvenience she experienced from the over-action of her heart. It beat full and strong against her ribs, and with sufficient force sensibly to raise my head at each stroke, when the stethoscope was applied over the præcordial region, though this is not usually the case. To this constant state of inordinate action were added occasional attacks of palpitation, so tumultuous as scarcely to admit of analysis. On inquiry I found the uterus had not performed its accustomed healthy function for several periods; and, in consequence, she had become feverish and irritable; the heart, in turn,

had sympathised with the general derangement of the system, but she complained only of the palpitation.

I was quite satisfied of the sympathetic nature of the affection ; and by ordering great quietude, low diet, blood-letting from the arm in the first instance, and then over the loins and above the pubes, by means of cupping and the application of leeches, with the exhibition of active purgatives, I soon restored her to health.

Although, at first sight, a train of symptoms such as I have enumerated might suggest the possibility of hypertrophy, yet, in examining the phenomena collectively, the two disorders can scarcely be confounded, and they might be distinguished even if the hypertrophy were complicated with palpitations. In the organic disease, the impulse of the heart is hard, circumscribed, and heavy; it raises the head of the observer at each stroke. The sound, instead of being clear, is obscure, and as it were muffled. The area of percussion dulness is increased, and the apex is often displaced. In the functional disorder the impulse is excessive but sharp and not heaving ; the site of the apex beat is not displaced; the sounds are loud and clear, perhaps too loud ; there is no

abnormal præcordial dulness: we have, in fact, what Dr. Latham aptly terms "mock hypertrophy." In hypertrophy, when the palpitations are, *pro tempore*, suspended, the beat of the heart still remains hard and more circumscribed than it ought to be; and indeed the movements of the heart are not always of a nature to merit the name of palpitation; they are not necessarily more rapid than in health—the patient does not always perceive them himself — and when he does, although they may in reality be much more forcible than natural, he seldom complains of the sensation being a source of distress, unless when the capacity of the chest is diminished by pressure, position, or otherwise. He attaches no undue importance to his symptoms; he evinces no unnecessary alarm respecting them, and, even in the advanced stages of the complaint, seems insensible to his danger.

The following table, taken from Canstatt's great work, (*Die Specielle Pathologie und Therapie von Carl Canstatt*, Bd. iv. p. 133,) and for which I am indebted to a friend, comprises in one view the main differences between the symptoms of palpitation from functional and from organic diseases.

Simple functional palpitation.	*Palpitation from organic alteration of the heart.*
Physical examination by percussion, mensuration, and auscultation, discloses no enlargement or valvular lesion.	Physical examination gives decided indications of organic alteration.
The attacks of palpitation often commence when the patient is perfectly tranquil from mental emotions, or other influences affecting the nervous system, and frequently disappear on moderate exercise in the open air, and after the use of stimulants.	Strong exercise increases the palpitation; the horizontal position causes it to be more moderate or to disappear. All heating, stimulating remedies heighten it.
Generally the condition of the constitution throws light on the origin of the palpitation; but all symptoms of heart disease fail.	Generally there are symptoms derived from the deranged circulation, in the lungs, for example, from œdema, &c.
In the intervals the patients are, for the most part, entirely free from all symptoms of heart disease.	Intervals of freedom do not exist. The physical signs always remain the same.

CHAPTER VI.

SYMPATHETIC OR PASSIVE PALPITATION.

It is to this variety of palpitation, by far the most frequent, troublesome, and obstinate, that I am particularly desirous of drawing attention. It exists in connexion with various morbid conditions of the blood, or depends on sympathy between the heart and other organs of the body. In this variety of the disease the pulsations of the heart are increased in velocity, but not always in strength, though they may seem so to the patient. In many instances they are so slight as to be scarcely perceptible to the observer; yet they are always sensibly felt by the patient himself. When the morbid sensibility of the system is very great, an impulse, even much below natural, may be so annoying as to create considerable distress.

"Il y a," says Bertin, "une espèce de palpitation qui est caractérisée par la *precipitation* des battemens du cœur même avec *diminution* de leur enérgie." Such cases, observes Foderé, though they may continue for years without producing organic disease, when the breathing is not much affected, are not to be viewed with indifference. It is, he assures us, in accordance with his experience, "that those who have been so affected from youth upwards, commonly die before the usual term of human existence."

The truth is, that persons liable to be affected with palpitation in this severe and troublesome form are generally of that highly susceptible and irritable temperament which is commonly denominated nervous.

Mental and physical agents influence individuals of this nervous habit much more readily, and with far greater energy than they do the rest of mankind.

Such persons enjoy the ordinary events of life with the most unbounded delight and gratification, or feel them with distress, sorrow, and disappointment.

Disease acts on them in the most strange and inexplicable manner, and is frequently found com-

plicated with symptoms which baffle all attempts at explanation. How trivial are the circumstances which will derange the system of the nervous and hysterical female! From a slight cause the action of the heart will become tumultuous, the pulse accelerated, propelling the blood to the most minute of its arterial ramifications, and laying the foundation of functional disturbance, which the repose of weeks and months is scarcely able to subdue. How necessary is it, then, to guard against these effects, and to be fully aware of the important changes they induce.

A morbid irritability of the nervous system is the most ordinary predisposing cause of sympathetic palpitation, as plethora is of the active variety. It will, therefore, be useful to enumerate some of those causes which tend to render the nervous system morbidly irritable.

The debility consequent on fevers and other acute diseases, and the no less wearing influence of chronic disorders; anæmia; loss of blood in undue quantity, either by the lancet or from spontaneous hæmorrhage; inordinate natural discharges; the constant and injudicious use of mercury and active purgatives; improper or impoverished diet; long continued anxiety and

distress of mind; watchfulness; intense study and close confinement; dissipation and debauchery, &c., are among the most prominent of these influences, and the injury arising from them, it is impossible too carefully to consider.

The degrees in which passive or sympathetic palpitation may present itself are very various, being modified by the energy of the exciting cause and the susceptibility of the individual. In slight cases the action of the heart is compared by the patient to the flutter of a bird, or to the hurried movement which results from the sensation of fear, sometimes consisting in a momentary feeling of a rolling, tumbling motion of the heart, accompanied by intermission of the pulse. The quivering sensation is frequently as much experienced in the epigastric region as in the præcordial; but to the auscultator it is only perceptible over a limited extent of the latter. It is often attended with a feeling of exhaustion or sinking in the epigastric region, not unlike the sensation occasioned by hunger, and with more or less acceleration of the breathing.

The attack may be occasional, and last for a few minutes only, to return after a long interval; or the palpitations may be repeated in rapid suc-

cession for half an hour or an hour together; or they may be felt occasionally at irregular intervals for several days or weeks, or for a still longer period.

In more severe cases the affection assumes the form of continued fits of palpitation, during which the sound, impulse, and frequency are all increased. Here the strong and irregular actions of the heart may continue without any intermission for an hour or more at a time, and recur in this manner daily, or several times in the day, for a length of time, or recur at uncertain intervals. The paroxysms are, of course, accompanied by irregularity of the pulse whenever the action of the heart is itself irregular; but frequently there is no irregularity of action, the complaint merely consisting of a pulsation more or less strong, which the patient feels or perhaps hears and can count distinctly, especially when lying in bed. Again, there may be only increased frequency of the action of the heart, (with little or no augmentation of force,) showing itself by paroxysms of quick pulse, accompanied by a feeling of anxiety, which continues for an hour or two at a time without any irregularity. The breathing is slightly hurried, a circumstance which I have ex-

plained when speaking of congestion, and the sufferer is under more apprehension for the consequences than the real danger justifies.

In more severe cases the pulsations are stronger, and sometimes appear to exceed the natural strength, but they seldom do so at all, and never for any great length of time.

Of the local symptoms accompanying sympathetic palpitation of the heart, the first which merits attention is unquestionably the "*bruit de soufflet*" or bellows murmur. This morbid sound likewise occurs with organic palpitation, and it is therefore necessary to dwell on such points of difference as may enable us to distinguish the functional from the organic murmur. Functional "*bruit de soufflet*" is almost always an attendant on palpitation connected with an anæmic state of the system, and in such cases is accompanied by the humming murmur in the veins. It is seated at the aortic and pulmonary orifices, and occurs during the systole of the ventricles. It never attains the hard character or high pitch of organic bellows murmur, and, generally speaking, is only developed when the heart's action is considerably excited by any occasional cause, as mental emotion, indigestion, &c.

I have already stated that sympathetic palpitation is sometimes accompanied by certain changes in the pulse, as well as in the impulse of the heart. In some cases the action of the heart seems completely suspended at close intervals, and then we have an intermittent pulse; when the suspension is partial, we have an irregular one; and in some instances these two conditions are found combined.*

* "From an attentive observation of this phenomenon (intermission of the pulse), and where we have had very good opportunities of investigation, we have come to the conclusion that, in all cases it depends on an unsuccessful action or contraction of the ventricle—not an *intermission* of the ventricular contraction. The causes, however, of this abortive action of the ventricle are various. In very many cases, it is dependent on sympathetic associations of the heart with other organs, especially with the abdominal viscera; in which cases the intermission of the pulse is not constant, but only temporary. Where there is a permanent irregularity in the action of the heart or in the pulse, we believe there is generally some valvular disease or alteration of structure."—*Forbes' Translation of Laennec.*

"Laennec himself states, that he believes 'there are two kinds of intermission—one *real*, consisting in an actual suspension of the heart's contraction—the other *false*, resulting from contraction so feeble as to be incapable of perception by the finger applied to a distant artery.'"—*Op. cit.*

Of this peculiarity in the state of the circulation the patient is himself often conscious ; and Dr. Brown, the author of "Medical Essays," conceives that this perceptibility on the part of the patient is pathognomic of nervous or sympathetic intermission of the pulse, and does not occur when the phenomenon bears reference to organic disease of the heart. "If the heart miss a stroke, the individual will instantly exclaim that his pulse is intermitting." This fact is also confirmed by the testimony of Dr. James Johnson, and other writers worthy of confidence. (*Med.-Chir. Review*, vol. xvi., p. 95.)

Pricking pain, felt over the præcordial region, is another very frequent sign of nervous derangement. Dr. Elliotson has recorded in his clinical lectures several cases attended with this symptom, which he considers as somewhat diagnostic of this affection.

"There is nothing dangerous in these pricking pains, but they are sometimes excessively troublesome. That they have nothing to do with disease of the heart I am quite certain, because many years ago I noticed this symptom over and over again in persons who are now perfectly well." (*Lancet*, Dec. 20th, 1830.)

It may also be observed that the pricking pains now alluded to, frequently occur without palpitation or any other disturbance or disease of the heart whatever. They probably arise from some slight neuralgic affection of the cardiac nerves, and are more frequently excited by flatulency of the stomach than any other occasional cause. The pains sometimes shoot out through the left scapula, or up to the left shoulder, and, in many cases, appear to be connected with the rheumatic diathesis.

Another peculiarity of nervous palpitation, which occasionally presents itself, is the perception of a double movement in the heart. When lying on his left side, the patient in such cases describes the pulsations of the organ as double those of the pulse felt in any of the arteries. This arises from his morbid state of irritability, rendering the contraction of the auricles also apparent to his senses. From Sir Benjamin Brodie's and Dr. Hope's experiments, there is reason to believe that the contraction of the auricles can in no instance be strong enough to admit of detection, unless when the heart can be seen or touched. (*Experiments of Dr. Hope, detailed in his Treatise on the Heart.*) A certain degree of oppression and

dyspnœa usually accompanies this variety of palpitation, and may vary from a mere feeling of anxiety, with accelerated respiration, to perfect orthopnœa. This double movement is, however, sometimes dependent on a species of intermission, and, in certain cases of diseased heart, is productive of curious results. Every second pulsation may be so feeble, as to be almost imperceptible. In the former case, the pulse appears to be quite regular and slow; but while in the act of feeling it, the intermediate or latent pulsation become suddenly distinct, and the pulse appears to be instantly doubled. A case of this description is recorded by Dr. Forbes, wherein the same patient had a regular pulse at fifty or sixty, and an irregular one at one hundred and one hundred and twenty, within the space of three minutes.

Dr. James Johnson was, however, I believe, the first who really pointed out this species of intermission several years ago, in the case of a gentleman residing in London, under the care of Mr. Cosgreave. In this instance, he informs us, "that the ventricular actions were usually double those of the tangible arteries. But when any feverish excitement took place, the pulse became double

the number, or more, at the wrist, and corresponded exactly with the pulsations of the heart against the ribs." When lying on his left side, the patient in such cases describes the pulsations of the organ as double those of the pulse felt in any of the arteries.

In addition to the special symptoms, thus far enumerated, we must inquire particularly into the constitutional indications of disease; and it is gratifying and consolatory to know, that by comparing these with the local symptoms, we may accurately decide upon the nature of the affection, and have at command great resources for relief and cure.

In nervous palpitations, some well marked constitutional characteristic of the temperament is generally observed; in females, anæmia, hysteria, with a morbid susceptibility to ordinary impressions; in males, hypochondriasis, or melancholic tendency; in both, great fear on the part of the patient as to immediate danger of life. Indeed, there are not many diseases which excite in the mind of the patient so much alarm. "He fancies himself doomed to become a martyr to organic disease of the heart, of the horrors of which he has an exaggerated idea; and it is the more diffi-

cult to divert him from this impression, because the nervous state which gives rise to his complaint, imparts a fanciful, gloomy, and desponding tone to his imagination."

No persons are more liable to this affection than those who are dabblers in physic; those who have just read enough of medical writings to excite, but not allay their apprehensions; arouse their anxious fears, but to give no satisfaction of cure. Such persons, having no knowledge of the science of medicine and its manifold resources—no acquaintance with disease beyond their own fancied symptoms—if their thoughts become directed to the state of the heart, are sure to be the victims of nervous palpitation; and fortunately for society, though unfortunately for themselves, their own case is the first they detect, and the first they attempt to cure. Gradually getting worse, they at length seek for proper medical aid; but by that time, in all probability, some organic change has commenced, which embitters, while it curtails, their existence. Such cases are far from being unfrequent, and they should serve as beacons to reflecting persons, to warn them from the danger of tampering with their own constitutions. Health is too precious a

gift to be thus trifled with by ignorance and presumption.

Some of the many characters which present themselves in nervous palpitation, will be best noted by the following cases, which are instructive, and in which the accuracy of the diagnosis enabled us to pursue a successful treatment.

Case. — Unexpected and melancholy intelligence was the cause of a severe train of nervous symptoms, in a young, amiable, accomplished, and extremely susceptible lady. The first impression from the shock of the news was a general tremor over the whole frame; her face became blanched, she fell from her chair, and, although restored to sensation after the lapse of a few minutes, she was from that time confined to her bed with a severe paroxysm of fever, which declared itself on the following day, and from which she slowly recovered after an illness of several weeks, with her nervous system very much shaken, and in an alarming state of mental depression. Among other results incidental to this distressing train of events, she became affected with obstinate paroxysms of palpitation, attended with considerable anxiety and oppression; which

at times were complicated with globus hystericus. The most trifling causes would induce these attacks; a full meal, acidity on the stomach, flatulence, indigestion, any agitation, going hastily up stairs, the recital of a tale of affliction, and similar causes. The movements of the heart were not violent, but very tumultuous, and she often complained of a thrilling sensation pervading her limbs. On some occasions the palpitations were accompanied by a cooing sound, which might be attributed to the distended state of the stomach diminishing the capacity of the chest, for she suffered much from flatulence and windy eructations. The movements of the heart were also at times intermittent, and the pulse at the wrist beat soft and feebly. In the first instance, she was recovered from the acute attack; and then, by a course of aperient and tonic treatment, in which the carbonate and tartrate of iron were liberally administered, she gradually recovered; and is in the enjoyment of health.*

* In this case, the history of the attack at once points out its nature, and the mode of treatment proper to be pursued; yet the local characters of the palpitation serve very well to illustrate the close resemblance these symptoms bear to organic disease, if not viewed in con-

CASE.—A young lady, 20 years of age, who had indulged in the pernicious and most destructive discipline of tight lacing, to preserve the symmetry of her figure, and had also, by a systematic course of starvation to preserve its delicacy, deranged the various functions necessary for the preservation of health, as might be expected, gradually made herself irritable and nervous. The heart soon participated in the general disturbance, and, to her other troubles, she became a martyr to palpitation. She could not bear to lie down, because of the heart's pulsations, which she was constantly counting; she had at times the fear of suffocation; her appetite, which she had long refused to gratify, in the course of time left her; an annoying dry spasmodic cough, the sound of which was noisy and metallic, supervened; her legs swelled; and feeding her imagination with every kind of apprehension of evil, she became so reduced and so irritable, that she was obliged to withdraw from society. She always described the movements of the heart as of a fluttering kind, accompanied with a sensation of sinking, and a feeling of emptiness in the epi-

junction with the general symptoms of constitutional disorder.

gastrium. They varied much in regard to the degree of intensity; and at times, even when she complained of them as very distressing, they were scarcely perceptible to the observer. The sound proceeding from the contractions of the chambers of the heart, always appeared clearer and louder than natural. The treatment of this case was consonant with the diagnosis, which clearly showed nervous palpitation. First, a change in the habits, and especially the style of dress was effected. She was subjected to a course of antispasmodic medicines, combined with digitalis. Afterwards she took mineral and vegetable tonics, and her restoration was completed by a change of air and scene. The aperient medicine she used was the aloetic and the compound asafœtida pills.

Case.—A gentleman, not 40 years of age, of a nervous temperament, had been for several years successively more and more unfortunate in business, fell into a low state of desponding melancholy, and general ill health. His tongue became white and furred, his bowels obstinately costive, and he lost his appetite; was thirsty, and suffered from a continued state of obscure or masked

fever, of a low debilitating kind. During the time he was in this condition, which lasted for several months, he complained occasionally of paroxysms of palpitation, which were accompanied with dyspnœa, insomnolency, and a distressing feeling of anxiety in the præcordial region. His pulse was small and sharp, his face pale, and his expression partook much of the vacant fixed stare of approaching mental derangement. He had been liable to epilepsy in his youth, and had suffered from St. Vitus' dance, at the age of thirteen years. The movements of the heart during palpitation were so tumultuous and irregular that they could not be analysed by the stethoscope ; but they were by no means strong, if we except an occasional hard thump every now and then against the parietes of the thorax. He described them as resembling something rolling about in the chest. Once or twice he compared them to the irregular efforts of an animal confined there, and struggling to make its escape ; and the similitude was not inappropriate. He was next affected with hæmoptysis, and symptoms of subacute pericarditis supervened. He complained of a sharp pain, darting at times through the chest, and passing to the shoulder and side of the neck ; also

of a constant dragging, and extremely distressing sensation in the site of the diaphragmatic attachment of the pericardium, which was increased on making a full inspiration, and by pressing the cartilages of the ribs against it. This, indeed, he could not bear. On the cessation of the hæmoptysis he was harassed with a troublesome cough, attended by a copious expectoration of a somewhat purulent character. During the existence of these latter symptoms, he was several times affected with fits of syncope, which occurred without any evident cause. His father was reported to have died of disease of the heart ; and had this state of matters been allowed to progress, doubtless the son would also have fallen a sacrifice to the same malady. The history of the case declares its character to have been at first a nervous spasmodic palpitation, symptomatic of the enervated condition of the whole system, on which supervened subacute pericarditis ; and the treatment was in accordance with this view of the disease. The condition of the primæ viæ, and his state of mental depression, although primarily induced by misfortune, yet in a great measure kept up and aggravated by the derangement of the alimentary canal, claimed first attention. This patient was

well purged with calomel and colocynth every other day, properly dieted, and subjected to a course of antispasmodics and digitalis, with a view to relieve the palpitations. On the supervention of the inflammatory symptoms, the antispasmodics were suspended; leeches were repeatedly applied to the seat of the pain, to the number of sixteen and twenty at a time, and blisters were placed in the immediate neighbourhood. He continued to take the digitalis, and was put upon a gentle mercurial course, with the use of a warm bath twice a day. In about a month's time the inflammatory symptoms completely yielded, but the palpitations continued. He again had recourse to bitters and mineral tonics, and ultimately recovered.

Sympathetic palpitation presents itself to us under several varieties, according to the system or organ with whose primary derangement the heart sympathises. That such causes of sympathetic disturbance must be numerous we can readily conceive, when we reflect on the various changes of *quality* which the blood itself may undergo, and on the intimate connexion which exists between the function of the heart and those of the cerebro-spinal, respiratory and digestive systems. The

distinction of the several varieties now alluded to is not simply a matter of methodical arrangement, but one of great importance in practice, because the diagnosis of functional disorder in each case, and its appropriate treatment, mainly depend on an accurate knowledge of the different primary disorders with which the sympathetic disturbance of the heart is connected.

CHAPTER VII.

ANÆMIC AND UTERINE PALPITATION.

Of all the forms of passive palpitation, by far the most frequent is that depending on an anæmic condition of the system. In females, this state of the constitution is very often associated with, or gives rise to, increased irritability of the nerves; and hence the numerous distressing cases of palpitation which are met with every day in females, even at an early period of life. The causes and general symptoms of anæmia are too well known to require any notice here. Whatever reduces the proportion of the red blood globules below a certain proportion may become a cause of this constitutional state, and the symptoms are more or less significant of the deteriorated quality of the circulating fluid.

Anæmia exists in all well marked cases of chlorosis, and the functional disorder of the heart, so often occuring in chlorotic females, may, therefore, be included with propriety under this head. Dr. Hope and M. Bouilland, have both remarked that this variety of functional palpitation is more likely than any other to be mistaken for organic disease of the heart. Indeed, the latter writer assures us that he has seen hundreds of cases where this serious error was committed even by experienced practitioners.

The general symptoms in anæmic palpitation depend, of course, mainly on the constitutional state of the patient. We have the pallid, exsanguineous condition of the cutaneous and mucous surfaces—the leaden, chlorotic hue—muscular debility—faintness—breathlessness from slight efforts—dizziness—ringing in the ears—headache—deranged or profuse menstruation. The pulse is quick, sharp, irritable, and presents a thrilling, *jerking* character, peculiar to anæmia. The impulse of the heart is likewise abrupt; that organ throbs in a very remarkable and distressing manner; and, as I have said before, the palpitations, whenever severe or temporarily augmented by any exciting cause, are accompanied by the weak bellows murmur of

functional disorder, and constantly by the continuous hum in the large veins. From the above brief description, it will be manifest that anæmic palpitation presents many of the characters of organic disease of the heart, and that some care is required to discriminate the sympathetic from the structural derangement. The differential characters will be fully noticed under the head of diagnosis. In the meantime I cannot avoid remarking how easily the mere routine practitioner may, under the circumstances now described, have his attention withdrawn from the real and primative nature of the disorder, and erroneously direct all his energies to the relief of the sympathetic affection of the heart. Such would be an unfortunate and fatal mistake; for how different ought to be the treatment in opposite conditions of the system—in the delicate, anæmic female, and in the stout, plethoric one. Blood-letting, purgatives, and low diet, on the one hand; iron, antispasmodics, diffusible stimuli, and generous living, on the other hand.

Uterine Palpitation.—Nearly allied to the preceding variety is functional derangement of the heart from disorder of the uterine secretion. Whenever the menstrual flux is morbidly in-

creased, or diminished, or comes on at irregular periods, we may have sympathetic palpitation, sometimes arising from the nervous consent which exists between the heart and uterus, but often, likewise produced by simple disturbance in the balance of the circulation. The kind of palpitation will thus be modified, according to the peculiar derangement of the uterine function with which it is associated. In cases of profuse menorrhagia we may naturally expect to find anæmic palpitation; with irregular menstruation the purely nervous or hysterical palpitation is most likely to occur; and when the menstrual secretion is diminished, or altogether suspended, we have disturbance of the circulation, extending to the portal system, and thence to the right side of the heart, giving rise to every degree of congestive palpitation. The irregular action of the heart in young females about the period of puberty is familiar to all medical men; and, as Dr. Wardrop has judiciously remarked, "It is this influence of a disordered uterus on the heart which causes many of the more remarkable symptoms of the hysteric paroxysm; the change in the heart's functions producing syncope, and deranging the functions of the cerebro-spinal sys-

tem, which disturbances of the circulation the economy restores by the vomiting, convulsions, &c., so remarkable in hysteria." (*l. c.* p. 479.)

Hysteria has been mentioned by all writers on diseases of the heart as a frequent cause of nervous palpitation, and there can be no doubt that the two affections very often co-exist in the same individual; but the ingenious views of Dr. Wardrop render it questionable whether the hysteric paroxysm may not often be the result of the disordered action of the heart instead of its cause, as has been generally believed. "Hysteria," says Dr. Wardrop, "may, I think, be distinctly shown to be most commonly symptomatic of an affection of the heart; the various symptoms which characterise it being all referrible to changes in the distribution of the blood in the cerebro-spinal system, and the hysteric paroxysm being always preceded or accompanied by more or less violent palpitation.

"Among the most striking symptoms of hysteria may be enumerated palpitation of the heart, dyspnœa, involuntary movements of the muscles, temporary disturbance of the intellectual powers, screaming, sighing, sobbing, weeping, laughing; all these being instinctive acts of the economy,

which are employed by the *vis conservatrix* to restore a disturbed circulation." (*l. c.* p. 172.)

The troublesome palpitations which sometimes occur during pregnancy are often evidently referrible to this principle of disordered circulation.

This is particularly the case when the palpitation occurs during the latter months only, when the mechanical action of the enlarged uterus obstructs the free passage of blood through the abdominal vessels, and throws it back upon the right side of the heart. In many other cases, however, the disturbance of the heart during the latter period of gestation can be clearly traced to some disorder or irritation of the stomach and bowels. Some females, on the other hand, are subject to severe and distressing palpitation during the whole course of their pregnancy, and here we can only attribute the disorder to that increased susceptibility of the nervous system which occasionally manifests itself as an effect of impregnation.

Dysmenorrhœa and a total suppression of the menstrual discharge are, as I have remarked, very frequently attended by palpitations. In the stout plethoric girl the affection is usually of the active kind, and may be accompanied by many other

symptoms indicative of the full habit thus induced. The following case will serve very well to illustrate the nature and ordinary phenomena of such an attack :—

Case. — During menstruation, a stout plethoric girl had some cold water spilled accidentally upon her legs and feet. The secretion ceased in a few hours afterwards, and did not return for several periods. In the meantime she became affected with pain in the loins and thighs, headache and giddiness, and general febrile irritation. She was attacked with hysteric epilepsy ; the heart sympathised ; she had palpitation and other symptoms of constitutional disturbance. On listening to the action of the heart, it did not beat over a greater extent than natural, and there was no dull sound more than usual on striking over the præcordial region. There was no preternatural sound accompanying the contraction of the cavities, and the increased action, constituting the palpitation, was universal. In this case there was, of course, no organic disease of the heart ; and the administration of such remedies as relieved the congested system, generally and locally, and restored the menstrual dis-

charge, dissipated the palpitation and induced health.

In connexion with this part of my subject, I cannot omit to notice the influence produced in some females, at a certain period of life, by the cessation of the catamenial, or monthly secretion. A state of nervous plethora is very often generated at this period, and which is accompanied by most troublesome and obstinate palpitation. These cases, from the age at which they occur being that more peculiarly characteristic of organic disease of the heart, are very liable to be mistaken; and it is of the utmost importance, that, by the use of the stethoscope, with great attention to the constitutional symptoms, a correct diagnosis be formed; for by an inaccurate opinion, a course of treatment might be pursued highly prejudicial and improper. It must not be supposed, however, that palpitations occurring at the cessation of the catamenia, are necessarily always accompanied by symptoms indicating plethora. There are many individuals, who, at this important period of life, fall into a state of low, irritable nervousness, the very reverse of a plethoric state, and in this condition palpitation is

even more inveterate and distressing. It is very necessary, then, that practitioners should be aware of the existence of these two opposite conditions of the system, and prepared to meet with functional disorder of the heart, as a result of either of them; otherwise, in numerous instances, they will attribute much more importance to the leading phenomenon, *palpitation*, than it really merits; and, in anxiety to subdue this symptom, of which the patient may principally complain, be led to pursue a line of practice the very reverse of that which would be attended with ultimate success.

CHAPTER VIII.

PALPITATION FROM DYSPEPSIA, POISONOUS SUBSTANCES, SPINAL IRRITATION, GOUT, RHEUMATISM, AND DEBAUCHERY.

Dyspepsia, and disorders of the alimentary canal, are very frequent causes of sympathetic palpitation. Even the introduction of any offending matter into the stomach may often excite fits of palpitation in persons who were previously healthy and free from habitual indigestion. Examples of this influence present themselves to us in practice every day; and although the paroxysms of palpitation from accidental indigestion are usually not severe, nor of long duration, we now and then meet with unfortunate cases in which the ingestion of a single offending substance has excited palpitation that lasts for years. I have known nervous and excitable individuals experience the most severe paroxysms in consequence

of having eaten too freely, either of generous food or of an article of diet which, from peculiarity of constitution, was difficult of digestion.

In some cases, indeed, the distress will continue long after the offending cause is removed ; and it occasionally assumes a degree of obstinacy almost incredible. The subjects of this form of palpitation are usually nervous ; the palpitations are irregular, tumultuous, and accompanied by accelerated respiration, or more or less difficulty of breathing. Derangement of the biliary secretions is likewise a frequent cause of sympathetic palpitation, particularly of that variety which precedes attacks of gout. All these dyspeptic disorders derange the circulation in the portal system, throw the blood back on the right side of the heart, produce congestion, and thus ultimately excite the functional derangement now described.

Flatulency of the stomach is also a well-known exciting cause of palpitation ; but in such cases the effect is probably more mechanical than sympathetic, and arises from displacement of the heart by the distended abdominal viscus. This view is confirmed by the fact that palpitation from this cause is more severely felt when the

individual assumes the recumbent posture. The occurrence of sudden death from the introduction of ice-cold fluids into the stomach, can only be accounted for in a rational manner on the supposition that, the violent impression made on the nerves of the stomach produces instantaneous and fatal congestion of the heart.

When this form of palpitation depends on chronic or intractable disease of primæ viæ, the severity which it may assume is quite astonishing. I could give several cases illustrative of this from my own practice; in short, the instances are innumerable. The following, extracted from the Hospital Reports of *La Pitié*, is particularly worthy of notice :—

Case.—An old man, 74 years of age, who had been a soldier in the Imperial and Republican armies, became subject to dyspnœa and palpitations, which had lasted for several years when he was admitted into the hospital. He then presented the following additional symptoms :—voice interrupted; pulse irregular, frequent; beating of the heart strong and rapid; elevation of the parietes of the thorax; decided *bruit de soufflet* during the contraction of the ventricles. He was

unable to breathe freely except in the erect posture ; the lower extremities were œdematous, and fluctuation was felt in the cavity of the abdomen. Eight days after admission he complained of acute pain in the præcordial region ; the dyspnœa and palpitation increased ; prostration ensued ; the tongue became dry ; the pulse acquired an extreme degree of frequency (140 in a minute) ; the intellect became clouded ; and, he expired.

This might fairly have been regarded as an example of progressive organic disease of the heart of the most complicated character ; and such it was considered by Velpeau. A *post-mortem* examination, however, demonstrated that the heart was in every respect perfectly healthy ; and that the symptoms arose entirely from sympathetic irritation, proceeding from extensive disorganising inflammation of the mucous membrane of the stomach. Dr. Abercrombie, in his observations on diseases of the stomach, observes, that "Sympathetic affections of the heart are often among the most troublesome symptoms that accompany affections of the stomach, and are always the most alarming to the patient. They appear," says he, "under various forms, and often

assume, in a very great degree, all the characters of fixed disease of the heart or large vessels." A case is recorded by Dr. Stokes, in his Lectures on the Theory and Practice of Medicine, wherein the latent disorder proved to be subacute enteritis. In the remarks of this scientific practitioner, there occurs an axiom worthy of being again recorded. "There was," observes he, "no abdominal tenderness whatever, a fact illustrative of the great law which so particularly applies to gastro-enteritic disease; *that when the sympathetic affections are prominent, the ordinary or local symptoms are usually latent.*" Let us, then, be ever careful and on the alert, in all cases of palpitation which we have reason to believe acknowledge a sympathetic origin.

Among the sources of irritation to which the intestinal canal is exposed, there is none of which abnormal action of the heart is a more frequent and obstinate attendant than vermination, particularly when the parasite is a tape-worm. This kind of irritation usually occurs at an age when the excitability of the system is very great, and the patient most susceptible of sympathetic influence. The following case, successfully treated, will afford a marked and distressing illustration of this fact :—

Case.—A young lady, 22 years of age, was affected not only with the ordinary symptoms of tænia, viz., fixed pain in the left hypochondriac region, voracious appetite, restless nights, disturbed dreams, febrile exacerbations, occasional syncope, and other similar phenomena; but she suffered, likewise, distressingly from periodic attacks of sympathetic palpitation, accompanied at times by great cerebral excitement—to such a degree, indeed, that she was obliged to pass the night in an upright position, in an easy-chair, otherwise she became temporarily delirious—a state which, on several occasions, threatened to assume a lasting character. The oppression and sense of suffocation she endured during the more violent paroxysms, were truly distressing, and would have led any one, not conversant with the diagnosis of organic disease of the heart and lungs, to suspect that something beyond morbid sympathy created the extreme constitutional derangement she suffered. During the paroxysms, the heart, it is true, beat most violently, and with a loud, clear sound; the latter, however, proved that the organ was not affected with hypertrophy, for then the sound is generally dull and obscure. The attacks were periodic, and

occurred always, half an hour or so, before the regular hours of repast, and were relieved by repletion. This would scarcely have been the case had the palpitations depended upon structural disease. The action of the heart was not greater at one part of the præcordial region than at another, nor was the sound louder in any particular situation. The action of the organ was regular, though quicker and more forcible than in a state of health. The entire organ appeared to labour under an increase of irritability, and the consequence was, that every part acted more energetically than it should have done. Now in structural disease we generally find that one part of the heart acts out of order ; one ventricle, or one auricle, or if the disease be extensive, both auricles, or an auricle and a ventricle, or an auricle and both ventricles, may simultaneously be in a state of morbid action. In such instances as these, it is by negative circumstances that we determine the non-existence of disease ; and this is, perhaps, in some cases, more easily decided in an advanced stage, than in those to which we are called at an early period. In all cases of organic diseases of long standing, we have either some pulmonary affection of a permanent nature,

dropsy, emaciation, a peculiar and characteristic expression of countenance, temporary confusion of the intellectual powers, or some other constitutional change to materially assist our judgment. Morbid indications ought to be considered generally, as well as in relation to each other; and when attentively examined in these two positions, if the practitioner possess ordinary tact and penetration, the diagnosis will, for the most part, be accurate, scientific, and practical.

The lady whose case I have just related was treated with daily doses of oil of turpentine, jalap, calomel, colocynth, and other purgatives. The irritation of the system was relieved by the frequent application of leeches to the temples, the employment of refrigerants to the head, and the internal use of antispasmodics, such as valerian, castor, camphor, hyoscyamus, and opium, as the varying circumstances of her case demanded; and her restoration was finally completed by a course of vegetable and mineral tonics. During the space of fourteen months she voided, in separate portions, many yards of tape-worm, varying in length from an inch to upwards of a foot and a half. She is now in the enjoyment of perfect health.

From Poisonous Substances.—This may, perhaps, be the place to notice the effects produced on the heart by the influence of certain agents which seem to act on the economy after the manner of poisons. Every one knows that the habitual use of strong green tea is apt to excite constitutional disturbance of the heart, often amounting to paroxysms of severe palpitation. The effect, here, depends, in all probability, on the poisonous substances which are employed by the Chinese to give green tea its peculiar taste and colour. A strong infusion of coffee sometimes gives rise to the same disturbance of the heart; although the usual effect is rather to produce more or less excitement of the circulation than actual palpitation. Tobacco smoking, when carried to excess, is also a very frequent cause of the nervous disorder now alluded to. The paroxysms, in such cases, are seldom very severe, but they come on constantly towards evening, and are always excited by any additional dose of the poisonous "weed" — by that species in particular which is denominated "grass-cut." The use of the Manilla cheroot, even in moderate quantity, will often, in a slight degree, excite the heart—an effect which we may attribute to the small

quantities of opium mixed with Eastern tobacco.

From Spinal Irritation.—In considering functional derangements of the heart as proceeding from disease or from simple irritation of the sympathetic nerves, pathologists have, as they are more liable to become disordered, too exclusively confined their inquiries rather to the more central and important portions of the system, than to the more distant ganglia and plexuses. These latter, are, however, occasionally disordered, and it is reasonable to conclude, may thus exercise an injurious influence on the organ and parts to which their ramifications are distributed.

It has been alleged that spinal irritation or inflammation may, now and then, be traced as the source of paroxysms of palpitation. I have witnessed cases of this kind, but not frequently ; and I am satisfied the sympathetic influence may materially aggravate existing disorder of the heart's function, emanating from other sources. I am not prepared to allow that the power of the ganglionic nerves primarily and wholly proceeds from the brain, though intimately connected with, and in some measure dependent on, the cerebral system ;

and as the nerves of sensation, that run directly from the spinal chord to the central organ of circulation, are comparatively few in number, I apprehend, that when diseased, either at their origin, in their course, or ultimate ramifications, they are more likely to produce painful sensations than derangement of function; admitting, still, that ultimately both disordered function and diseased structure may be induced, for impaired energy of any part of the nervous system must materially influence an organ dependent upon it for health and energy. I have been enabled to trace palpitations to spinal irritation; but I think the phenomena were induced through the intervention of the cervical ganglionic nerves. Some years ago, my esteemed friend, Mr. Thomas Teale, one of the Hospital Surgeons, at Leeds, published an Essay on "Neuralgic Diseases, dependent upon irritation of the Spinal Marrow;" and he writes, "Palpitations unconnected with any structural disease of the heart, are not of unfrequent occurrence. They are generally considered as dependent upon some disease of the nerves of the heart, from which they are designated 'nervous palpitations.' As far as I have observed, all ages are liable to the complaint, and

nearly in an equal degree. Both sexes appear equally obnoxious to it; perhaps, however, the preponderance may be given to the female. These unnatural beatings, or contractions of the heart, at the commencement of their attack, or when they exist but in a slight degree, occur in paroxysms at distant intervals, and only after exercise, or in consequence of some mental emotion; and after a short interval of quietude, gradually disappear. As the complaint advances, the paroxysms become more frequent, violent, and of longer duration: they are produced by slighter causes, until, at length, the heart becomes so irritable, that the mere act of walking, or of speaking—changes of position, from sitting to the erect posture, and the reverse; the slightest mental agitation—in fact, any cause, sufficient to produce a momentary, though slight, increase to the influx of blood to the heart, becomes sufficient to disturb the harmony of its contractions. The interval of the paroxysms gradually becomes less and less distinct, until at length the state of irritable, incomplete, and irregular action, is seldom or never superseded by regular, decisive, and rhythmical contractions." This train of symptoms, Mr. Teale assures us, he has satisfactorily traced, in numerous

instances, to "a morbid state of the *cervical ganglia* of the sympathetic nerves."

These palpitations are often attended with other symptoms peculiar to, or dependent upon, the same disease of this portion of the ganglionic system. There are pains in the heart and lungs, or the patient may complain of a dull aching sensation, situated in these parts, more decidedly referrible to the heart itself, though often felt through a part, and sometimes the whole of the pulmonary structure. These pains are often compared to those of rheumatism; occasionally they are seated in the upper portion of the aorta, and pursue somewhat the course of the carotids and subclavians. The muscular apparatus of the bronchial tubes is occasionally affected with spasm, producing a true asthma. This affection of the ganglia is generally attended with disease of the adjacent portion of the spinal marrow. Hence we find nervous palpitations and neuralgic affections of the heart and lungs accompanied with certain symptoms referrible to the cervical spinal nerves; such as pains of a variety of kinds, numberless tremors and weakness in the arms, and upper and anterior parts of the chest. Upon the whole,

these pains exist most frequently and most intensely on the left side of the body.

It will not be travelling very far from the subject of this work, to devote a few pages to the consideration of diseases of the lungs induced by spinal irritation, for many are attended by palpitation; and I will therefore mention one interesting case I had lately under my care in which the paroxysms of palpitation were very severe, uncertain in their approach and duration, accompanied by the varied pains before mentioned, and with all the threatenings of phthisis. The case was that of a young lady of delicate organization and susceptible system. She had been ill more than two years, and the general, as well as pectoral symptoms, caused a belief that she was consumptive. A careful examination by percussion and the stethoscope, induced a different opinion in my mind, and, on drawing the fingers gently down the spinal column, a small lateral curvature was detected, with considerable pain on pressure; the pressure on the spine brought on pain in the chest, palpitations, and cough. Leeches, frictions, and fomentations to the spine relieved the tumultuous movements of the heart more than any other remedies.

Under the idea that she was going rapidly into a consumption, though contrary to my advice and opinion, she was taken away to her native air. It is nearly a year since she left Nottingham ; but she has continued, in a great measure, the treatment I recommended, and I understand her health is materially improved. Now, when palpitations arise from the cause just discussed, it is quite clear the ordinary routine plan of treatment by anodynes, antispasmodics, and tonics ; bleeding, digitalis, and prussic acid ; by electricity or magnetism ; or by irritants and depletory measures, applied to the anterior parts of the chest, must fail in affording relief ; and many of these remedies are very likely materially to aggravate the disease.

It is in such cases that the unfortunate victim of nervous palpitations, or of disease of the lungs from nervous irritation, after having repeatedly changed the medical attendant, and tried in succession innumerable remedies, is obliged to endure with more or less patience the distressing malady, consoled by the assurance, that it is "seldom attended with danger." But let such a patient be treated with reference, not to the symptoms only, but to the primary origin of the distress, and I have sufficient practical experience to warrant me

in asserting, that there is a reasonable and probable chance of a speedy and permanent cure.

From Gout and Rheumatism.—The tendency of the heart to be affected in cases of acute rheumatism is now so familiarly known to every practical man, that little need be said on this head. To Dr. Pitcairn is due the merit of first having directed attention to the fact. Afterwards, Dr. Baillie, Sir David Dundas, Dr. Wells, and others, published various papers on the same subject in the Medico-Chirurgical Transactions; and, more recently, it has attracted the attention of all practical men. Disturbance of the heart's action likewise takes place, either among the premonitory symptoms of gout, during the paroxysms of that disease, or, more frequently still, on its sudden disappearance from the joints or external surface of the body. This gouty affection of the heart has been more fully and carefully described by Dr. Wardrop than by any other writer with whom I am acquainted.

Rheumatic palpitation of the heart is, in my opinion, always dependent on an inflammatory affection of the heart (endocarditis) or on pericarditis, and cannot, therefore, be ranked among

functional disorders. The palpitations are often distressing, and accompanied by considerable anxiety ; but their nature, extent, and duration, will be essentially modified according to the period of the disease, the amount of effusion, &c. The pulse is sometimes intermittent, and we frequently observe some pain shooting up to the left shoulder. Gouty subjects are still more frequently attacked by paroxysms of palpitation. The blood in this disease, is evidently vitiated in quality, and contains a foreign matter, the urate of soda ; patients labouring under gout are generally of a plethoric habit, and these two circumstances, as I have already shown, are eminently favourable to the development of functional disturbance in the heart. Still it appears more than probable that gouty, like rheumatic palpitation, depends essentially on translation of inflammation from distant parts to the heart itself. This is the more recent opinion, and with it I fully coincide. The only cases where any doubt can exist, are those in which the tumultuous and irregular palpitations, accompanied by a distressing sense of sinking at the præcordial region, manifest themselves, as they sometimes do, with the premonitory symptoms of gout, before

any signs of inflammation appear in the external tissues. The digestive and biliary secretions are often at the same time considerably deranged ; and the heart's disturbance might, with some appearance of truth, be attributed to the sympathetic influence of these systems. This is a point on which much obscurity still prevails ; but, on mature consideration, I believe that the safest conclusion is the one at which I have already arrived, namely, that any considerable disturbance of the heart's action in gouty subjects should be attributed to inflammation of that organ. The chronic endocarditis of gout or rheumatism often continues for years without much structural change, or any prominent signs of organic disease ; the bellows murmur occurs every now and then in cases of this kind, and when palpitation, from any occasional exciting cause, is superadded, we have a condition which it is extremely difficult to distinguish from functional disorder, because the patient appears to be perfectly well during the intervals.

Palpitation from Debauchery.—There is one species of palpitation, arising from sensual indulgence and debauchery, which has not been much discussed by English physicians, but which is far

too important to be passed by unnoticed. The cause of it unhappily prevails more than is generally imagined, and is unfortunately too often acquired in early life, casting a baleful influence over the brightest prospects of youth, and sending to a premature grave the loveliness of woman, and the strength of manhood. I have had several severe cases of palpitation from this cause, accompanied with other functional and organic derangement ; but in a work of this kind they cannot be more particularly noticed.

Several very interesting cases are recorded by Dr. Krimer, of Aach, in "Hufeland's Journal" for 1827, and also in the "Medical Gazette," vol. i., p. 582; and these observations are corroborated in the notice of Dr. Marshall's very valuable practical work on Spinal Irritation, inserted in the "Medico-Chirurgical Review." The subject is there discussed in reference to some of the cases. I will quote the leading points in Dr. Krimer's communication, the accuracy of which I can confirm.

Headaches, great anxiety, palpitations, faintness, oppression, and unusual sensibility in the epigastric region, are the first symptoms. These increase in proportion to the sensual indulgence ; and quickly diminish or decrease as that indul-

gence is abandoned. He enumerates the following as pathognomonic symptoms of nervous affections of the heart resulting from this cause ; and by some care the practitioner may distinguish the train of symptoms from other diseases, which are not unfrequently suspected :—

1. The hair loses its natural brilliancy, is remarkably dry, and frequently splits at the extremities. It falls off easily and in large quantities, especially from the fore part of the head. Whilst, in persons affected with consumption, or organic disease of the heart, the hairs appear well nourished, and rarely fall off.

2. The eyes are dull, downcast, frequently full of tears, and without expression, and deeply sunk in their orbits. The edges of the eyelids are reddish, and surrounded by a bluish tint ; while in phthisical patients and those labouring under organic disease of the heart, the eyes are brilliant, and always preserve their natural expression and vivacity. In young females, at the approach of menstruation, a blue circle is commonly observed around the eyes ; but here, also, their brilliancy is undiminished.

3. The patient appears very timid and unwilling to look other people in the face.

4. Periodical headache is common, extending from the occiput to the forehead.

5. The power of sight is diminished, the appetite lost, the tongue is usually loaded. A light cough, short and difficult respiration, are generally present, but still the patient can draw a deep inspiration.

6. Pains in the stomach, with weight and pressure in the epigastric region ; while patients with organic disease of the heart have occasionally those symptoms, but then they are unaccompanied by those above-mentioned.

7. A general feebleness of the limbs, or a feeling of lassitude, with pains in the lower part of the back.

8. The perspiration has a dull and sweetish odour, similar to that of infants at the breast.

These are the most important signs ; and though there is great difficulty in managing these cases, and that in proportion as the pernicious habits of indulgence have been long continued, still, the difficulty only renders the more necessary accurate diagnosis, and the more guarded the treatment ; such cases are not to be despaired of. Serious functional derangement will follow the excitement and depression of the nervous system,

organic change will precede the fatal termination of the case ; but by judicious treatment, following correct views of disease, present benefit and permanent cure may be obtained. An excessive indulgence in conjugal pleasures may also give rise to many of the symptoms described in the preceding sections.

CHAPTER IX.

FUNCTIONAL DISORDER OF THE HEART WITH DIMINISHED ACTION.

I HAVE hitherto considered only those cases of functional disorder in which the heart's action, being more or less increased, gives rise to palpitation; but there is an opposite state to this, consisting in diminished energy of this organ. The precise nature of this condition is still very obscure, nor has it been studied with the same care which writers have bestowed on active disorders of the heart. In these latter, palpitation is the most prominent symptom; in the form now referred to syncope is the principal once.

Diminished action of the heart, giving rise to faintness or actual syncope, may be the result of excessive loss of blood, of the sudden derivation of blood from the heart, or of diminished nervous

energy. The syncope and other disorders which follow a diminished supply of blood to its central organ are too well known to require any description here; but the effects of diminished nervous energy are less understood, and not always to be traced to their efficient cause.

Depressing passions, poisonous substances, excessive pains, or violent shocks to the nervous system are the most common causes which lower the action of the heart. In some cases, however, we seek in vain for any apparent cause for the distressing symptoms which present themselves. Thus a patient is subject to fits of sinking, not amounting to actual syncope, which may last for an hour or two at a time. They begin with efforts at vomiting; after which the countenance becomes deadly pale and sunk, the patient feels as if he were about to die; the respiration becomes panting, the pulse is absent at the wrist, and the beats of the heart are all but imperceptible. During the intervals, the patient appears to be perfectly well, and no abnormal sounds or other signs of organic disease can be discovered in the heart; yet death may occur suddenly, and the heart be found completely free from structural change. Dr. Graves, of Dublin, who has related

some instructive examples of this form of disease, (*Clinical Lectures*, vol. ii., p. 182,) remarks how difficult it is to distinguish it from the effects of organic lesion.

There are some other diseases of the heart which, like the one now noticed, do not afford us any audible symptoms, or alter its action. For example, when the coronary arteries are ossified, there is no difference in the sounds, the action of the heart is not increased, neither is it discoverable over a greater extent of surface than when in health.

Palpitation, however, may accompany this state of the organ, and under such circumstances an accurate diagnosis can never with certainty be formed. Ossification of the coronary arteries is a pathological change, of the existence of which, in any particular case, we cannot arrive at positive knowledge, though our suspicions may be such as to amount to conviction in our own minds.

It is, in fact, astonishing to what an extent ossification of the heart itself may proceed, and, in some instances, without presenting any evidence during life of the change taking place. A remarkable example of this fact is recorded in the Glas-

gow "Medical Journal" for 1830, wherein it is stated, that on a post-mortem examination it was discovered, that nearly the whole of the right auricle, and fully one half of the corresponding ventricle, were found invested with a thick and rugged deposition of ossific matter. An osseous lamella half an inch in breadth, nearly surrounded the heart, following the course of junction between the auricles and ventricles. The parietes of the left ventricle were marked by numerous striæ of bone, corresponding with the course of the coronary vessels ; and on its upper and lateral surface an irregular plate of bone, an inch and a half long and three quarters of an inch broad, was deposited. This individual died suddenly, but during his life suffered no inconvenience sufficient to lead to an inquiry into the nature of the change that was taking place.

CHAPTER X.

NEURALGIC DISORDER OF THE HEART.

The affections included under this head may be divided into two parts ; one composed of the disease well known under the name of *angina pectoris;* the other comprising the less severe and undefined painful disorder, which occasionally have their seat in the heart itself, or in the nerves of the præcordial region. The pathology of angina pectoris is still a matter of doubt : but whatever view we may take of its nature, it is certain that the sensory nerves of the heart, like those distributed to other organs, may occasionally be the seat of pain. This, indeed, occurs more frequently than we should be led to suspect from the little

notice bestowed on it in medical works ; yet there are few persons who have not experienced at some period or another during their lives, the uneasy sensations to which I now allude. Nervous and hysterical females are peculiarly subject to them ; they are often present during dyspepsia, or are excited by flatulency of the stomach. Plethoric persons of the male sex may also be more or less affected by them, and we know that local plethora, or any local excitement of arteries in the vicinity of nerves, is one of the most frequent determining causes of neuralgic pain. When connected with plethora, the pains are generally of a dull and heavy kind. In nervous subjects they are more acute and darting. The pain may be deep-seated, appearing to occupy the tissues of the heart ; or, as is much more frequently the case, it may have its seat in the præcordial region ; it may be confined to this part ; but frequently, likewise, the painful sensations extend along the nervous branches to the mamma, stomach, sides of the neck, or even to the left shoulder and arm. The duration and intensity of the pains vary infinitely ; but in the form of attack now under consideration, they are never extremely severe, and when they continue for any length of time,

are for the most part undefined, appearing and disappearing at uncertain intervals.

Palpitation often accompanies these painful sensations, which I am disposed to regard as of a neuralgic nature; the disorder of the sensory nerves involves the motor filaments; or the same original cause which disturbed the one set of filaments may derange the functions of the other likewise. This combination of palpitation with neuralgic pain of the heart presents itself under a very severe form in persons subject to gout when the constitutional symptoms of that disease set in without having been preceded by any local inflammation. Here, however, it is much more probable that the disturbance of the heart's action arises from gouty inflammation of its membranes, the painful sensations being merely superadded.

Dr. Seymour, of St. George's Hospital, has described a peculiar condition of the heart, which he ascribes to over-exertion of the organ, and in which deep-seated pain, though not of a violent kind, is conjoined to severe palpitation. The cases described by Dr. Seymour are evidently examples of congestion of the heart, accompanied by pain; and the diminution in the vigour of the pulse at the wrist, "the artery appearing as if

there were no blood in it," which he notices as a remarkable symptom, is now well ascertained to be a usual effect of cardiac congestion.

Again, organic disease of the upper portion of the spinal chord may manifest itself by functional disturbance of the heart, which completely masks the symptoms of the original disease. Several cases of this kind are on record; the patients chiefly complaining of irregular, tumultuous palpitation, with pain in the region of the heart, and the cause of the cardiac disturbance, viz., softening of the spinal marrow, not having been discovered until after death.

The neuralgic pains now referred to may be confounded with those of angina pectoris. In fact, when they are very severe, it is impossible to distinguish them from the milder forms of that disease. From fully established angina, or that form to which the name more properly belongs, they may be distinguished by their never coming on in the violent fits characteristic of angina; the respiration is never affected, or during the latter disease, there is not the same tendency to syncope, or the same feeling of approaching dissolution, and the attacks never assume the paroxysmal character so peculiar to those of genuine angina.

Neuralgic pains of the heart may be associated with all the various degrees of nervous palpitation. The combined malady then becomes very distressing; for the moral effect on the patient is greatly aggravated, the presence of pain during the fits of palpitation convincing him that he is subject to some organic heart disease of the most serious nature. Unprofessional persons are always accustomed to associate together the ideas of pain and danger; yet the physician well knows that the most fatal maladies are often the least painful. Fortunately the combination is a rare one; for the general rule, according to my experience, is, that the action of the heart does not undergo much disturbance from derangement of its sensory nerves; and the converse of the proposition is equally true. Patients may labour for years under more or less severe and prolonged palpitation; yet the sensory nerves of the heart remain unaffected. When palpitation does coincide with pain, especially if both originate at the same period, it is more reasonable to attribute the increased action of the heart to the same cause which deranged its nervous sensibility, viz., plethora, dyspepsia, irregular menstruation, &c.

Angina pectoris should, I believe, be ranged

among functional disorders of the heart, and I shall therefore here briefly notice it, referring for a more detailed description to the numerous authors who have devoted their attention to this formidable malady. The precise nature is not yet clearly ascertained; at least a great variety of opinions prevails among the most experienced physicians on this part of the subject. Dr. Brown referred angina to spasm of the heart; Dr. Parry, Burns, and others, to ossification of the coronary arteries; Dr. Hosack attributes the disease to plethora; Dr. Darwin to asthmatic cramp of the diaphragm; while other physicians, limiting their views to the cases which happened to come before themselves, and ignorant of, or neglecting the experience of others, have described almost every possible variety of cardiac disease as the cause of angina pectoris. Dr. Baillie, however, formed a more extended and rational opinion of the nature of angina. He indicates clearly the possibility of its being a functional disorder. "I have met with two cases," says Dr. Baillie, "in the course of my medical experience, in which symptoms exactly resembling those of angina pectoris depended upon an imperfect digestion; and the patients ultimately recovered, by correcting the dis-

ordered condition of the stomach." Dr. Wilson, also, after carefully reviewing the facts known respecting this singular and distressing malady, concludes, " that angina pectoris is a disease which may arise from a morbid sympathy with a primary cause, seated in the primæ viæ." This is a view with which I entirely concur. Angina has been found very often to coincide with ossification of the coronary artery ; with disease of the valves or aorta ; and with numerous other organic lesions of the heart. But it has been placed beyond all doubt, that the assemblage of symptoms to which we give the name of angina pectoris, may also exist without organic lesion of any kind whatever ; the paroxysms, in such cases, being traceable to some derangement of function in the respiratory or circulatory systems, and being induced by causes which operate on the primæ viæ specifically, and directly on the stomach ; or by gouty or rheumatic irritation not sufficiently advanced to show structural change in any tissue, or any vessel.

Angina pectoris, then, is sometimes a functional disorder, that is to say, a mere change of sensibility in the nerves of the heart ; and hence it appears to me more logical to conclude, that when

it does occur in conjunction with organic disease, the latter should be merely regarded as an occasional exciting cause of the nervous paroxysms. The same remark applies to, and illustrates other forms of neuralgia. The irritation of a decayed tooth, spiculæ of bone, tumours, &c., will irritate the facial nerves, and give rise to severe neuralgia; but these are not the sole causes, and the disease—so far as our actual knowledge goes—often presents itself as a simple derangement of function. From what I have just said, it will appear that I consider angina pectoris as a neuralgic disorder of the heart, excited by a variety of causes, or often superadded to organic disease of that organ. The painful sensations may, perhaps, sometimes be referred to spasm of the muscular fibres of the heart; but this has rather been inferred from analogy, than established by anything resembling proof. Sudden and violent contraction of the heart is not necessarily accompanied by pain, and the only disease in which convulsive spasm of the heart has been proved to exist, tetanus to wit, is never, to my knowledge, attended by angina. Yet the heart has been found by post-mortem examination twisted on itself, like the last coil of a cork-screw, in cases of tetanus. The

nature and variability of symptoms in angina pectoris also confirm the idea of its being of neuralgic origin; and this theory is further strengthened by the remarkable fact which Dr. Hope has mentioned, "that he has known malaria produce intermittent periodic neuralgia, not only in every extremity, but also in the heart."

If we admit angina pectoris among neuralgic disorders, we are compelled to place the seat of the malady in the sensory nerves of the heart; although M. Bouillaud places it in the intercostal and phrenic nerves, while other writers refer the painful sensations to the par vagum, or even the great sympathetic nerve.

The essential character of angina is an excruciating pain in the præcordial region coming on in paroxysms. The other symptoms of the disease are consequences of this violent paroxysmal pain; for according to the view I have taken of the nature of the malady, all those coexisting symptoms which depend on organic lesion of the heart should be excluded. Like other neuralgic disorders, the attack is often of a sudden kind, not easily traceable to any evident cause, and very variable both in duration and intensity. The pain of angina is seldom confined to the heart

alone, but extends to the præcordial region, shoulder, and left arm, even down to the fingers. Dr. Hope has seen cases in which the pain extended to all four extremities. It is often extremely acute and excruciating; and according to the well-known description of Laennec, "as if the front of the chest were torn by iron nails, or the claws of an animal."

The paroxysms of pain may continue for a few minutes only, or prevail from half an hour to an hour at a time, and once established, they have a great tendency to recur at uncertain intervals, being brought on by error of diet, mental emotions, exercise, by anything, in short, which may excite the heart, or produce congestion in that organ.

The paroxysms are almost always attended by more or less violent palpitation; and to this latter I would chiefly refer several of the symptoms described as appertaining to angina pectoris. Thus, immediately on the attack the patient feels a sense of constriction and suffocation in the chest; if walking, he is at once forced to stop or sit down from want of breath; the breathing becomes panting, and the orthopnœa, joined to the violence of the pain, induces a feeling as if death were im-

minent. The face may be cold and pale, with a tendency to syncope; or the contraction of the heart may drive the blood to the head with such force as to produce cerebral congestion, convulsions, and many other disorders of the nervous system. From the violence of the paroxysm sudden death may ensue, even in cases where the disease is not complicated with any organic lesion of the heart.

The diagnosis of confirmed angina is seldom attended with any great difficulty. The paroxysmal form of the attacks, and their severity, point out the nature of the disease with sufficient clearness. The main points to be determined are, whether or not the complaint is complicated with organic lesion; and, in the former case, to discover the species of lesion and its seat. On these points we obtain negative evidence by careful examination of the chest; when, if no sign of organic disease be discovered, we attribute the anginic paroxysms either to primary disorder of the cardiac nerves, or trace them to some affection of the spinal marrow, liver, stomach, &c., of which they are secondary or sympathetic consequences. The only cases in which any obscurity can exist are those already alluded to, where severe pain in

the cardiac region, with palpitation is produced by local congestion and by over distension, probably of the coronary vessels. Here, however, there may be some dulness on percussion ; but the pain is rather continual than paroxysmal, and does not often radiate towards other points of the nervous system, as in true angina pectoris.

CHAPTER XI.

DIAGNOSIS.

This I consider to be the most important, as it undoubtedly is the most difficult, part of my subject. It is easy enough correctly to observe the symptoms of disease. Modern science has likewise established with a great degree of certitude the treatment most appropriate for the various forms of disease, when their nature has been fully ascertained. But here lies the difficulty. Functional disorder of an organ may assume nearly all the appearances of organic disease ; yet it is of paramount importance to distinguish between the functional and structural derangements, because, although the symptoms may in both cases bear strong resemblance to each other, the principles of treatment are often diametrically opposed. To

affections of the heart this remark applies with peculiar force. It is true that organic disease of that organ, when completely developed, is usually attended with symptoms which leave no doubt as to the nature of the disease; but when the latter has made such considerable progress, the hope of cure is proportionately diminished. It is in the early stages alone, that a correct diagnosis can be of great advantage in a therapeutical point of view; and it is at this period, unfortunately, that we encounter the greatest difficulty from the circumstance that functional disturbance, and slight or incipient organic lesions of the heart present themselves to us with many characters which are common to both.

In forming our diagnosis of functional palpitation of the heart, the age of the patient is an important consideration. The nervous or sympathetic disorder usually attacks young and sanguine men, or anæmic females, between the ages of fifteen and twenty-five. Organic disease, on the other hand, is rarely seen until the prime of life is passed. Those diseases of the heart which do occur at an earlier period partake of one character. They begin as inflammation of the lining membrane of the heart or pericardium, and are con-

nected, perhaps, with arthritic or rheumatic pains, presenting from the first the usual symptoms of acute pericarditis, or endocarditis, which are not easily to be mistaken.

The duration of the complaint must also be taken into account; and often affords useful diagnostic characters. If the patient has been suffering for a considerable length of time under palpitation, and we are unable, after careful examination, to discover any physical signs of organic disease, we may be certain that the disordered action of the heart is of a functional nature.

The history of the complaint, the general symptoms which attend it, and the *order* in which these general symptoms have been developed, are points that cannot be too minutely studied, if we desire to discriminate functional from organic disease.

Sympathetic palpitation of the heart is often accompanied by general nervous symptoms, and occurs in nervous, irritable persons, who have previously experienced other nervous phenomena. They are occasional, not constant. Those of the purely nervous form are very irregular, and variable in their duration, characters which contrast strongly with the permanency of the increased impulse in many organic diseases of the heart.

Still we must not forget that the symptoms may remit in extensive organic disease.

During the intervals of attack, the action of the heart and the state of the pulse are natural; but here, likewise, I must observe, with Dr. Walshe, "that the force and rhythm of the heart occasionally return to the normal state in structural affections of that organ."

Functional palpitations have a disposition to supervene while the patient is at rest; whereas the paroxysms that accompany organic disease can usually be traced to some mental or bodily excitement, and are always relieved by perfect quietude. Indeed, sympathetic palpitations, as Dr. Hope well observes, are generally relieved by exercise of such a nature as would certainly disturb the action of a diseased heart.

The constitutional symptoms that accompany palpitation will suffice, in a great majority of cases, to indicate its true nature. Anæmia, as I have remarked, is a very frequent cause of sympathetic disturbance of the heart, and when we find the general and well known symptoms of this condition, combined with the jerking pulse, the soft bellows murmur, and the venous hum, we can have no hesitation in attributing the disorder

of the heart to a derangement of function. In like manner, when the palpitations have been preceded, and are accompanied by any considerable derangement of the digestive organs, we may reasonably conclude that they are sympathetic, because actual disease of the heart seldom produces much disturbance in the functions of the alimentary canal.

There are certain negative signs, also, which must not be overlooked as auxiliaries towards establishing a correct diagnosis.

The sensorial functions may be slightly deranged in cases of passive sympathetic palpitation, but we seldom or never observe any genuine signs of cerebral determination or congestion. The physical signs of organic disease of the heart are absent. This absence of physical signs, however, is not to be taken as absolute proof that the heart is perfectly free from organic disease. "The different signs," says Andral, "which auscultation furnishes, and which are regarded as distinguishing characters of organic disease, may be manifested when no such affection exists. On the other hand, it is equally certain that structural disease may have advanced to a very grave

extent, and yet it cannot be discovered by auscultation."

For my own part, I should be inclined to lay more stress, in incipient cases, on the presence or absence of general symptoms indicating disorder in the cerebro-spinal, respiratory, or digestive systems. As Dr. Wardrop justly observes, the absence of all symptoms of such derangements is strong presumptive evidence that the affection of the heart is primary and organic.

Of the local or physical signs connected with functional palpitation, the most prominent are changes in the impulse and sounds of the heart. Laennec attached much importance to the strength of the impulse. He remarks that it is seldom such as to elevate the head of the observer when the stethoscope is applied. It may at first appear strong; but a moment's careful observation will convince us, that in reality, it possesses very little actual increase of force. This observation applies correctly enough to many forms of palpitation; but I think it is not a diagnostic symptom of functional palpitation in general; since there can be no doubt that in the palpitation connected with plethora, the impulse is often con-

siderably more powerful than natural. Nor is it to be denied, that there are many examples of the *passive* disease, wherein the impulse of the heart, from the temporary influence of exciting or stimulating agents, mental or physical, may be actually and considerably increased in force. In such cases, however, it will generally be found that the radial, and other distal arteries do not participate in the augmentation of power. The pulse remains sharp and jerking; it is never full and strong; it keeps pace in velocity, but its force does not equal in a corresponding degree the pulsations of the central organ of the circulation. According to Dr. Walshe, the apex beat is not changed in site; dulness on percussion seldom exists, and when it does, is never prolonged upwards. Now, in active organic disease the pulse would be full and bounding; and on the cessation of the paroxysm of palpitation, there would be some indications, either local or general, leading to the detection or suspicion of the primary disorder; more especially in cases which have lasted for some length of time. Thus pain, more or less acute, in the præcordial region, extending perhaps to the left side of the neck, and along the course of the supra scapular nerve;

momentary dyspnœa, threatening instant suffocation; sudden suspension for a second or two of the action of the heart, or permanent derangement of its rhythm, impulse, or sounds; or the extent to which these latter may be perceptible by the stethoscope and percussion; asthmatic, or simple dyspnœa; blueness of the extremities; fulness of the facial integuments; sympathetic cerebral disorder; marked determination of blood to the encephalon, or symptoms of congestion in the brain; occasional fits of syncope; dropsical effusions, either into the cavities, or more generally into the cellular texture; loss of flesh; an anxious, contracted expression of countenance, to which Corvisart attached much importance; and the absence of all unnecessary apprehension of the final result; or, on the contrary, in the latter stages, a desire for death:—these symptoms are all, singly or conjointly, to be regarded as presumptive proofs, at least, that the paroxysms of palpitation owe their origin to some cause of more importance and permanency than simple nervous irritation; that, in fact, there exists some structural change in the large vessels proceeding directly from the heart, or in the heart itself. It must also be especially noted, that these symp-

toms are to be sought for during the intermission of the paroxysm of palpitation; whereas at this time, in the purely nervous disorder, the patient is free from all inconvenience or symptoms of disease, and can lie equally well on both sides of his back. Compression of the thoracic parietes, so as to diminish the cavity of the chest, does not particularly distress him. His spirits are good, and he appears to be in the enjoyment of health.

The contrary of all this prevails in palpitation connected with hypertrophic disease of the heart; and, moreover, such remedies as antispasmodics and stimulants, which ordinarily afford relief in the nervous affection, in the organic disease greatly aggravate the patient's sufferings.

The change which takes place in the sounds of the heart also requires some particular notice. Preternatural sounds accompany functional as well as organic palpitation; and it therefore becomes a matter of great importance to consider how far we may be able to distinguish the one form from the other. This is not so easy a matter as some writers would lead us to believe; and every physician who has enjoyed extensive opportunities of examining disorders of the heart must be aware that it often requires not only a

highly practised ear, but a profound knowledge of the varied phenomena of disease under different circumstances, to decide, with any degree of certainty, whether the physical sign which presents itself be the result of functional disorder or of organic change in the structure of the heart.

The practitioner who undertakes to pronounce on a difficult question of this kind must have a perfect knowledge of the various morbid sounds characteristic of organic disease; he must know under what circumstances they are produced; where they are to be sought for; with what special lesions of the heart they are connected; his ear must be trained by long practice to discriminate their different changes in tone, intensity, pitch, rhythm, &c., and even then he may find, that without the aid afforded by the general symptoms, the physical signs would still leave him in perplexity and doubt.

I have already observed, in a former part of this work, that the bellows murmur may accompany functional disorder of the heart under two circumstances,—first, when the quality of the blood is considerably deteriorated, as in ænemia, chlorosis, &c.; and, secondly, whenever purely

nervous palpitations become extremely violent. Let me now endeavour to point out such characters as may assist us in distinguishing this bellows sound from the abnormal murmurs of a diseased heart.

In the first place, it is always of a soft kind and low pitch. It occurs during the *systole* of the ventricles and at *both* orifices ; whereas two of the most common organic murmurs are confined to the left side of the heart, and are regurgitant ; that is to say, occur not *with* the current of the blood, but *against* it. The murmur of organic disease, when once fully developed, is always continuous; the murmur of nervous palpitation exists during excitement only : when the latter has ceased and the heart becomes still, the abnormal sound vanishes. Even in anæmia, where the cause of the bellows sound is permanent, we do not usually find it unless the thin blood is driven with considerable velocity through the orifices of the heart.

The bellows sound of anæmia, which is infinitely the most common of functional murmurs, is always accompanied by the venous hum.

An impediment may be offered to the free

transit of blood by temporary partial displacement of the heart;* from excessive repletion; awkward position; tumours in the chest; or dropsical effusions. Under all these circumstances, palpitation, complicated with bellows murmur, may present itself. This phenomenon, it is presumed, necessarily takes place, as a consequence of the slight regurgitation of blood which must immediately succeed any impediment opposed to its passage through the various cavities, or to its free exit from the heart; and being *regurgitant*, is distinguised from the *direct* murmur of functional disorder. Severe functional palpitation may also be attended by a species of friction sound, from the increased velocity with which the walls of the heart are propelled against the pericardium. It is necessary to distinguish this sound, when it does occur, from the "rubbing murmur" of pericarditis.

* A very remarkable and interesting case of this nature is recorded in the Edin. Med. and Surgical Journal, No. cviii., by Dr. Wm. Stokes, wherein the heart was dislocated into the right side of the chest, with *rupture of the pericardium and right pleura*, which the patient survived nine years!

From the above, we may draw the practical inferences, that, when morbid sounds arise from organic change established in the texture of the valves, they must be almost, if not wholly constant, though variable perhaps in regard to intensity; while, as the companions of nervous palpitations, they are relieved with their relief, and cease with their cessation. On this fact, we must mainly rely in estimating their importance, until some less equivocal sign of structural change declare itself; which, for the most part, under such circumstances, will be enlargement of the heart.

We have, finally, to consider the special diseases of the heart with which functional palpitation is most likely to be confounded. There are dilatation of the heart, with attenuation of its parietes, and endocarditis.

When palpitation presents itself as a symptom of enlarged heart, with thinning of the walls, the diagnosis is very obscure and difficult, especially in the early stages. This form of disease is particularly liable to occur in persons of an irritable, nervous habit; and the fits of palpitation are provoked by any over exertion or mental excitement. The movements characteristic of this state of pas-

sive enlargement of the heart are described by Dr. Hope as "feeble and oppressed, distressing, frequent, and prolonged in proportion to the extent of the malady." In general, he says, they are more protracted than in other diseases of this organ. The impulse, instead of being increased, as it is in most forms of functional palpitation, is diminished, and in extreme cases ceases to be felt altogether, even though the heart may seem to be beating violently. When the dilatation is great, the seat of the impulse is lower down than natural. Some dulness on percussion also accompanies the form now under consideration ; and the dulness, as well as the impulse, is seated lower down than usual. The sounds of the heart are louder, shorter, and clearer in passive dilatation than natural, and the first sound resembles the second one so much that it can scarcely be distinguished from it. The obstructed circulation, arising from debility of the heart in dilatation, is attended with secondary affections of a serious nature at a much earlier period than we are wont to observe in mere sympathetic palpitation. Thus the lungs become congested and respiration difficult ; there is cough, and sometimes hæmoptysis ; the blood stagnates throughout the venous

system ; the face gets livid ; and, as the disease advances, we have œdema of the lungs, violent accesses of dyspnœa, effusion of serum into the lower extremities, and serious disturbance of the functions of the brain, &c.

The symptoms which attend endocarditis in its early stage, and still more chronic endocarditis, unaccompanied by any serious organic disease, also bear a strong resemblance to those of sympathetic palpitation. The action of the heart is violent and abrupt ; the patient experiences much uneasiness about the præcordial region ; the pulse may present the jerking character of anæmia, and the first sound of the heart is attended by a bellows murmur ; the impulse of the heart is abrupt and violent, extending over a considerable portion of the chest, and there is some dulness on percussion whenever the disease is severe. Persons affected with this slight degree of endocarditis often become nervous and irritable ; mental emotions, active exercise, or any other exciting cause, will bring on fits of palpitation in them, and as they are comparatively free from any heart symptoms during the intervals, the true nature of the disease may be very easily mistaken.

In cases of this kind we must pay especial at-

tention to the history of the disease. On inquiry it will generally be found that the patient had at one time suffered under acute rheumatism or gout, and that the cardiac symptoms at the commencement were accompanied by inflammatory fever.

The bellows sound of endocarditis is generally confined to the left side of the heart; whereas the anæmic murmur is heard at both the aortic and pulmonary orifices; and there is no venous hum with the systemic murmur of the organic disease.

In the preceding remarks I have endeavoured to indicate the principal characters by which functional and organic palpitations of the heart may be distinguished from each other. There is, however, another class of affections of the heart, sometimes accompanied by palpitation, where it is exceedingly difficult, if not impossible, to form an accurate diagnosis with any certainty. Cases of this kind are referrible to diminished, not increased, action of the heart.

The following indications are insisted on by several modern writers of celebrity as diagnostic of functional and organic affections of the heart.

"1. Functional palpitation, not dependent on

anæmia, is distinguished from organic palpitation by the following circumstances :—

"The palpitation occurs only occasionally. It is not excited, but relieved by corporeal exercise of such a nature as would certainly disturb the action of a diseased heart. It has a disposition to supervene while the patient is at rest ; there is fluttering at the epigastrium. Nervous symptoms are generally prevalent, and whenever they are aggravated, the palpitation is increased. The heart and pulse are natural during the intervals of attack ; valvular and aortic murmurs are absent ; as also undue impulse ; there are no genuine signs of cerebral determination or congestion.

"In palpitation from anæmia the impulse is abrupt, the pulse jerking ; the arteries throb, and hence the palpitation is very audible to the patient. There is always a weak, soft, bellows murmur, with whiffing in the main arteries. There is, likewise, invariably, a venous murmur (hum) in the internal jugular veins, &c.

"The diagnosis of this bellows sound from valvular murmur rests on the following circumstances :—

"It is confined to the first sound and the aortic

orifice. It is always weak and of the same bellows kind. In the anæmic it is attended by a continuous venous murmur in the jugular, and very often by a short bellows whiff in the principal arteries. It exists in anæmia during temporary excitement only, subsiding whenever the palpitation ceases. It also ceases wholly when the anæmia is cured by iron," &c.—Dr. Hope.

"In functional palpitations, although the impulse is too extensively visible, the apex beat is natural in site.

"Habitually the area of dulness remains unaltered. Dulness is never prolonged upwards. Reduplication of the second sound at the base is common. In anæmic cases, basic systolic murmur always exists, and is accompanied by the continuous hum in the veins. The murmur is not permanently harsh, nor is the pitch high.

"It is scarcely conducted along the aorta, and is most audible at the second costal cartilage of the left side; never at the left apex."—Dr. Walshe.

"The extended dulness on percussion, the morbid or adventitious sounds, the more or less

constant dyspnœa, the bloated state of the countenance, the dropsical effusions, &c., sufficiently mark organic lesion of the heart, especially if they have been far advanced.

"The following circumstances also may be adduced as distinctly pointing to functional disorder.

"1. The general prevalence of nervous symptoms, and the recurrence of the attack from causes acting on the nervous system.

"2. Return of the affection when the patient is quiet, and the relief following gentle exercise in the open air, and the means used to improve the digestive functions, and restore the nervous energy.

"3. The prolonged and complete intermissions during an improved state of the general health, and the exacerbations consequent on whatever depresses or exhausts organic nervous power.

"4. The absence of physical signs characterizing inflammatory or structural diseases of the heart." —Dr. Copland.

"We judge that palpitations and irregularities are merely sympathetic consequences of gastric disorder when they occur occasionally only; when

the rhythm of the heart is perfect during the intervals, and when we fail to discover any other physical or general signs, that its texture, has undergone alterations."—Dr. Watson.

"When the impulse and sound increase together, there is probably no hypertrophy, but the heart is only acting more forcibly. When the impulse and sound decrease together, there is probably no atrophy, but the heart is only acting more feebly from pure defect of nervous energy.

"When the impulse of the heart is in excess, and, at the same time, its sounds are as loud and clear as ever, or louder and clearer still, and the whole præcordial region is quite resonant to percussion, save the small space which is naturally dull, there the signs of hypertrophy are incomplete ;—we have mock hypertrophy.

"Young persons at the prime of life are especially subjects of this violent impulse. They are often plethoric and sedentary. Again it occurs in dyspeptic and very sensitive persons."—Dr. Latham.

"There is no better evidence of there being a primary disease existing in the heart than the

absence of all symptoms of disease in the digestive, respiratory, and nervous systems. When the action of the heart is increased, and there is a corresponding increase in the pulse, the heart will probably be in a sound state; but if the action of the heart be increased, and there be no corresponding increase, but a diminution in the vigour of the pulse, then will there probably be some change in the heart's structure." — Dr. Wardrop.

"On percussion we do not discover any abnormal dulness, and this contrasts so strongly with the violent pulsations of the heart, that it is sufficient, in the majority of cases, to exclude the existence of organic disease.

"The duration of nervous palpitation also distinguishes it essentially from those having an organic origin. If a patient has laboured for several years under palpitation, and if we cannot discover, on percussion or auscultation, any physical signs of organic disease, we may conclude that the complaint is of a nervous kind.

"In forming a diagnosis, we must bear two points in mind :—

"1. The absence of any dulness in the præ-

cordial region, and of any considerable heaving up of the walls of the chest.

"2. The considerable exacerbations of the disorder and its greater or less intermittence. Continued nervous palpitation is excessively rare. Hypertrophy of the heart is the only disease with which we are likely to confound nervous palpitation."—M. VALLEIX.

"It is certain that we can, by means of percussion, auscultation, the sight and touch, measure the heart exactly; determine whether its valves work well or not; whether the orifices be free or contracted; the walls thickened or thinned, &c.

"Now, in palpitations not arising from organic disease, it is easy—especially during the intervals—to convince ourselves by careful examination, that the volume of the heart is not remarkably increased; that the blood flows freely through its cavities and orifices. On the other hand, the venous congestion, the purple tint of the face, the dropsical effusions of advanced organic disease, never occur in pure nervous palpitation.

"The cases most difficult to distinguish are those in which nervous palpitations are superadded

to the palpitations of organic origin." — M. Bouillard.

In conclusion, I will again allude to the diagnosis, between the various forms of nervous affection connected with disorders of the stomach and disease of the heart, and point out that the most important feature of diagnosis consists in the regular action of the heart and beat of the pulse, during the intervals between the paroxysms, and the relief afforded by medicines directed to the disordered state of the stomach ; also, that when the stomach is the cause, exercise will not, as it otherwise would, aggravate the symptoms ; which, on the contrary, occur more frequently after eating, and when the body is in repose.

I am aware, that in this outline of the nature, symptoms, usual complications, and diagnosis of nervous palpitation, I have not entered into very minute detail ; but the inquiry is of great interest and importance, and cannot yet have been fully dwelt upon, nor completely understood. I have endeavoured to bring into one view many scattered facts and opinions, and only corroborated or disagreed with such as my own experience warranted. I have attempted to be useful to my pro-

fessional brethren, in leading them to prominent and practical points; and humbly endeavoured to excite attention to a class of diseases, and the use of the stethoscope in their diagnosis, the value of which I have for many years recognized in my own experience and practice.

CHAPTER XII.

TREATMENT.

In the treatment of functional or sympathetic disorders of the heart, the practitioner must be chiefly guided by the nature of the primary affection with which the heart sympathises. To this his attention must in the first instance be directed; for it is manifest that no radical cure of the cardiac disorder can be effected, so long as the disturbance in other parts of the economy, on which it depends, is allowed to persist. The condition of the heart itself, must not, however, be lost sight of; and while we combat the primary disorder wherever it may be seated, we at the same time endeavour to relieve the secondary disturbances which have supervened in the functions of the heart. The distinctions I have endeavoured to establish in the pre-

ceding chapter of this work of the various conditions with which palpitation may be associated, as an effect, will be of use to the practitioner in his selection of that line of practice which is best suited to each form of the complaint. But in addition to these, he must likewise bear in mind the two different states of the constitution under which palpitation is liable to occur. This is a point of the highest importance.

I have already shown, that, as a general rule, to which however there are many exceptions, palpitation may present itself either as an active disorder connected with plethora, or as a passive affection, resulting from an opposite condition of the system. Our principles of practice, must, therefore, have a direct reference to these two distinct conditions of the economy whenever they exist; but we must not, at the same time, lose sight of the fact, that functional palpitation may be produced by congestion of the heart itself, giving rise to many active symptoms, though the general character of plethora may be entirely absent; while, on the other hand, several forms of the complaint, as those from indigestion, disease of the spinal chord, mental emotions, &c., may

become developed in individuals who present no decided appearances, either of a plethoric or an anæmic constitution.

The description which I have given of active or plethoro-nervous palpitation, shows that the patient is either constitutionally of a plethoric habit, or is rendered so by the more or less direct operation of adventitious causes. The heart may be over-stimulated by the quality, as well as the quantity of the blood circulating through its cavities. The patient may be either originally of a nervous and irritable temperament, or may have become so from circumstances. A combination of plethora with morbid irritability, is necessary to constitute this first variety of palpitation, and our remedial measures must, therefore, be addressed to the two principal elements of which the disorder is made up.

Among the causes promoting a disposition to plethora, may be enumerated, indolence, inactivity, indulgence whether mental or physical, luxurious habits, and full living. These, not only increase the quantity of the blood, but render its quality more stimulating, tending at the same time to generate an undue degree of irritability, and cherishing that condition of the nervous

system, which is most favourable to the development of undue action of the heart.

Similar results, though produced in an inverse manner, proceed from the suppression of the ordinary evacuations and secretions. By their retention and accumulation, the arterial system becomes oppressed and gorged; and the irritation they give rise to induces a state of excitability in the nervous system, highly favourable to the production of palpitation.

The cases now alluded to may be considered as examples of general or constitutional plethora; but a disordered action of the heart very often arises from congestion within its cavities, when the palpitations are to be regarded as an effect of local plethora. The principal causes of this state, as I have explained, are violent muscular efforts, mental emotions, atmospheric changes, &c. The influence of these causes may be exercised on individuals of different constitutions, and hence we may have congestive palpitation, combined with active symptoms, with signs of general debility, or occurring in persons who had previously enjoyed perfect health.

Blood-letting, either general or local, is the main agent on which we should rely in cases of

active palpitation ; while the distinction I have drawn between general and local plethora must be our guide in determining what form of abstraction of blood is best suited to the case.

General plethora will usually indicate the necessity of general bleeding from the arm, the quantity being, of course, determined by the particular circumstances of each case, and the operation repeated once or twice after an interval of a few weeks, if it seem necessary. After the abstraction of blood, active purgatives are to be administered, and these means, together with careful regulation of the diet, will, in most cases, suffice for the cure of all palpitations which depend on a plethoric state of the constitution.

Congestive palpitation, arising, as I have explained, from accumulation of blood in one or both sides of the heart, will also require bloodletting ; but here, as a general rule, the topical abstraction of blood, by means of leeches or cupping-glasses applied over the præcordial region, will be preferable to venesection. In severe cases, where we can evidently trace the disorder to violent muscular efforts, when the symptoms are urgent and the patient strong and of full habit, general bleeding may be required ; but care must

be taken never to push this so far as to induce syncope, or repeat it in a manner calculated to increase any tendency to irritability which may exist.

With reference to blood-letting in the treatment of palpitation, I must not omit to notice a point of considerable importance relative to the state of the pulse and which might seem to contra-indicate the use of the lancet. In cases of palpitation, whether arising from general or from cardiac plethora, the pulse at the wrist usually presents a degree of feebleness and want of fulness which might deceive the practitioner. These conditions depend on the circumstance that the left ventricle, being gorged with blood, is unable to expel that fluid with its accustomed force; and if attention were fixed exclusively on the state of the pulse, the case might readily be mistaken for one connected with debility. But, in proportion as the tension is removed by the abstraction of blood, and the heart relieved from the load which oppresses it, the pulse will gradually rise and acquire more strength and fulness; thus clearly indicating the cause of the modifications it presented.

The beneficial effects of purgatives, as a means

of unloading the heart by derivation of blood to the intestinal mucous surfaces, have been long established by experience. The choice of the particular purgative to be employed will depend on circumstances. When the congestive state of the heart appears to be connected with derangement of the biliary secretion, mercurial purgatives are indicated; if with accumulation of fæcal matter in the large intestines, aloetic purgatives or small doses of croton oil are to preferred; in plethoric palpitation depending on general fulness of the circulating system, free purgatives, with saline evacuants, is obviously indicated. Several other modifications in the treatment may become necessary, according as the disordered condition of the heart may be connected with derangements of the uterine, digestive, spinal systems, &c.; but these will be more conveniently noticed under their respective heads.

Next to purgatives the most effectual means we possess of diminishing the quantity of blood in the heart, and therefore relieving that state of fulness which gives rise to palpitation, are emetics and nauseating medicines. I have already explained in another part of this work the way in which the act of vomiting assists in unloading the

right side of the heart. Nature has often recourse to this act as a means of restoring the disturbed balance of the circulation ; and the physician may often imitate her example with the greatest benefit. Repeated vomiting, with small doses of ipecacuanha, is better suited to the indication of which I now speak than one evacuation of the stomach with a large dose ; for the nausea consequent on small doses contributes powerfully towards diminishing the vigour of the circulation, and at the same time acts in a beneficial manner on the skin.

Antimonials may likewise be employed with the latter objects, and will be found useful auxiliaries in cases where the abstraction of blood has not been followed by the relief which we expected from it.

I have endeavoured, in many parts of this work, to point out how various disorders may excite functional palpitation, either by sympathy, or by deranging the balance of the circulating fluid, and producing more or less congestion in the cavities of the heart. In cases of the latter description, the treatment must be modified according to the nature of the primary affection which has been the cause of disturbance of the cardiac

functions. Thus, I would remark as important in practice, that when palpitation depends on congestion arising from suppression of the catamenial discharge, the leeches, instead of being applied to the præcordial region, should be applied to the inside of the thighs or to the feet, and the cupping-glasses to the sacrum. The best time for having recourse to local abstraction of blood will be a day or two previous to the expected appearance of the catamenia.

For analogous reasons, congestive palpitation depending on suppression of an hæmorrhoidal flux is to be met by abstraction of blood from the hæmorrhoidal veins. But congestion of the heart is not always dependent on sthenic causes: it may arise, under circumstances of general debility, from the effect of depressing passions, &c., and in such cases the abstraction of blood would be highly improper. The heart becomes congested from want, not through excess, of vigour; and the indication is evidently to restore the balance of the circulation by augmenting, not by diminishing, the force of the central organ. Here gentle emetics, stimulants, and such means as are known to increase the power of the heart, must be had recourse to.

When such symptoms as depend on the congested state of the heart have been reduced to the necessary degree, any nervous irritability of the organ that may remain must be treated by sedatives and other means calculated to restore the tranquillity of the heart or nervous system in general. This second indication is not always so easily fulfilled as the former one. When the functions of the heart have been disordered by violent causes acting on young persons, in the prime of life, the irritability of the organ may continue for a great length of time in spite of the most judicious treatment, and then suddenly disappear without our being able to account for the unexpected change. Attention to the state of the digestive organs is a point of great importance in the treatment of those who have suffered from congestion of the heart, and the practitioner should be careful to avoid having recourse to "strengthening" medicines, as they are called, unless imperiously indicated; for these remedies often increase the morbid irritability of the heart instead of diminish it.

In passive palpitation (with the exception of such cases as depend on congestion) the depletory practice just recommended would be highly im-

proper ; it would increase the disorder. As this variety occurs in the hypochondriacal, hysterical, enfeebled, irritable, &c., it requires a corresponding plan of cure.

Our first care should be to ascertain the exciting cause, and, as a matter of course, remove that as speedily as possible. This is the more easy, as the affection seldom exists without some sufficient evident cause, to be traced, by accurate investigation, generally to errors in regimen, mental distress, or derangement of some corporeal function. The inquiry as to these causes should never be omitted ; and should we fail in detecting the agent most active in producing the evil, there can be no safer, or more effectual plan of treatment, than that which is based on temperance, regularity, and the improvement of any deranged function. The irritability of the nervous system being materially reduced by that which gives natural tone and strength to the body, it is imperative to enforce a steady plan of exercise, on foot, on horseback, or in a carriage, according to the condition of the patient, and his habits of life.

A reference to that part of the work in which the varieties of sympathetic palpitation are described, will show the principal disorders which

occasion it, and consequently the principal indications of constitutional treatment applicable to different cases. The treatment, in fact, must be modified according to the condition or disorder with which the heart sympathises; but these are often of a complex kind, and will require much discrimination on the part of the practitioner. It is impossible to enter into particulars which would necessarily embrace the treatment of most of the diseases incidental to the cerebro-spinal, digestive, or uterine systems; and I must therefore confine myself to a notice of the main practical points. The important one is to discover the particular disease or disorder under whose influence the action of the heart is sympathetically deranged; this done, the intelligent physician will have little difficulty in determining the best line of practice to be pursued.

The great majority of passive palpitations will be found, I believe, to be more or less connected with an anæmic condition of the system. The treatment of such a condition is now well understood. Iron, in its various forms, must be perseveringly administered for several weeks, until the state of the blood is improved; aleotic purgatives should be occasionally given; an invigorating diet

recommended; active exercise in the open air enjoined; in short, every means capable of restoring the general health must be had recourse to, and followed up with perseverance.

This mode of treatment will apply to many cases of palpitation connected with the uterine system; because derangements of the latter often give rise to an anæmic state of the blood. But the palpitation, symptomatic of uterine disorder, may manifest itself under other circumstances. It may be strictly sympathetic, that is to say, a purely nervous palpitation arising from sympathy with the uterus; or it may be congestive, the disorder of the uterus having disturbed the portal circulation and thrown the blood on the right side of the heart. Lastly, as Dr. Hamilton has observed, palpitation of a very troublesome nature may arise from the impression made on the system by mere imagination. These various states will necessarily modify the treatment of the disorder connected with them.

Menorrhagia, or profuse menstruation, is more likely, from its effects on the quality of the blood, to produce anæmic palpitation, and therefore furnishes an indication for the use of iron, &c.

Dysmenorrhœa, and suppressed menstruation,

act on the heart sometimes sympathetically, but more often by disturbance of the circulation; and the practitioner in such cases must be attentive not only to the cardiac congestion, but to the employment of such means as restore the uterine functions to a healthy state.

In such cases, after the use of leeches, &c., it is of the utmost importance to evacuate the bowels thoroughly with aloetic purgatives; to improve the various secretions of the liver, kidneys, skin, &c.; and, above all, to restore the natural evacuation from the uterus by emmenagogues. Of the latter, turpentine is perhaps the most efficient, as it not only acts on the uterine system specifically, but is, at the same time, a very useful purgative and antispasmodic. Next must be subdued any symptoms of a nervous character that remain, by a course of antispasmodic, sedative, and, if requisite, of tonic treatment. We must recommend a change of habits, lay down a plan of regimen and exercise, and strictly enjoin the avoidance of all such causes as appear to have been principally influential in producing the attack.

Dyspeptic palpitation is likewise of frequent occurrence, and here, as in the former variety,

the disordered action of the heart may arise from mere sympathy with the digestive organs; from loss of balance in the circulation; or from changes in the quality of the blood consequent on imperfect assimilation of the food. These different circumstances will exercise a corresponding change in the line of treatment to be pursued; and it is necessary to bear in mind that in many cases of dyspeptic palpitation the disorder of the heart may not assume any degree of severity until long after the offending cause has been ejected from the stomach or bowels. On the treatment of dyspepsia I cannot here enter, contenting myself merely, in reference to verminous palpitation, to notice the great efficacy of a remedy—kousso—which has been lately introduced for the cure of tænia.

The special treatment of palpitation, when connected with the gouty or rheumatic diathesis, must be founded entirely on the views which we may take of the nature of the primary affection on which the palpitation depends. Those who believe that the palpitations which precede in many instances a gouty paroxysm are connected with gouty inflammation of the heart, would, of course, adopt an antiphlogistic line of treatment;

while a different method is indicated if we attribute the disturbance to biliary disorder, or to changes in the quality of the blood. Much obscurity still exists on these points; but, as I have already observed, the safest practice will generally be, in all severe cases, to base our treatment on the theory of an inflammatory origin, or at least of active irritation.

The treatment of diminished action of the heart must also, in a great measure, partake of the obscurity which involves both the nature and causes of this morbid condition. I do not, of course, now allude to the faintness or syncope produced by excessive loss of blood, anæmia, depressing passions, &c.; but to cases in which the heart's action is so reduced as to render the pulse insensible, yet which are unattended by any symptom of organic disease, or preceded by any appreciable exciting cause. The nervous energy of the heart is here evidently depressed, by some influence, to an excessive degree, but the difficulty is to ascertain what that influence may be, or in what particular manner it operates. In the present state of our knowledge we are reduced to conjecture. The efforts at vomiting and the fits of dyspnœa, which often accompany the attacks,

would rationally lead to the conclusion that, in such cases at least, they depend on sudden congestion of the right ventricle, although the cause of the congestion may still remain obscure. In other cases it seems possible that the existence of organic disease, either in the heart itself or in some principal organ of the body, may have been overlooked; for it is difficult to consider the severe and even fatal cases of syncope alluded to, as mere idiopathic affections of the cardiac nerves. However this may be, the treatment must be palliative, as we are ignorant of the cause which produces the disease. The principal indication is to restore the energy of the heart which has been temporarily diminished, and the means of so doing are familiar to every practitioner.

Painful affections of the heart require a special mode of treatment, suited to the nature of the disease and to the general state of the system which may accompany it. When neuralgic pains occur in plethoric subjects, we must have recourse to local bleeding, purgatives, &c. In cases connected with hysteria, dyspepsia, anæmia, &c., attention is first to be directed to these disorders, after which the special remedies intended to relieve neuralgia may be employed.

These latter are either general or local, and will vary according to the views we may form of neuralgia; for there is hardly any disease on the special treatment of which practitioners entertain so many various opinions. As local applications, flying blisters, or the belladonna plaster, have been recommended, and Laennec placed the greatest faith in the use of the magnet. In anæmic neuralgia preparations of iron are obviously indicated; where the remissions are well marked or periodical, quinine or arsenic may be advantageously employed. Should we suspect a rheumatic or gouty diathesis, the treatment will, of course, be modified.

Angina pectoris, when uncomplicated with organic disease of the heart, is to be treated on the same principles as other neuralgic affections of that organ; but, as the disease is more severe, the treatment must be proportionately active. If any signs of plethora exist, and the patient be of strong habit, from six to ten ounces of blood should be extracted from the arm; while local bleeding must be had recourse to in such cases as will not admit of venesection. This is to be followed up by free evacuation of the bowels and by low diet. If the paroxysms be at

all severe, or recur at short intervals, sedative and antispasmodic remedies become indispensable. Prussic acid, or the acetate of morphia, with compound sulphuric æther or asafœtida mixture, are those which will be found most generally useful in allaying the neuralgic pain, and diminishing the duration of the fit. In many other cases of neuralgic angina, especially those connected with anæmia, disorder of the uterine function and nervous irritability, the careful administration of the compound iron mixture, alternating with aloetic purgatives, has been attended with beneficial results.

It is hardly necessary to mention that every occasional cause of the paroxysms should be avoided, and that during their intervals, every effort must be made to improve the tone of the constitution.

The treatment of functional palpitation comprises, as I have said, two chief parts ; the one is the treatment of the primary disorder with which the heart sympathises ; the second is the more direct treatment of the heart itself, our object being to allay the irritability of the organ, and diminish its tendency to be affected by disturbance or disease in distant parts of the body.

Some further remarks are required on the remedial means best calculated to fulfil this second indication.

The maxim, "ablatâ causâ tollitur effectus," does not always hold good in therapeutics. A severe mental shock, an indigestible meal, a powerful exertion will often give rise to palpitation which continues for a long period after the exciting cause has disappeared, and may require for its relief the utmost skill of the physician and all the resources of his art.

The chief points at which we aim for the fulfilment of the second indication now spoken of, are to render the general system less impressionable, and to diminish or remove the morbid irritability of the heart, which is, in fact, the proximate cause of all functional palpitations.

A great variety of medicines has been employed for the purpose of subduing inordinate action of the heart and mitigating its irritability. The principal are opium, prussic acid, belladonna, hyoscyamus, digitalis, camphor, musk, asafœtida, valerian, and æther. Each of these remedies may be used with advantage in certain cases, according as it may be requisite to call into action the special properties of the therapeutic agent.

To allay the irritable condition of the heart, which sometimes persists after depletion, &c., in cases of active palpitation, there is no remedy superior to opium; and the liquor opii sedativus appears to be the best form under which that powerful agent can be administered. Camphor, likewise, possesses remarkable power in tranquillizing inordinate action of the heart. It may be substituted for opium in some cases of cardiac irritability after depletion, and is an excellent sedative for nervous palpitation where a slightly stimulant action on the stomach is thought at the same time necessary. Digitalis is, perhaps, the most efficient remedy we possess for controlling inordinate action of the heart; and if its employment be steadily persevered in, it seldom fails to reduce the frequency of the heart's pulsations even below the normal standard. We must, however, be always cautious in its use; for it diminishes nervous energy in a very remarkable degree, and does not, therefore, seem suited for cases of palpitation which are attended with any degree of debility. Whenever the pulse becomes influenced by its use, the administration of this remedy should be suspended for a time, and resumed again on the cessation of its specific effects.

Prussic acid is a powerful sedative, the beneficial action of which may be employed with great success in the treatment of palpitation. I have administered this remedy freely and with the best results, more especially in those cases of palpitation attendant upon uterine excitement, and accompanying disorder in the action of the uterus. I have sometimes felt assured that the prussic acid acted beneficially on the uterus, in the first instance, and subsequently on the sympathetic disorder of the heart ; whether this were the case or not, certain it is, that in such cases the remedy has been attended with great success. I find Dr. Elliotson has tried its sedative powers in cases of palpitation, and laid down some useful rules for its employment. The cases are those complicated with dyspepsia and vomiting. "If," says he, "you give antacids in these cases, you merely remove the effect, while the cause remains ; but if you give prussic acid, you relieve the morbid irritability of the stomach, which is the general cause of the disease. You cannot control palpitation by prussic acid, when it is dependent on any affection of the heart itself; but when it arises from an irritable state of the stomach, it will very often, along with the affec-

tion of this viscus, yield to its sedative influence." I have already mentioned, that my own experience bears out this practical remark, and, furthermore, extends it to uterine disorders, producing or accompanying palpitation.

But even when he has removed the primary disorder on which functional disturbance of the heart depends, and allayed the irritability of the organ by narcotic, sedative, or antispasmodic remedies, the practitioner has still an important indication to fulfil. The irritability of the heart is often part and parcel of a general condition of the nervous system which must be corrected; and to remove this condition by moral as well as physical treatment, and to render the patient's system less impressionable, must the attention of the practitioner be finally directed.

It is unnecessary for me to enumerate at any length the numerous and well-known means at our command for improvement of the general health, and for giving increased tone to the nervous system. I shall briefly allude to a few.

The use of the shower-bath I consider of great importance, tepid at first, and gradually made cold, and to be used daily, or every other day; also country air and sea bathing, when they can

be procured. When our patients are of the more elevated ranks of life, and accustomed to habits of idleness by day, crowded rooms, heated atmosphere, and late hours, not unaccompanied by excitement at night—these, by weakening the frame, render it irritable, and induce severe attacks of palpitation, which come on suddenly, run through their paroxysm and depart, leaving the patient in greater distress than attended the commencement of the attack; in these cases we have no chance to be of service, unless we at once curtail or forbid such enjoyments, and change the scene and the pursuits. For such patients, I prefer the waters of Leamington, Tunbridge Wells, or Cheltenham, as preparatory to sea bathing. These may be further assisted by a course of vegetable and mineral tonics, especially steel, diffusible stimuli, and antispasmodic and sedative remedies. I have found the use of the ioduret of iron, in doses of two grains, twice or thrice daily, and five grains of the extract of cicuta, night and morning, of incalculable service.

But there are very many instances wherein this complaint is extremely unmanageable, and where it is a great object to be able to say that it *is* nervous palpitation, and unaccompanied by

danger. In the truly idiopathic form of the disorder (if such a form can exist), i. e. when we can detect no exciting cause, or disordered function, the remedies most effectual are such as would be found to afford the greatest success in the treatment of such disordered actions as are referrible to the class of sympathies which operate through the medium of the organs of sense—such as make new impressions on these organs, and thereby diminish the effect of sensations already existing; or else such as blunt the sensibility in general.

It is, perhaps, to the former of these principles, that we are to refer the beneficial influence of change of air, warm and cold bathing, scenery, and society; the effects of exhilarating emotions or passions, and the influence of stimulant and tonic medicines. Besides, many forms of palpitation have their origin in moral causes, and to moral impressions we are then mainly to look for a cure.

The emotions most usefully called into activity, are such as do not cause violent agitation, and act permanently; for instance, the emotion of enjoyment, induced by any employment which interests and occupies the mind; the emotion re-

sulting from kindly and grateful feelings exercised in doing good; the sentiment and practice of benevolence and charity; the pleasure of making others happy and prosperous; the due exercise of morality and virtue, and the composing satisfaction of an approving conscience. If to these be added, attention to the precepts and practice inculcated by our holy religion, a calm will come over the most troubled spirit, which, strongly contrasted with the previous state of mind, will have a decided effect on the circulation, will be observed throughout the capillary system, and rapidly tend to the removal of nervous palpitation.

It is in cases of passive palpitation that the mental, perhaps, even more than the corporeal, treatment is deserving of great attention. Such of the emotions as have been enumerated, cause a slight but permanent glow on the countenance, and impart brilliancy to the eye; they, in some degree, elevate the temperature of the surface, augment the insensible perspiration, and promote the secretions, increasing the power of digestion, securing the regular evacuation of the bowels, and thus assisting nutrition.

In conclusion, when prescribing a system of

aperient and tonic treatment, conjoined with change of habits, of air, and of scenery, in order to remove the general debility which so constantly accompanies or gives rise to the passive palpitation, let us never forget to urge a moderate and sustained intermixture of such exhilarating emotions as I have briefly dwelt upon; and our patients, instead of looking upon their state as hopeless, and themselves as miserable, will have increased confidence and enjoyment; and ultimately be thankful for the infliction of that passive palpitation, which caused so healthful an alteration in their habits, feelings, and constitution.

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